

Empowerment of Women through Water Use Security, Land Use Security and Knowledge Generation for Improved Household Food Security and Sustainable Livelihoods in Selected Areas of the Eastern Cape

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by

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Abstract

High levels of poverty and deep inequality remain major challenges in South Africa. In the higher-density rural areas of the country opportunities for wage labour employment are low, and while rainfed agriculture contributes only some 10% to household survival, it remains the third-most important means of livelihoods, after remittances and Government grants. Given the political and human rights challenges of hunger and unemployment there is urgency to provide practical, cost-effective support to smallholders that can be implemented at scale. Two dominant agricultural trajectories are commonly envisaged. One aims for increased sophistication, modernisation and integration of (larger-scale) smallholders into the mainstream commercial sector, driving a business farming agenda. The other targets (smaller-scale) smallholders en masse to intensify food production on arable plots within their homesteads. While diversity of farming interests and styles is widely acknowledged, these two pathways of agricultural development are often posed as oppositional stances. This research set out to quantify the different land, water, infrastructure and knowledge resources at the disposal of rural people in three villages in the Eastern Cape, and documented their agricultural aspirations and challenges. It was found that 30% and 55% of people practised farming in fields and homestead gardens respectively, in the research period. Yet, their water and land resources are substantially underutilised. Their aspirations are diverse and are tied to distinct farming practices situated on different parcels of land at their disposal. Two of these lie within the homestead (in isiXhosa these are the very intensive, irrigated 'isitiya', and the more extensively farmed 'igadhi'), and the third is linked to farming on more distant fields – a practice which is in inexorable and well-documented retreat, highlighting land-exchange limitations and declining field-farming profitability, amongst other challenges. A set of eight intervention strategies was formulated to facilitate multiple parallel avenues of smallholder development, coordinated through a participative watershed development approach and underpinned by reflexive knowledge-networking systems. When implemented together these are expected to initiate yet-untapped synergies and exploit the full diversity of smallholder opportunities at any location. Based on diverse aspirations and skills and on the existing land and water resources, these strategies would enable women's agricultural and institutional empowerment to achieve increased food production.

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Executive Summary

1 Motivation and Approach

1.1 The rural and agricultural development context

High levels of poverty and deep inequality remain major challenges in post-apartheid South Africa, affecting rural black African people the most severely. In rural areas, opportunities for wage labour employment are low and rain-fed agriculture is the third-most important means of livelihoods, after remittances and wage labour from low-skilled jobs. Agriculture thus makes an important contribution to food security at a household level, particularly for the poorest households. It is well-established that a poorly-functioning rural economy with undeveloped infrastructure, weak market linkages and poor agricultural support services isolates rural households from the mainstream economy and critically important agricultural value-chains, with weak and conflicted land institutions adding uncertainty and limiting transactional opportunities. In addition, small-scale farmers in rural areas have limited access to human capitals such as knowledge and skills, and natural capitals such as land and water. Despite these systemic challenges, current policies and strategies for national development, agriculture, and water focus on the need for a stronger, more vibrant smallholder agriculture sector, with ambitious goals for intensive crop production activity.

1.2 Research aim

The research focused on smallholders in three rural areas of the Eastern Cape and set out to *“...ensure a comprehensive understanding of the constraints, challenges, opportunities and interventions required for empowerment of women to promote household food security and rural livelihoods through increased water productivity, with the focus on crop cultivation in, amongst others, the Eastern Cape Province.”* Specific themes addressed in this research project include: water-use in farming; existing knowledge and skills gaps; gender roles, responsibilities and dynamics; institutional arrangements around land and water; the impact of water allocation reform policies; and farming constraints and aspirations. The research concludes with recommendations for policies and strategies to achieve people-centred water use, food production, and rural development, with a particular focus on the empowerment of women.

1.3 Smallholders and smallholdings in South Africa

In South Africa the term *smallholder* refers to producers who are black Africans and who farm on smallholdings; the term is used inclusively to incorporate farmers growing in home-food gardens (200 000 ha nationally), irrigation farmers (100 000 ha), and people farming in rainfed fields outside of the homestead (2 000 000 ha nationally). The term *smallholder* by name recognises the characteristic of small(er) farm size, and is typified by partially-developed links with the larger economic system. This distinguishes smallholders from large-scale commercial enterprises, which have access to fully-formed external markets. Factors that describe smallholders and allow differentiation from the commercial sector include scale, purpose of farming, contribution of agriculture to incomes, use of family labour, mechanisation, capital intensity, and financing ability. About 3.7 million people consider themselves subsistence-oriented smallholders, and a further

200 000 to 300 000 are commercially-oriented, although categorization and data is far from definitive. Women make up 60% of all black Africans involved in farming and outnumber men by 165% in the category of 'farming as an extra source of food'.

1.4 Research approach

A case study approach was adopted and both quantitative and qualitative methods were used. Three rural villages were selected as study sites, with the main unit of analysis being the household as a social and physical entity. Phase 1 entailed the site selection of three villages (one in each of three District Municipalities in the Eastern Cape), selected purposively based on qualitative criteria. The selected villages were Lutengele (OR Tambo District), Sirhosheni (Amathole District), and Mbekweni (Chris Hani District). In Phase 2, quantitative village surveys were conducted with 164 households (a sample size of 18%) to describe the socio-economic context, including demographic data, poverty indicators, education, farming practices, and livelihoods assets and resources. The results provided socio-economic insights and informed the selection of case study households to participate in subsequent, detailed exploratory research. Phase 3 involved in-depth engagement with 30 households which had some cropping activity in the previous year, a priority criteria for selection given the central focus on crop-farming aspirations. Half of these were female-headed households. Data was collected over two years using mixed methods, and it was expected that when combined with the representative survey data, the results would reflect the diversity between the villages and provide a basis for wider inferences in relation to the project-specific themes.

2 Findings

2.1 Socio-economic overview

The socio-economic scoping survey confirmed what is widely known to be the case in densely settled rural areas of South Africa occupied mainly by black South Africans, although the situation at the study sites is worse than average, even for the Eastern Cape, which is the second-poorest province in the country. In socio-economic terms the sites are characterised by substantial material poverty, with more than 80% of the people in all three villages living below the Lower Bound Poverty Line, which in 2012 was calculated at R 468 per person per month. There is high unemployment (between 72-78% are unemployed or work in the informal sector) and a high incidence of social grants (63-89%). Food insecurity and hunger are prevalent, with 70-94% having had insufficient food in the previous year, and 17-30% having had no food at all for one or more days in the month prior to the survey. Asset ownership is low, reflected, for example, by latrine ownership, with 10-25% of the respondents having to defecate in the veld. Despite this situation of dire material poverty the research team observed a sense of resilience amongst people, enthusiasm, energy and humour, a willingness to participate in the research, and curiosity as to where it might lead.

2.2 Roles and Responsibilities of women

The socio-economic survey showed that on average 61% of the households are female-headed though quite different between the villages (52-78%). **Culture and tradition still dominate** over more contemporary views and the intra-household domain is a variously contested space where male family members strongly influence decision-making.

Decisions are made at two levels: strategic (e.g. major investments) and operational (e.g. day-to-day decisions and most agricultural decisions). Male household heads make the strategic decisions although they generally consult with their families, whereas most operational decisions are typically made by women. The practice of *lobola* is widely supported by young women, their mothers, and female elders, yet this arrangement also denotes a *contract of ownership* entailing submission; it is within this context that agricultural decision-making takes place. Middle-aged and elder married women and widows have more decision-making autonomy than young single women, *makotis* (newly married) and divorcees, who must often acquiesce to male in-laws. Female-headed households have advantages in that they are an enabling space for women; but while single women and widows have the most control over their household and livelihood decisions, they also face distinct disadvantages. These include reduced access to resources, a lower uptake of technologies, a reproductive overload, and increased financial vulnerability.

Women bear the triple burden of reproductive work, productive work and community roles, and have limited time available to expand their agricultural interests. Time-saving interventions, particularly water storage in the homestead, were found to have an empowering effect by making time and energy available for other more enjoyable or productive activities.

Assets which are under a woman's control due to her domestic responsibilities (e.g. water-tanks, tools, fencing and sheds) have the positive effect of increasing her bargaining power within the homestead. **Time saved collecting water or performing agricultural tasks has a catalytic impact on women's lives and presents an important development opportunity.** Program planners intending to facilitate women's agency to increase food production need to focus on empowering asset investments, in this case mainly agricultural water storage and/or infrastructure. In addition, it was found **that gender roles are dynamic and are continually being redefined** as democratization, globalization, migrancy, and urbanization impact on rural lives and livelihoods. These ongoing changes can be shaped by interventions that include role-awareness campaigns, although only medium- to long-term outcomes should be anticipated in relation to cultural and role changes.

2.3 Land use and cropping

Across the three sites most respondents spoke of different farming spaces, each with distinctly different crop-choices, levels of cropping intensity and water-use practices. In isiXhosa these spaces are differentiated by the terms *isitiya*, *igadhi* and *intsimi*. There are two spaces which fall within the boundary of the *umzi*, which refers to the homestead (including its dwellings, kraals and outbuildings), which is the foundation of the family identity and is sacrosanct regarding family rights generally. These are the *isitiya* (100-1000 m²), which is an intensive vegetable garden that is always watered; and the *igadhi* (0.1-2 ha), which is more extensively farmed and typically rainfed but sometimes irrigated. Tenure of these spaces is never contested and is a family right. The third space, the *intsimi* or *amasimi* (fields), is located away from the homestead boundary itself. The differentiation between these spaces was important when discussing and understanding household land assets and related crop production activities and framed the research process and recommendations. At the same time, it is important to recognise that while these names are widely used and similarly understood, they cannot be applied rigidly to all situations.

The results show that 87% of the 164 respondents have access to an *isitiya*, 51% to an *igadhi*, and 69% to an *intsimi* (distant field). Out of these households with access to arable land, 63% had cropped within their homestead and 44% had planted in their fields during the 2012-2013 season.

Cropping intensity refers to the total area cropped in one year, divided by the arable area available (e.g. 150% = 1½ crops per year). Data obtained from the 30 case study households showed high cropping intensity in the *isitiya* (173%, with an average size of 680 m²), moderate cropping intensity in the larger *igadhi* (90%, with an average size of 0.38 hectare), and low cropping intensity in the fields (47%, with an average size of 1.32 hectare). When incidence of use is combined with cropping intensity this shows **very low utilisation of the land resource in the fields**.

A wide range of irrigated vegetables is grown in the *isitiya*, which typically contains a healthy mix of crops and thus has positive implications for nutritional security. Preferred crops are cabbage, spinach, carrots, butternut, onions, potatoes, peas, beans and herbs. In the *igadhi*, nearly everyone plants maize and approximately half intercrop with pumpkins and/or beans. A few people grow potatoes and spinach. The summer crops grown in the *intsimi* are similar to those in the *igadhi* – all fields are cropped with maize, although intercropping with pumpkins and beans is not prevalent. Approximately 15% of the fields in Mbekweni that were partially irrigated under an old and failing system were put under oats in winter but were otherwise left fallow.

While these results are not statistically representative due to the relatively small sample size they were corroborated by field observations and in-depth enquiries made over the study duration, and concur with a wide body of literature regarding size, incidence of use and intensity (Andrew & Fox, 2003; Hebinck & Monde, 2007; Walker, 2011; Fay, 2013; Stimie et. al, 2010; Van Averbeké et al., 2008). The findings tell a story of **withdrawal from field production** and a much **higher utilisation of land in the *igadhi* and particularly in the smaller *isitiya***.

2.4 Land institutions and tenure

The perception of **land as a family entitlement** as opposed to an individual one was shared by all, and while the arable portions within the *umzi* are exclusively a family space, many people are open to crop-sharing or leasing their fields. It was found that contrary to generalised narratives in the literature, **institutional impediments have limited gender bias**, with no evidence indicating that land administration institutions constrain women's aspirations to use productive land. There are both policies and acts of law that not only encourage women to use land, but encourage local leadership structures to give land to women as a constitutional imperative. Specific caution was taken to try to identify underlying gendered power contestations impeding women's aspirations, but none of the female participants aspired to having more land, and all of them stated that having land registered in their names would not make a difference to them. However, in different contexts (e.g. where productive returns from fields are high), issues around contestation and access might well be found to exist.

Property rights in relation to fields are uncertain due to the significant misalignment between policy and practice by the State, as well as the various local evolutions of traditional institutions and practices that have arisen. The continued extension of old-order rights through 1996 Interim

Protection of Informal Land Rights Act has both weakened and rendered uncertain the tenure security of landholders. However, this uncertainty relates not to their individual rights of use, but to the consequences of leasing out land or conducting other land-related transactions. The main fear is that there is no guarantee that lessees will return land once a verbal or written agreement expires because there is no institutional order that provides certainty in the land-exchange market. **The deficient land institutions de-incentivise exchange and investment.**

2.5 Water resource availability and use

The water assessment was conducted using a Multiple Use Services Framework and covered the wider resources shared by the whole village, as well as homestead use of each case study household. The results showed that **village water resources are markedly underutilised**. Total use of available mean annual runoff within the wider resource boundaries of the villages was estimated at less than 3% across the three villages. At Lutengele, the adjacent Umzimvubu River is fractionally used, and at Mbekweni, the bulk water supplied by gravity pressure from the Bushmanskrantz Dam to the irrigation lands has a low utilisation for cropping (15%) due to wider agricultural challenges. Both of these major water bodies are, in volumetric terms, practically unused by local residents.

The **median water use is 18 L/person per day**, and 2786 L/household per month (and this includes water for livestock and crop watering). This is less than half of the Free Basic Water provision requirement of 6000 L/month per household. Of the individuals surveyed (n=180 persons), 71% are using less than government targets of 25 L per day, and **38% are using less than 12 L per day** (including water for livestock and crop watering), showing a situation of serious water deprivation.

Per household, the average amount of water used for crop production is 3224 L/month, equalling 51% of monthly household water consumption. The average for domestic use is 2513 L (40%), and the average for animal watering is 578 L (9%). The overall average water use for productive purposes (i.e. for crops and animals) is thus 3802 L/household per month, equalling 60% of the total amount used per household. **Water for productive use thus dominates household water-consumption patterns.**

Additional water must sometimes be purchased (e.g. for building purposes, for celebrations or to save seedlings in the *isitiya* from dying) at an **extremely high cost**, most frequently at Lutengele but also at Mbekweni. In both locations the price of this water is extreme, costing between R 500 and R 2000 per kilolitre, even though water is purchased in smaller quantities, typically 10-300 litres. This means that when no other options are available, **people are willing to, and do pay 50 to 200 times the typical tariff of treated municipal water** in South Africa, and ironically this cost is incurred by some of the poorest people in the country.

People with Multiple Use Services (MUS) water infrastructure use significantly more water for crop production than those without, resulting in a high local disparity of water use. The segmented use (domestic, animal, crops) shows the reality of Multiple Use Services (MUS) in practice, even though the systems used are not those originally designed for MUS but are ones which have been augmented or modified by locals. These people use orders of magnitude more water than the median users (median = 18 L/person per day, upper quartile = 127 L/person per day). A MUS

approach to water supply infrastructure investment, particularly the provision of raw water to homesteads (as modified locally in Mbekweni through the use of hosepipes), and rainwater harvesting storage through roof and surface water runoff collection (at Lutengele), is strongly associated with increased crop and animal production benefits.

Water is just one of the constraints limiting agriculture, as is well-established in agricultural systems literature. In Mbekweni, for example, an irrigation supply was available to the arable fields at no direct cost to farmers up until late-2014, when this supply was cut off by the DWS. However, it was estimated that only 15% of the water available for irrigation was used, and this was linked to additional constraints such as a lack of fencing, financing, ploughing services and profitability. However, these constraints were overcome by the same people within their *isitiya*, as evidenced by their high cropping intensities (190% average). In Lutengele, unused high-value irrigable land right alongside the Umzimvubu River contrasts sharply with high cropping intensities within the *isitiya* (220% average). Both of these situations lend strong support to the idea that **water investments in homesteads with an interest in agriculture will result in increased food production within the umzi.**

2.6 Impact of Water Allocation Reform on women in the project

Pilot WAR initiatives have had a significantly positive impact on two of the villages, but were never rolled out after piloting. The **Resource Poor Farmers Subsidy** funded a water harvesting and food production initiative at Lutengele in 2008-09. The sustainability of this intervention was documented, with vibrant water harvesting and home-food production systems in place and powerful narratives of benefits to women and their families. However, no cost-benefit or yield assessments have been conducted and are needed to provide additional quantitative evidence beyond the **convincing qualitative observations of successful impact.**

Mbekweni Village and twelve other villages lies within the area of operation of the Hewu Dalubuzwe Water User Association (WUA), the representatives of which comprised both men and women with primary interests in increasing their benefits from water through agricultural water investments to grow food, generate cash income and improve stock-water supplies. In 2011/12 a DWA Support Programme was implemented to help the WUA develop a business plan. Coherent and strategic sub-catchment agricultural water development plans were developed through an intensive participative process over one year, with the primary intention of increasing water for smallholder productive use through agricultural water investments. However, the 2013 DWA Policy Review Positions created policy uncertainty around WUAs which remains unresolved to this day, and this has impacted negatively on the support process, resulting in a loss of momentum and interest. This case highlights an unfortunate and unintended outcome of the proposed policy review and de-establishment of WUAs and a **lack of appreciation of the potential for 'smallholder' WUAs to drive the WAR agenda.** It is politically tragic that a proposed policy shift to better-achieve equity and water redress for HDI South Africans was cause for halting progress on the agricultural and water plans of a WUA that comprised only HDI smallholders and that was already empowered and mobilised to achieve to very transformation the policy shift intended. Despite this failure, however, it is clear that **DWA support to smallholder WUAs provides a sound platform for intervention at scale.**

2.7 Agricultural Skills

The socio-economic survey showed that 86% of the households have an ongoing or future interest in agriculture, and that 63% of households with access to home-gardens (*isitiya/igadhi*) and 44% with access to fields had cropped in the previous year. The results on agricultural skills pertain to this subgroup and show that many respondents rate their knowledge as **competent in basic skills** such as determining seed depth (63%), and plant spacings (93%). Respondents also have knowledge about when and how to irrigate (mainly hand-watering). The **knowledge and skills which are lacking relate to many of the technical aspects of farming**: water-storage; operating small-farm equipment, pumps, and tractors; financial management; knowledge of marketing contracts and pricing; and determining produce costs in different seasons. Most respondents want more hands-on and practical learning-training, and communicated a **strong preference for informal, locally-based knowledge-exchange systems**, rather than external courses. Learning through media such as DVDs is thought to be particularly useful, whereas books, manuals, pamphlets and workshops are considered much less helpful.

2.8 Farming typologies and related aspirations

A set of farming typologies was developed based on in-depth engagement with the 30 participant households and informed by the location and scale of food production activities (i.e. the *isitiya*, *igadhi* or *intsimi*); the purpose of production; reliance on family labour; type of mechanisation; and external dependency (which considers the risks in relation to loose and tight value chains, reflecting market integration and farmer exposure to external uncertainties). Each of these typologies requires a different set of strategic responses.

Crop production aspirations are reflected by farming preferences and are thus associated with a chosen typology (Table 1). These reflect the aspirations of the 30% of the total population who are active in fields, and the 55% of the total population who are active in the *isitiya* and/or *igadhi*, given that the basis for case-study household selection was that they have some agricultural interest.

It was found that all of the case study households have a strong intention in deriving benefit from their agricultural land in the future, although individual aspirations vary. A total of **23 out of 30 want to be directly involved in agriculture**, with **seven wanting to lease out their land or engage in farming partnerships of some sort**.

Seventeen of the 30 respondents aspire to Typology B, having primary aspirations that are modest in scale but of high importance for households. This food production takes place in the *isitiya* and *ighadi*, both of which are within the boundary of the *umzi*. Four respondents aspire to Typology C, aiming to produce crops for their own food supply as well as for cash-sale. Only two are interested in Typology D, aspiring to be Business Farmers, whereas seven aspire to Typology E (Equity-Labourer). The latter are people who recognise the economic value of their fields but don't want to farm themselves, for various reasons including age, life-interest focussed elsewhere, or only being resident in the village part-time. This typology only applies to the more distant fields, as no-one would consider leasing their *isitiya* or *igadhi* as these lie within the boundary of their *umzi*.

Table 1: Farming typologies and characteristics informing the intervention responses

Farmer Typology	Key characteristics: Purpose / labour / risk appetite / external dependence	Scale and location	Typical Crop mix	Farming Aspirations n=30
A: Food Grower (low productivity)	People who grow <u>primarily for home consumption</u> (and social exchange) but with low productivity and minimal surplus for cash sale. Low-investment low-risk farming approaches.	< 200 m ² <i>isitiya and igadhi</i>	vegetables greens maize pumpkins beans tree crops	0 people
B: Food Grower (high productivity)	People who grow <u>primarily for home consumption</u> , with high productivity and sale of surplus. Low external dependency. Typically hand-watered.	0.2-1 ha <i>isitiya and igadhi</i>		17 people Female=13 Youth=3
C: Food and Cash Farmer	Farming with intention of <u>significant cash sale requiring external markets</u> . Land preparation is mechanised but family labour predominates. Significant external dependency, moderate risk. Loose value chains predominate.	0.5 ha to 2 ha <i>igadhi and intsimi</i>	food and high-value cash crops	6 people Female=1 Youth=1
D: Business Farmer	Farming for <u>cash sale to external markets</u> and where the farming enterprise makes a <u>dominant contribution to livelihoods</u> . Employed labour. Mechanised. High external dependency and high risk. Marketing through loose and tight value chains.	2 ha to 20 ha <i>intsimi</i>	intensive veg green maize field crops	2 people Female=0 Youth=0
E: Equity Labourer in a contract arrangement	Residents who have rights to land and water but no intention of farming actively but instead lease or sharecrop. Low financial risk-high contract risk.	Field scale with consolidation of multiple plots and leased out	commodity crops	7 people Female=4 Youth=0

Of the 17 individuals who aspire to the High Productivity Food-Grower typology, 13 are women. Somewhat differently, of those with an interest in cash-generation as a priority (i.e. typologies C and D), only one of the six is a woman. Of the seven people who want to use their land resource but not farm themselves (typology E), the spread is roughly even (3 women and 4 men). The respondents in the Food Grower and Food-Cash typologies have diverse ages, ranging from 23-72 years, with the average age being 53 years, but also including four people younger than 35. The Business Farmers and the Equity-Labourer groups do not contain any people younger than 50, and five of the six farmers who aspire to the more risky categories of Food-Cash Farmers and Business Farmers are all older than 60. The participants indicated that farming experience was needed for these higher-risk typologies.

2.9 Constraints and priority pathways to fulfill aspirations

Constraints to farming aspirations were identified and qualitatively ranked by farmers in relation to a systems view of the farming enterprise, and linked to the different typologies. Table 2 lists key elements of the farming system, shows the level of difficulty of each challenge, as ranked by the farmers.

Table 2: Qualitative ranking of farming system challenges by aspirant farmers

	Type B Food–Grower	Type C Food-Cash	Type D Business	Type E Equity
Constraints <i>land area</i>	<i>isitiya/igadhi</i>	<i>lgadhi/intsimi</i>	<i>intsimi</i>	<i>intsimi</i>
Farming knowledge and skills	2	2	4	0
Land use rights	1	1	3	4
Land control rights	1	1	4	4
Water resource availability	1	2	2	0
Water infrastructure	4	4	4	0
Fencing	2	3	4	2
Mechanisation	1	3	3	0
Labour	1	2	2	0
Access to inputs	2	2	2	0
Ability to self finance	1	3	4	0
Access to markets	1	2	4	0
Score (indicative ranking only)	17	25	36	12

Key: Farmer assessed level of severity of farming challenge

Critical (4)	Serious (3)	Moderate (2)	Manageable (1)	Lessee problem (0)

The farmer-led qualitative analysis indicates that the High-Production Food Grower (Typology B) and the Equity Labourer typologies both fall within the less complex end of the intervention scale, with Food Growers requiring water infrastructure within the boundary of the homestead as well as support interventions to develop knowledge and skills, and access to inputs.

At the other end of the difficulty scale (in relation to intervention design), the Business Farmers face a raft of critical challenges which reflect what is widely known and observed – that smallholder business farming is complex, marginal, and risky, requiring multiple parallel responses to support those who are keen to engage.

3 Opportunities and Priorities for Intervention Support

3.1 Convergence of findings and intensification of homestead cropping

High Productivity Food-Growers and Food-Cash Farmers (Type B & C): The assessment of household water-use, land use and intensity, land institutions, farming aspirations and constraints all point to the **priority opportunity for intensification in the production zones of the *isitiya* and *igadhi***. These typologies retain the advantages of economies of ‘small-scale’ (Kirsten & Van Zyl, 1998; Christen & Anderson, 2013), though the latter will require additional support across the wider production system, but less so than the Business Farmers.

A focus on these two typologies is supported by a convergence of factors:

- They involve the type of farming that most respondents (23 of 30) are keen to pursue and have many advantages such as proximity, time-efficiency, security, existing fencing, etc.
- The *isitiya* and *igadhi* already have the highest incidence of use (63%) and highest cropping intensities (*isitiya*= 173%, *igadhi*=90%).
- The water-use findings show high productive water-use in homesteads where infrastructure has been acquired or is available, whereas productive water-use in the fields is significantly lower. Technical solutions, both for water storage and WH&C techniques, are well established.
- The diversity of the vegetable crop choice prevalent in the *isitiya*, combined with the intercropping (maize-beans-pumpkins) prevalent in the *igadhi*, present a best-possible scenario from a nutritional perspective (Wenhold & Faber, 2008).
- The significantly higher fertility status of the *isitiya* and *igadhi* due to their proximity to kraal manure (Van Averbek et al., 2008), a finding supported by the recorded use of manure (71%).
- With intervention support, these typologies have the greatest chance of success, given their relatively few and more easily managed constraints. Some food-cash farmers also want to engage in limited field production in the *intsimi* which will present additional challenges, but the scale in relation to factors of finance, labour etc., remains advantageously small.

While these typologies are found to have the best chance of intervention success, overall impact is potentially limited by the relatively small area and scale of the cropped areas, although the high number of aspirant Food-Growers can offset this to a degree. Quantification at programmatic scale is needed.

3.2 Agricultural water opportunities and Water Allocation Reform

Agricultural water for Type B: Homestead water storage, and MUS infrastructure

Investment in water infrastructure following a MUS framework is identified as essential (particularly in the irrigated *isitiya*), and is likely to have favourable financial and economic returns, based on the high cropping intensities observed. When viewed from a WAR perspective, Cullis and van Koppen (2007) have shown that if sufficient water was made available at scale at homestead level to support the intensive irrigation of 1000 m², the water GINI index would be reduced from 0.96 to only 0.9; thus, a very small shift in water allocation at a regional scale would have a major effect at local level, dramatically altering livelihoods and requiring only a small reduction of the current entitlements for existing users (6%). **Massive investment in homestead water tanks and other MUS and water-harvesting and conservation systems would directly benefit those who suffer water deprivation and lead to increased food production** for households with an interest in agriculture.

Agricultural water for Type C and D: WAR through the interception of surface runoff to arable lands

Small-scale irrigation is an obvious but expensive option for crop intensification and comes with a suite of risks, demanding sophistication more suited to Business Farmers (Typology D). Where **low-cost gravity systems can be implemented, these will suit the Type C farmer** but such sites are not plentiful. Water for crops can be augmented with water-harvesting methods where expensive irrigation is not feasible, takes too long, or is unaffordable. There are many water-harvesting

techniques that can be used within fields, including floodwater harvesting techniques such as saaidamme, runoff diversion channels to swales, and ‘in-field’ rainwater harvesting (Denison et al., 2011; Botha et. al, 2003).

These types of **interventions will intercept water and capture it in the soil root zone cost-effectively**, resulting in a de-facto re-allocation at source for the benefit of historically disadvantaged farmers. Over the last decade there have been numerous cases of existing licensed users voluntarily agreeing, through negotiations facilitated by the DWS, to curtailments in their entitlements in order to facilitate uptake by HDI farmers (Enright, 2012). This has attractive practical and administrative advantages in that HDI farmers can benefit immediately through such re-allocations, which do not have to wait for extended compulsory licensing processes in areas where catchments are stressed (5 years or more), or be delayed by the extended timelines and high costs of irrigation development.

3.3 Liberating land through leasing

An intervention that specifically enables Typology E farmers (Equity-Labourers) to securely lease out their land is required. **Creating enabling land-exchange institutions which facilitate land leasing over timelines that are attractive to farming investment** is relatively simple from a programme implementation perspective, and can unlock large areas of arable land for leasing, thus leaving the suite of more complex farming challenges up to the lessees (e.g. existing resourceful local farmers, or farmers from outside of the village). Given the social dimension of change involving communities and traditional leadership, and the need for local organisational development and trust-building in a new (local) land-institutional order, timelines for wider uptake are likely to extend into years. However, this intervention is essential to catalyse a higher utilisation of the available arable fields (*intsimi*) through land consolidation and production at scale.

3.4 Interventions for Business Farmers (Typology D)

Finally, intensive support to business farmers should not necessarily be avoided due to the many challenges involved. However, in terms of prioritising the application of limited budgets in the pursuit of increased food production, it seems that this group is likely to be the most costly to support and will present the highest risks, given the multiple challenges they face. Yet this group remains important as these farmers are likely to utilize the largest portions of land, compete most effectively in a hostile market place, and fulfil an important part of the political agenda, which is the development of larger-scale black African commercial farmers.

3.5 Multiple pathways

It is clear that no single pathway will respond to the diverse aspirations of smallholder farmers or use the available set of livelihoods resources to its full potential. The opportunity suggested by the constraints analysis, when combined with farmer’s aspirations, is that a programme that aims to increase food production at scale must **target multiple parallel interventions, be prioritised through local participation**, and be **locally tailored** to maximise resource opportunities, capabilities and predominant aspirations. The following interventions are likely to be the most cost-effective, to give the greatest returns on investment, and to respond to the majority of smallholders’ aspirations:

1. Investment in homestead water tanks, MUS and WHC systems to intensify production in the *isitiya* and *igadhi*.

2. Investment in dynamic agricultural knowledge networks, focussed on practical learning in a typical farmer setting, energised by networking with a wide range of information sources on priority food crops, with emphasis on input rather than output value chains.
3. The creation of an enabling land-exchange institution to facilitate land leasing over timelines which are attractive to farming investment (minimum two year lease, ideal of 10 year lease).

4 Recommended Intervention Strategies

The proposed intervention strategies follow from the research findings and the identified available resources and prioritised opportunities. They also respond to the aspirations of food-growers and farmers, and are informed by their self-assessed capabilities. While the strategies are not necessarily new in their individual technical form, it is proposed that when combined strategically, new avenues of intervention design and meaningful action will emerge.

STRATEGY 1: Initiate agricultural learning through knowledge networks

Target group: All food-growers and farmers

The focus of this strategy is to facilitate agricultural knowledge exchange and information access through linked networks for farmers at all scales. The establishment or consolidation of innovative knowledge communities (farmer groups) to develop current agricultural practices holds the best chance of success amidst a national extension crisis and conforms with the intentions of the Draft Extension Policy. The innovation revolves around fostering networked expertise through communities of practice, rather than dependence on one individual (i.e. the extension officer) for agricultural knowledge and support. Advances in farming practices can be achieved by promoting farmer-to-farmer learning as well as by establishing links to outside sources of information through a 'facilitator' or farming-knowledge broker. Part of this intervention includes activating and supporting essential links with relevant information sources, including input suppliers, nearby agricultural learning organisations (colleges, universities) and possibly NGOs, to promote information and knowledge flow between local groups of farmers and external sources of information. An emphasis on nutrition to promote further crop diversification and on agricultural learning for children is important. Learning materials which are readily available to support this include Stevens (2012), which focuses on irrigation, Stimie et al. (2010), which focuses on home-food production, and Denison et.al (2011), which focuses on water harvesting and conservation, as well as initiatives such as the WESSA Eco-Schools programme, used at Lutengele village.

STRATEGY 2: Develop homestead MUS water-storage and supply systems

Target group: Type B (High Productivity Food Growers)

Within the homestead, water-infrastructure investments can be made in roof-water storage, yard-tap connections, or small ponds that collect surface runoff. Yard-tap connections remain understandably contentious for productive use, due to the costs of purifying domestic water, although it must be pointed out people at Mbekweni and Lutengele pay between 50-200 times the cost of urban treated water to keep seedlings alive in times of water-crisis. In practice, increased agricultural water provision in the homestead for intensive farming in the *isitiya* requires the collection and storage of at least 30 000 litres from roofs, ditches, roadways etc. This runoff-and-storage strategy is different to on-farm water harvesting methods, where water is captured directly into the soil and root zone.

The installation of tanks, such as those funded by the in 2008 at Lutengele using the Resource Poor Farmers Subsidy, have proven to be sustainable and effective in supporting food production and liberating women's time for agriculture. Alternative infrastructure investments include innovations which exploit local water opportunities, such as connecting homesteads at Mbekweni to the irrigation gravity main (an underutilised source of untreated water) which runs alongside the village, and which some residents have already done on their own initiative to supply homestead cropping. Investments in assets under the control of women can mobilise women's agency at an intra-household level and help to balance the triple-burden of work which characterises their lives.

STRATEGY 3: Application of water harvesting and conservation methods

Target groups: Type B (Food-Grower) and Type C (Food-Cash Farmer)

Water harvesting and conservation techniques and their contextual applications are documented extensively by the WRC and in various international publications. Their applicability to each local situation, involving considerations of soils, slope, runoff areas, crop-type, farming practices and costs must be explored as part of a wider set of intervention responses. These all aim to increase water availability to the root-zone, reduce plant-water stress and improve resilience to drought, contribute to significantly increased yields, and reduce soil erosion. It was found in the research that there is widespread interest in maize, beans and pumpkins, particularly in the rainfed space of the *igadhi* and fields. This particular intercropping choice has root development and nutrient uptake synergies, nutritional and cultivation advantages due to less weed growth. While technical expertise is needed in some larger scale water-harvesting methods, many are simple and affordable in their application and can be implemented coherently in rollout programmes. Women are empowered through knowledge and the ability to take greater control of climatic consequences and agricultural factors impacting on their lives.

STRATEGY 4: Linkage to commercial seedling nursery or establishment of a local nursery

Target groups: Type B (Food-Grower) and Type C (Food-Cash Farmer)

Farmers unanimously stated that access to a ready supply of robust and disease-free seedlings is essential for vibrant production, and while most obtain seedlings from local or commercial suppliers, the sources are unreliable, quality varies, and additional costs are incurred due to distances and the absence of coordinated bulk purchasing. While crops that can be vegetatively propagated must be promoted (e.g. sweet potatoes), any intervention that aims to increase fresh vegetable production (particularly in the *isitiya*) must ensure that farmers have bi-weekly and cost-effective access to a seedling supply. Strengthening linkages for a critical input such as seedlings reduces vulnerability and stress, increases the chance of success of food production initiatives, and alleviates hunger in the homestead, thus also impacting positively on women, who take primary responsibility for growing additional food and for food management in the homestead.

STRATEGY 5: Local land administration system

Target groups: Type D (Business Farmers) and Type E (Equity-Labourers)

While greater tenure security in relation to control rights (land sale or use as collateral) would provide full tenure security, this requires fundamental legislative changes which are politically complex and thus highly unlikely to occur in the short to medium term. A local land administration system will address institutional inadequacies around the access, exclusion, transfer and

enforcement of land rights within a communal tenure regime. Approaches that develop local land-exchange institutions through the active involvement of and formal approval by Traditional Authorities, government representatives and farmer organisations are well-established (Baipheti et al., 2012; Manona et al., 2010; Denison & Manona, 2007) and can be implemented immediately, although this does not guarantee success at all locations. At the research sites, the Chiefs and the Headmen responsible for village affairs are progressive and open-minded and supported this concept as it would lead to an increase in the productive use of land, providing local benefits. By having explicit institutions in place, the intervention can reduce uncertainties and minimises or eliminate social forces of gender exclusion where they exist. They will therefore increase women's opportunities to secure greater benefits from agricultural pursuits, either as a lessee or lessor.

STRATEGY 6: Financed and trained mechanisation contractors as a business-venture

Target groups: Type B (Food-Grower), Type C (Food-Cash Farmer), Type D (Business Farmer)

Discussions with farmers on tractor services showed that most farmers had the financial means and willingness to pay for such services. However, the reality of poor mechanisation services is ubiquitous at the research sites. The strategy would involve establishing local mechanisation contractors through structured, practical skills-development and business training. In concept these would be no different to local taxi-operators; contractors can be supported by smart subsidies, co-funding arrangements, and training in running a tractor-business, including marketing and maintenance. A specialist facilitator can support the development of a coherent business plan based on local demand and an affordability survey, as well as the training of contractors. Sustainability of the mechanisation contractors would call for systematic monitoring in an intervention-rollout of tractor servicing, financial recordkeeping, and loan repayment. The practicability of this tractor-business approach is supported by the existence of local tractor operators at the various sites, who are in short supply and high demand. Women entrepreneurs need to be part of the population targeted for support and mentoring to run mechanisation businesses.

STRATEGY 7: Value-chain mapping and optimisation for smallholders

Target groups: Type B (Food-Grower), Type C (Food-Cash Farmer), Type D (Business Farmer)

This strategy requires assessing existing and possible forward- and backward-linkages along value chains for the predominant cropping systems with the aim of identifying market opportunities and develop simple market information systems for crops of interest. In its simplest form, this would be a register of suppliers and buyers, and the organization of collaborative bulk purchasing. A value chain analyses would identify and assess major constraints and opportunities to be addressed, such as quality, affordability, and availability of improved inputs, technologies and techniques, standards and grading, packaging, storage, transportation and pricing (Van Averbek et al., 2007). Further support could include negotiating technical and commercial partnerships with off-takers, suppliers and service providers, including financial services, underpinned by smart-subsidies from Government, thereby overcoming systemic impediments that exclude smallholders. Women, who form the largest group of farmers, would be empowered through this knowledge-exchange and training process, and would have increased control over the financial aspects of their lives.

STRATEGY 8: Participative implementation planning at watershed scale to ensure cooperative governance in implementation and integrated water resources management

Target groups: All

Smallholder farmers face widely diverse situations in South Africa in relation to land-size, farming approach, aspirations and the contribution of farming to livelihoods. Site-specific opportunities and preferences thus need to be systematically identified to properly inform intervention plans which are locally appropriate, and therefore nuanced. Agricultural water interventions at the scales envisaged in the National Development Plan and other key strategies require substantial volumes of agricultural water. Some RWH methods will be regarded as a ‘flow-reduction activity’ by DWA, while irrigation (excepting for the *isitiya* and Type B farmers) will fall under a General Authorisation or require a license. In places where interventions are conducted at scale (as intended by policy) the upstream-downstream implications must be identified and assessed. Increased national water-stress, the capping of national agricultural abstraction volumes (in the NWRS-2), increased urban demands and climate change realities mean that new interventions, particularly those at scale, must optimise and focus on the areas of highest return (assessed in financial, food and/or socio-economic terms as the case may be). Embracing a watershed or sub-catchment approach to implementation planning is therefore not only practically necessary for water-supply security and water resources management, but also highly advantageous developmentally to participatively identify high-priority resources, poverty nodes, degraded areas etc. International best practice presents a convincing case for a watershed implementation approach to respond to the typologies of farmers identified in this project, and to the scale of the physical resources at the disposal of the farmers, including women, who are responsible for the majority of farming decisions (Hope, 2007; World Bank, 2008).

5 Diverse needs and parallel pathways

The performance of the smallholder sector has been weak and in decline over the last six decades or more, but policy direction for the sector is clear. Given the widespread social challenges of hunger, unemployment and lack of alternatives in rural areas with high population densities, there is urgency to provide practical, cost-effective support to smallholders that can be implemented at scale.

An important question posed by the research team during this study was whether or not smallholders with land really want to farm. It was found that most people in the three villages expressed some interest in an agricultural component in their livelihoods in the future (86%; n=164), but are acutely aware of their farming-resource inadequacies, of marginal profitability, and of the multiple risks involved. The random survey of 164 households showed that 55% invested in crop production in the homestead (in varying degrees) and 30% invested in crop production in fields (again in varying degrees) in the 2012-13 production season. This is evidence of a scale of present crop production commitment that provides a basis for future mass uptake and agricultural transformation. The in-depth work with the agricultural decision-makers from the 30 case-study households showed diverse motivations and aspirations, echoing the diversity refrain throughout the literature. Aliber and Hall (2012:548) motivate that “...*the emphasis of a new national initiative to support small-scale farmers should be on achieving scale and impact, enabling ‘accumulation from below’ for a substantial portion of the existing population of small-scale farmers. Between the agendas of welfare and food security for the poor on the one hand, and narrow empowerment and*

commercialisation on the other, this must make possible an alternative path of widespread sustainable growth and improvement in the small-scale farming sector.”

The intervention strategies that were developed from the research evidence and with participation from farmers are not revolutionary in their individual form, but present an alternative approach to engagement that facilitates multiple parallel avenues of smallholder development. This is expected to initiate synergies within the village resource and social systems, and exploit the niches of smallholder opportunity that have thus far remained largely un-activated in South Africa.

It is a sign of the future that the 2015 Stockholm Water Prize was awarded to Rajendra Singh for his decades of work in rainwater-harvesting and watershed conservation work in India in support of increased agricultural and environmental water productivity. The **expansion of the concept of irrigation development to one of agricultural water development**, which includes MUS and water-harvesting in its many forms, **is centrally important to achieving the desired impact at scale**. This allows for parallel opportunities to be unlocked through both intensive but expensive irrigation, as well as rainwater harvesting in the *igadhi* and in fields, underpinned by reflexive knowledge interventions. These varied technologies will better-suit the diverse situations of smallholders farmers than can be achieved by a narrow, high-risk and high-cost irrigation emphasis.

The authors thus propose that the purposeful implementation of the combined set of strategies outlined in this report will contribute to an agricultural transformation process that is practical, can be implemented incrementally as funds allow, and is programmatically scalable. When supported with Government investment that is concomitant with stated national rural development targets, meaningful progress towards WAR targets, home food security, and the massive agricultural water expansion intended in the National Development Plan seems not only theoretically possible but also practically achievable. The tools and justifications are well-established and on the table; what is needed is the courage and commitment to drive the clearly-stated vision into action for the benefit of motivated rural land-holders, and particularly for women.

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Acronyms

ABET	Adult Basic Education and Training
AET	Adult Education and Training
AgriSETA	Sector Education and Training Authority for Agriculture
ANC	African National Congress
BEE	Black Economic Empowerment
BP	Business Plan
CAC	FAO/WHO Codex Alimentarius Commission
CCAW	Coordinating Committees on Agricultural Water
CHDM	Chris Hani District Municipality
CLaRA	Communal Land Rights Act
CMA	Catchment Management Area
CODESA	Convention for a Democratic South Africa
CSA	Climate-Smart Agriculture
CSG	Child Support Grant
DAFF	Department of Agriculture, Forestry and Fisheries
DFID	Department for International Development
DLA	Department of Rural Development and Land Reform
DoH	Department of Health
DSD	Department of Social Development
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWCPD	Department for Women Children and People with Disabilities
DWS	Department of Water and Sanitation
EU	European Union
FAO	United Nations Food and Agriculture Organisation
FGD	focus group discussion
GHI	Global Hunger Index
GHS	General Household Survey
GIS	Geographic Information System
GPS	Global Positioning System
ha	hectare
HDI	historically disadvantaged individuals
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HWA	Homestead Water-Use Assessment
IB	Irrigation Board
ICID	International Commission on Irrigation and Drainage
IDT	Independent Development Trust
IFAD	International Fund for Agricultural Development
IFSS	Integrated Food Security Strategy
IIEP	International Institute for Educational Planning
ILO	International Labour Organisation
INFOSAN	International Food Safety Authorities Network
IP	Implementation Protocols
IPILRA	Interim Protection of Informal Land Rights Act

IRCWASH	International Reference Centre for Water Sanitation and Hygiene
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
KSC	Knowledge, Skills and Competencies
MAR	Mean Annual Runoff
MDG	Millennium Development Goals
MUS	Multiple-Use Water Services Framework
NCCRWP	National Climate Change Response White Paper
NDP	National Development Plan
NFSD	National Framework for Sustainable Development
NGO	Non-Government Organisation
NIDS	National Income Dynamics Study
NIE	New Institutional Economics
NSSD 1	National Strategy for Sustainable Development and Action Plan
NWA	National Water Act
NWRS	National Water Resource Strategy
OECD	Organization for Economic Co-operation and Development
PLAAS	Institute for Poverty, Land and Agrarian Studies
PTO	Permission to Occupy
RAFSF	European Union Rapid Alert Systems for Food and Feed
RDP	Reconstruction and Development Programme
RIDA	water Resources, Infrastructure, Demand and Access
RPF	Resource-Poor Farmers
RWH	Rainwater Harvesting
SA	South Africa
SADC	Southern African Development Community
SALDRU	Southern Africa Labour and Development Research Institute
SANBI	South African National Biodiversity Institute
SANCO	South African National Civic Organization
SD	sustainable development
SETA	Sector Education and Training Authorities
SLF	Sustainable Livelihoods Framework
SWRA	Situational Water Resources Assessment
TA	Tribal Authority
TRACOR	Transkei Agricultural Corporation
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
WACD	Water Carrying Drudgery Index
WAR	Water Allocation Reform
WESSA	Wildlife Environmental Society of South Africa
WHO	World Health Organisation
WRC	Water Research Commission
WRSM	Water Resources Simulation Model
WTW	Water Treatment Works
WUA	Water User Association

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Chapter 1 The Research Study and the Policy Context

J Denison, A Perry & C Murata

The research is premised on the idea that rural household food security and livelihoods can be improved through increased crop production on the land they have available, as well as through the empowerment of women to overcome present production constraints. The project objectives which provided detailed parameters for the research are first set out, followed by an overview of the challenges of poverty, food insecurity and unemployment in rural areas that are the primary motivations for the research effort. A definition of smallholders is provided, their landholding sizes are identified, and their particular institutional, market and systemic challenges are described. The chapter concludes with an overview of Government rural development priorities and a justification for the research focus.

1.1 The Project Objectives

The research project resulted from a directed call for proposals which included Terms of Reference with clearly defined research aims. The general project objective is: *“To ensure a comprehensive understanding of the constraints, challenges, opportunities and interventions required for empowerment of women to promote household food security and rural livelihoods through increased water productivity, with the focus on crop cultivation in, amongst others, the Eastern Cape Province.”*

Increased water productivity is viewed as an agent of change, and the objective explicitly acknowledges numerous interrelationships, elaborated in its seven specific aims. These have informed the primary themes of the research effort, as reflected in the chapters of the report (emphasis in bold added).

1. To describe and analyse existing **water use in crop cultivation** (not excluding livestock husbandry) activities undertaken by women at homestead food garden and/or cropland scale in rural villages in at least three selected district municipalities.
2. To empirically investigate and specify the existing levels of knowledge, identify **knowledge and skills** gaps as well as requirements for skills development of women.
3. To describe and analyse social relations, demographics, **gender dynamics, roles and responsibilities** of women in rural villages in at least three selected district municipalities.
4. To describe and analyse the influence of **institutional arrangements (regarding access for land and water use)**, organisational structures and processes (at village level and beyond) on incentives and/or disincentives for use of land and water by women.

5. To empirically investigate the **constraints, needs, aspirations and goals** of women for food crop production in the context of local culture, tradition and custom in rural villages in at least three selected district municipalities.
6. To evaluate the **impact of land and water allocation reform** policies, strategies and legislation on women in rural households.
7. To review and **recommend policies, strategies and interventions** for effective people-centred water use, food production and associated rural development with particular reference to women.

The project is thus focused on understanding smallholder aspirations in relation to food production, and on better understanding what interventions are needed to facilitate and/or empower women to achieve these aspirations.

1.2 Hungry Smallholders – A South African Conundrum

1.2.1 Food insecurity on agricultural land

High levels of poverty and deep inequality remain major challenges in post-apartheid South Africa and black Africans living in the rural areas of the country are the most severely affected by these. In 2011, it was concluded that 23 million people (45.5%) of the population were living in poverty (based on the Upper Bound Poverty Line) and 10.2 million were classified as extremely poor, which means they were living below the Food Poverty Line. The incidence of poverty in rural areas was more than twice that of urban areas, and the severity of poverty for rural people was 2.9 times worse than for urban people. Poverty was closely associated with lack of education and was higher for both women and for youth, though not equal within these sub-groups or within households (StatsSA, 2014).

The Eastern Cape was ranked as the second-poorest province in the country, with 69.5% of residents assessed as poor. The province had the highest unemployment rate at more than 40%, which is far higher than the national figure of 25%, and social grants provided the main source of income for 37.9% of the households (StatsSA, 2012b). Young black African women living in rural areas of the Eastern Cape are therefore likely to be among the poorest in the country.

Although South Africa is classified as a food-secure country in that it is a net exporter of agricultural products, the situation is different when food security is measured at household level. In 2011 it was found that 26% of the population had inadequate access to food, and 13.4% suffered from hunger, which dropped by nearly half since 2002 (StatsSA, 2014). In the rural provinces of the country, where opportunities for wage labour employment are very low, rain-fed agricultural activities remain an important part of livelihoods, albeit small at around 10% (Vink & Van Rooyen, 2009). Overall, agriculture is the third most important livelihoods means after remittances and wage labour from low-skilled jobs (Machethe, 2004, StatsSA, 2012a). It is well established that a poorly functioning

rural economy with poor infrastructure, weak market linkages, and poor agricultural support services tends to isolate rural households from the mainstream economy, including important agricultural value-chains. In addition, weak and conflicted land institutions add uncertainty and limit transactional opportunities, and small-scale farmers in rural areas have limited access to both human capitals (knowledge and skills) and natural capitals (land and water) (Backeberg & Sanewe, 2010a).

Other studies suggest that the majority of households in rural areas (about 80%) earn incomes that are far below the poverty line and belong to the ultra-poor poverty class (Monde et al., 2005; Hebinck & Monde, 2007). Backeberg and Sanewe (2013) more recently point out that limited progress has been made when considering the Global Hunger Index (GHI), the combined measure of undernourishment, underweight children (<5yrs) and child mortality rate (<5yrs).

Both within Government and in wider academic circles there is an established contemporary view that food production and related agricultural enterprise development at various smallholder scales is the priority opportunity to address these pressing social and economic development challenges (NPC, 2011, Wenhold & Faber, 2008). This perspective is captured by Aliber and Hall: “In view of South Africa’s massive unemployment problem, government has determined that the underlying purpose of having a small-scale farmer emphasis is to maximise the creation of livelihoods. The drive must be to identify the sector’s potential to contribute to labour absorption and poverty reduction, particularly in the economically depressed areas of the ex-Bantustans, where (self-) employment opportunities are desperately needed, and then help it to fulfil this potential” (2012:557). This view is however contested so it is important to understand what characterises smallholders and the various perspectives on their challenges and potential productivity.

1.2.2 Smallholders and smallholder productivity

A working definition

In South Africa, the term *smallholder* colloquially refers to producers who are black Africans and who farm on smallholdings (van Averbeke et al., 2011), which include irrigation plots, home gardens and rain-fed fields. The term ‘smallholder’ by name recognises the characteristic of small(er) farm size, although the concept is influenced by the type and intensity of farming (e.g. the size in ha. of an extensive livestock farm of a smallholder would be much larger than the size in ha. under intensive tunnels). In addition, smallholders are typified by a partially-developed link with the larger economic system, with input and output markets localised and not fully formed (Ellis, 1998), and operating with loose value chains (Christen & Anderson, 2013). This distinguishes smallholders from commercial enterprises (both large-scale and family farms) which have access to fully-formed external markets.

Cousins (2014) describes smallholder farmers broadly as those who use mainly family labour, simple technologies, and eat a proportion of their produce, but who have to earn cash either from the sale of farm products or their own labour; he also differentiates between smallholders and small-scale

capitalist farmers, who farm as a business primarily for profit and for whom home consumption and family labour is negligible.

While definitions vary, factors that describe smallholders and differentiate them from the commercial sector include: scale, purpose of farming, contribution of agriculture to incomes, use of family labour, mechanisation, capital intensity, and financing ability (Cousins, 2014). These factors as they apply to the research are further expanded on in Chapter 7, noting that the term smallholder in this study is used inclusively, and thus includes growers farming for own consumption, for mixed-purposes, as well as business-oriented farmers. These enterprises function at various scales, but all share the above-mentioned characteristics.

Domains of production

The arable land occupied by smallholders is estimated by the following three groupings:

- farming on small plots as part of agricultural development projects such as irrigation schemes, estimated at 100 000 ha (Van Averbeké et al., 2011);
- homestead or backyard gardening, estimated at 200 000 ha (Botha & de Lange, 2005); and
- rainfed fields, totalling 2 000 000 ha (Backeberg & Sanewe, 2010a).

Estimates of the number of agricultural households in South Africa vary. Vink and Van Rooyen (2009) estimated 1.3 million smallholder households, mostly black African, with access to land for farming purposes. Aliber and Hall (2012) extrapolated from the 2009 General Household Survey, and arrived at 2.6 million agricultural households, of which 5.6% were commercially oriented, while the 2011 census survey identified 2.9 million agricultural households (StatsSA, 2013). The census data is criticised as being too inclusive of those making an insignificant contribution to food availability such as households "...with a few chickens scrabbling in their backyards" (Sender, 2015), but on the other hand as not reflecting the many invisible smallholder farmers (Aliber and Hall, 2012). While the total is open to some debate, close to half engage in cropping of some sort, either in mixed farming (animals and cropping) or cropping alone (StatsSA, 2013), with between 4%-8% being commercially-oriented smallholders (Vink & Van Rooyen, 2009; Aliber et al., 2010). Women are the household heads of between 49% and 57% of agricultural households (StatsSA, 2013; Vink & Van Rooyen, 2009). Moving from households to people, it is estimated that about 4 million black people are involved in agriculture at some level and women make up 60% of all of those involved in farming (Aliber and Hart, 2009).

Backeberg and Sanewe (2010a) and others argue that the smallholder domain of the backyard garden, comprising 200 000 ha, is a priority area for engagement to target food insecurity because of: its inclusion in the household boundary with security and fencing advantages; the locus of control for multi-tasking women; the low opportunity cost of, and more easily mobilised family labour; the financial manageability of this small scale of farming; and the benefits of mixed cropping and extended harvesting periods from a nutritional perspective (Fay, 2013; Stimie et al, 2010; Wenhold and Faber, 2008). Others have documented the inexorable retreat from field farming to intensified and diversified production in home-gardens over the last few decades in the Eastern Cape and Free State (Andrew and Fox, 2003; Hebinck & Monde, 2007; Walker, 2011; Fay, 2013) with only some

20% activity in fields in recent times (Fay, 2013; Sender, 2015). This is attributed to numerous challenges in the fields, not least fencing, financing and ploughing shortages. While field activity was declining and low (22%) in Fay's 2002-11 longitudinal study in the Eastern Cape, he observed that 82% of households were active within the homestead and describes positive trends of increased cropping intensity, crop diversity and increased planting of tree-crops, supported by farmers' associations and local market strategies (Fay, 2013). It is relevant that in a similar context, the fertility status of home-gardens was found to be significantly higher due to availability of kraal manure in close proximity to home-gardens (Van Auerbeke et al., 2008) which helps to explain intensification trends. Reinforcing this is the high stock ownership in the Eastern Cape. In 2011, 86% of agricultural households owned between 1 and 10 head of cattle, and 67% owned between 11-100 head of sheep (StatsSA, 2013), the highest in the country, an indication of the manure resource that is available and apparently being utilised in concentrated, smaller and more manageable production spaces.

Another important smallholder development focus is farming on irrigation schemes which have demonstrated many individual enterprise successes that illuminate ways forward, even though nationally, smallholder scheme performance is poor (Van Auerbeke et al., 2011; Cousins, 2013). Interventions needed for the intensification of activity on smallholder irrigation schemes are reasonably well understood, if very expensive and complex. These typically require state intervention in infrastructure rehabilitation, land-administration, water institutions and individual farmer capacity development in integrated ways that have been largely missing in South African efforts in the last 2 decades, though are routinely adopted elsewhere in Africa with a greater measure of success (Denison & Manona, 2007).

Diversity and systemic challenges

The above discussion shows there are three domains of possible engagement to increase food production and food security in the smallholder sector. In this line of thinking, it is postulated that substantial numbers of livelihoods can be created through a mixed strategy focused primarily on small-scale farming at varied scales and for different purposes – alongside a programme supporting the growing numbers of black commercial irrigation farmers more conventionally targeted (Cousins, 2013; Aliber and Hall, 2012, NPC, 2011). The view holds that a diverse set of smallholders are capable of high productivity and rejects simple stereotypes of large-scale and small-scale farming systems, following from Kirsten and van Zyl (1998) some years earlier, the latter convincingly highlighting the potential of particular economies-of-(small)scale that can be uniquely exploited by smallholders. Diversity in social-class, resources, capabilities and ways of farming is seen to be important, and responses to promote smallholder agriculture must therefore acknowledge the opportunities in this diversity and respond accordingly (van Auerbeke et al., 2014; Cousins, 2013; Van Auerbeke & Denison, 2013; Perret, 2002; Christen & Anderson, 2013).

The cautiously optimistic take on smallholder farmer development is long-contested in fields of land reform, water reform and agrarian reform, where smallholder development as a strategic focus is criticised as being unviable or extremely difficult, given multiple constraining factors that include scale, sophistication, market exclusion, macro-economic agricultural decline and institutional

weaknesses (Sender, 2015; Vink & Van Rooyen, 2009, Cousins, 2013; Movik, 2012). Available data on the minimal contribution of smallholder farming in the national context supports this view: “...none of these statistics point to any signs of dynamic capitalist development from below or of the emergence of a new class of productive capitalist farmers from the ranks of smallholders” (Sender, 2015:15). Sender argues that what is needed is to respond where there are local underutilized agricultural resources in a re-directed capitalist drive, where government: concentrates on crops which are wage-labour intensive; follows corporate agricultural production trends; progressively increases the minimum wage; and makes strategic institutional interventions in the food-value chain to make food cheaper for poor households. While Sender makes no attempt to explain how one might move to consolidate many small portions of arable land held with family rights (under communal tenure) for such corporate-driven massification without prompting major social and political upheaval, it is argued that in this way, women will increasingly be able to escape poverty through the empowering reality of wage-labour, rather than attempting to earn an income from a small (vegetable) plot which the evidence shows is impossible. “Populist and nationalist slogans demanding home gardens and food self-sufficiency should no longer be allowed to stifle debate on more effective forms of direct intervention in food and labour markets to reduce malnutrition” (Sender, 2015: 22).

Cousins (2013), while concurring with many of the views on macro-economic constraints and systemic exclusion of smallholders from markets, maintains a positive view of smallholder potential, though with the caveat, in agreement with Sender on this point, that success may not be possible without fundamental re-structuring of the capitalist framework within which smallholders operate. On this theme, Fay (2013) shows how various government cash grants (child-support etc.) have positively improved household agricultural investments, and how targeted subsidies around critically constrained farming inputs and strategic modest farm-level investments (funded by the South African Government) have catalysed lasting smallholder agricultural productivity with a positive local impact on food supplies.

Reasons to pursue a smallholder agenda

While valid questions are raised with regard to severe and marginalising institutional and macro-economic forces in South African agriculture from a smallholder perspective, the presently insignificant contribution to national food production made by smallholders, as well as the failed agricultural productivity related to the land-reform programme, there are four main reasons for pursuing a smallholder-focussed investigation:

1. There is substantial landholding within the immediate locus of poverty and unemployment, potentially impacting on four million people with arable land, 2.9 million ‘agricultural households’, smallholder arable fields totalling 2 million ha and home-gardens 200 000 ha (noting both land portions are held with largely undisputed rights of access and use within the traditional tenure system, though with limited rights of transfer and enforcement).

2. Agriculture remains the priority *local* economic activity, though contributing only 10% to rural family incomes, as livelihoods are supported mainly by non-local wage-labour, remittances, pensions and grants.
3. Evidence of successful smallholder trajectories which are linked to localised opportunities and farming niches is documented at various scales and for different purposes; these successes have occurred on smallholder irrigation schemes, in home-food gardens, and to a lesser extent in rain-fed fields.
4. The current National Food Security Strategy, the National Agricultural Strategic Plan and the National Development Plan all aim to improve smallholder produce and yields for market sale and home consumption, and policy favours both smaller-scale and larger-scale interventions (expanded later in this chapter).

The research team has approached understanding women's empowerment for improved crop production as a function of capability and agency, within the boundaries set by local circumstances. Given the relative poverty and hunger, alongside currently under-utilised primary resources, the research effort is focused on smallholders in this context, and limited to three parts of the Eastern Cape. The work recognises that in policy and literature, increased smallholder agricultural production is seen as a primary opportunity to increase local economic development and improve food security. It also acknowledges that smallholder agriculture suffers from critical higher-level institutional and market constraints, and that smallholder production is in general marginal within the wider agricultural context and the capitalist forces that prevail (Cousins, 2013; Sender 2015).

1.2.3 Smallholder food systems and related domains

The research team is cognisant that a systems approach is best conceived in making development-related decisions that could have an impact on reducing poverty or increasing the knowledge and skills for communities facing potential threats (Backeberg & Sanewe, 2013). Authors such as du Toit (2005:12) locate definitions and understandings of poverty beyond concerns related to access to formal incomes gained within the market place, and take cognizance of how structural economic imbalances and institutional weaknesses "...undermine people's attempts to escape poverty".

This work is guided by the view that both access to knowledge and suitable agri-tech responses are essential to any comprehensive initiative which aims to stimulate local economic growth and development, including smallholder farmers; and that interventions are needed which respond to the preferred agricultural systems of smallholder growers (Backeberg & Sanewe, 2013). The research project thus proceeded on the basis that an assessment of people's agricultural production aspirations, when considered in the reality of local water, land, market and other institutional factors, can lead to site-specific and diverse strategies that respond to unique combinations of livelihoods capitals at their disposal – natural, human, physical, financial and social.

Research on smallholder food systems by the Water Research Commission and others, including training materials, water harvesting, and small-scale irrigation solutions, is well documented (van

Averbeke et al., 2011; Backeberg, 2010; Backeberg & Sanewe, 2010a; 2010b). However, as Backeberg and Sanewe (2013:10) point out, “...research alone will not be enough to tackle the needs of acquiring food security for the masses,” unless research leads to decisions and actions. It is also noted that across the agricultural and water sectors, skills development is emphasised (Stevens et al., 2012; De Satgé et al., 2002). From a sustainable development and climate change response perspective, skills development, and especially extension services-related skills development, is emphasised for building a climate-resilient agricultural sector that reduces climate vulnerability of the poor (Green, 2008). There is a general recognition that extension services skills development requires substantive enhancement and new innovative approaches, and that new knowledge needs to be more successfully and effectively mediated at grassroots level.

This follows other researchers who suggest more integrated research approaches (du Toit, 2005, Kothari, 2001 & 2005; Lahiff & Cousins, 2005) which set out to bridge the divides between informed critical theory, i.e. anthropological, sociological, economic and otherwise technicist discourses on development. Researchers have felt it important to explore ‘agency’ or those capabilities at localised scale, and in relation to more ‘structural’ issues, with concerns over justice and equity remaining relevant (du Toit, 2005:25).

It is important as part of this introduction to state that the project is founded on the livelihoods framework, which is the key frame of reference for the field research process, resultant analysis and formulated interventions. A working concept was adopted where strategies for intervention would need to be informed by farmers and particularly by women’s livelihood realities, given their aspirations, knowledge, and the type of agricultural opportunities that exist in their gardens, rainfed-fields and irrigated lands. The literature recognises that there is substantial diversity in the smallholder farming sector which can be grouped by various factors and which allow diversity to be simplified to gain insights and to inform appropriate developmental responses (van Averbeke & Mohammed, 2006, Vink & van Rooyen, 2009, Cousins, 2014, Bembridge, 2000). Such typologies were considered and reformulated with farmer involvement to inform analysis and formulate developmental responses.

1.3 Agricultural Policy and Smallholder Development

In order to address the project objectives it is necessary to understand the broader policy environment, which places emphasis on the smallholder farmer and/or the household farmer in post-apartheid South Africa. A condensed policy review follows which places the research in a national context in relation to food security and agricultural policies. Land and water policies are discussed in additional, substantial detail in the separate thematic chapters. In the policy discussions, weight is given to the National Development Plan (NDP) (NPC, 2011), given the national strategic importance of the NDP, and it’s analysis of the rural development challenge and smallholder agriculture. In the NDP, smallholder irrigation and the development of a black entrepreneurial farming class are seen as central to rural development. More widely within policy there is a consistent focus on the need for a strong, vibrant smallholder agriculture sector with

ambitious goals for intensive crop production activity, as this review will show. Detailed considerations of water and land policy are addressed separately in Chapters 5 and 6 respectively, and are not repeated in this more over-arching policy review.

1.3.1 National frameworks for sustainable development

In 2008, Cabinet approved the National Framework for Sustainable Development (NFSD, 2008), which signalled a new wave of thinking aimed at promoting the effective stewardship of South Africa's natural, social and economic resources.

The National Strategy for Sustainable Development and Action Plan (2012), also referred to as NSSD 1, has a time window of 2011-2014, and lessons learned from its implementation will feed into NSSD 2 (2015-2020). The NFSD links to the 2012 Rio+20 process, which promotes the emergence of green economies for poverty reduction and sustainable development with five objectives, all of which are relevant to this project:

- 1) Enhancing systems for integrated planning and implementation.
- 2) Moving towards a green economy.
- 3) Sustaining ecosystems and using natural resources efficiently.
- 4) Building sustainable communities.
- 5) Responding effectively to climate change.

Under the objective of 'building sustainable communities,' the NSSD 1 suggests the need to strengthen community awareness and participation, to use resources more sustainably, and to build self-sufficient farming strategies using indigenous knowledge and sustainable production approaches. It considers strategies for creating new jobs within a 'green economy' framework, which effectively responds to climate change (discussed in more detail under the National Climate Change Response White Paper). It is aligned with the New Growth Path, which adopts a labour-absorbing growth path, as also mentioned in the analysis of the National Planning Commission's National Development Plan (NPC, 2011) and in the agriculture policy generally. Smallholder farmers are a key part of the growth-path for sustainable development in a green-economy. For this to be achieved, the NSSD 1 suggests that a massive outreach programme should be developed to raise awareness and to support changes in behaviour and more sustainable production and consumption practices. It furthermore highlights the critical need to ensure implementation capacity across all sectors in South African society to achieve sustainable development and empower communities. From an action planning perspective the implementation of a comprehensive capacity-building programme is suggested, as well as increasing the number of community-based capacity building projects that support principles of sustainable development.

1.3.2 National Policy on Food and Nutrition Security

The overall aim of the National Policy on Food and Nutrition Security for the Republic of South Africa (Department of Agriculture, Forestry and Fisheries, 2013:3) is to have strategies in place which look to improve the health and well-being of the most vulnerable and of children (as part of Vision 2030's

National Development Plans). The policy is guided by an earlier approach and focuses on the Integrated Food Security Strategy (Department of Agriculture, 2002), which targeted streamlining the various programmes in government toward the goal of prioritising food-security. From that strategy and subsequent policy review of the effectiveness of the IFSS, a more comprehensive National Food and Nutrition Security Policy (2013) was enacted.

The Constitution recognises “the right to have access to...sufficient food and water” and that “...the State must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of each of these rights” (South Africa, 1996:12).

South Africa has realised relative success in providing national-level food security through country-wide production levels, global partnerships, and food imports (DAFF, 2012:3). The General Household Survey (GHS) conducted by Statistics South Africa (2012a) indicated some improvements in food security trends and overall social and material benefits, but within South Africa, food distribution, relative affordability and access is heavily skewed. Government estimates that many citizens (13.8 million) go hungry for periods of time each month (DAFF, 2013:6). The current National Food and Nutrition Security Document (RSA, 2013:8) is thus guided by several dimensions of uplifting food and nutritional security (paraphrased below):

1. To provide adequate availability of food.
2. To provide access to healthy food, which in its making encourages better social, economic and environmental realities (particularly as land access for women ought to be encouraged).
3. To encourage the safety and quality of food for consumers.
4. To encourage the stability of value chains within the food supply.

As an important definition of food and nutritional security, National Policy defines food security as such:

“[Having] access to and control over the physical, social and economic means to ensure sufficient, safe and nutritious food at all times, for all South Africans, in order to meet the dietary requirements for a healthy life” (Department of Agriculture, Forestry and Fisheries, 2013:8).

One important programme which has had an impact in rural areas, the Zero Hunger Programme (DAFF, 2012b) is aligned with programmes targeting food security within the Department of Agriculture, Forestry and Fisheries. The objectives of the Zero Hunger Programme and Strategy align with National Policy in that nutritional security is enhanced by food assistance, nutrition education, and local development (some pillars of food and nutrition security). The programme aims at the heart of the target of social and economic development by providing basic necessities for those who are often without food.

The National Policy targets the improvement of agric-production levels of (rural) areas, for instance, “where productive land is available...(but) it is not always optimally utilised for food production”. The National Policy also recognises, as does this research, that constraints and aspirations for

farming are contingent on “inputs (including finance, equipment and water), or skills” (RSA, 2013:4). The National Policy is important to this research in that there is intention to support improved production (resource use and output) by investing in local farming capacity to improve food security. The National Policy also recognises that steps must be taken to improve smallholder farmers’ access to markets and training.

1.3.3 Agricultural policy and the smallholder focus

The strategic importance of smallholders has been articulated in earlier agricultural policies such as the ANC’s Agricultural Policy (1994), the White Paper on Agriculture (1995) and the Strategic Plan for South African Agriculture (2001).

A review of policy highlights the goals of improving well-being and security on rural South African farms. The current agricultural Strategic Plan aims to improve smallholder produce and yields for market sale and home consumption. Policy favours both smaller-scale and larger-scale interventions. There remains an emphasis on subsidising farmers to increase their productive capacity. Subsidisation is part and parcel of the long-term economic stability and sustainability of local economies to help strengthen engagements in global markets (Department of Agriculture, 1995:27-28). Later documents, such as a policy brief put together by the Organization for Economic Co-operation and Development (OECD), highlight the dualistic qualities of the South African economy between commercial farming and subsistence agriculture; the document remarks that major policies to date have been focused “...to bring the previously excluded black community into the mainstream economy through job creation and entrepreneurship” (OECD, 2006:1-2). South Africa remains an important player in market exports despite some authors asserting that the country operates ‘backwardly’ within global trading systems (Sender, 2015).

it is noted that as of 2005, South Africa remains committed to programmes initiated to develop market-orientated approaches to encourage small-scale and emerging farm sectors to grow via land reform, and access to credit mechanisms (i.e. often micro-credit) and retail financial services in rural areas (OECD, 2006:2). However, land reform and redistribution is mentioned as costly and so far ineffective to move fast enough to empower emerging farmers to take up larger-scale farm operations; this has been similarly highlighted in other reports. There is an important shift in the 2001 Strategic Plan from the position of an earlier White Paper (1997:5-11), with interest to go beyond thinking about agricultural practices mainly at a commercial scale. The potential for small-scale rural growers and small-scale urban practices to stimulate wider economies and therefore to strengthen current market value and growth within the industry is recognised. There is a heavy emphasis on food insecurity within the country and the need to move towards a food-secure nation, through the promotion of both smallholder and larger-scale sophisticated farming enterprises.

The ANC’s current Strategic Plan for the Department of Agriculture, Forestry and Fisheries, 2012/13-2016/17 (DAFF, 2012a) is an even more refined and structured document aligning past ideology to create a more just and sustainable South Africa. The plan outlines the way forward across agricultural, forestry and fisheries sectors, highlighting the importance of addressing climate change

(DAFF, 2012a:33). Climate change is noted as undermining potential food security strategy. There is also acknowledgment of rising population pressures which will place considerable strain on current food growing practice and supplies if there is not a serious push forward to increase small-holder/small-scale production.

The plan's strategic overview highlights the key policy mandates moving forward, including: (1) the Zero Hunger Programme, (2) the Strategic Plan for Smallholder Producers, (3) the Aquaculture Programme, (4) the Agro-processing Strategic Framework, and (5) the Spatial Analysis of Agriculture, Forestry and Fisheries (DAFF, 2012a). Programmes (1), (2), (4) and (5) are aligned to this study. The Strategic Plan highlights the complexity of current and pressing challenges, including the challenges of global austerity and recession politics which have impacted on markets, particularly as agricultural subsidies are often utilized to the advantage of foreigner countries under (capitalist) ideologies of deregulation and/or liberalisation. However, there are plans and efforts made to improve the efficiency and 'agro-logistics system' promoting cost-effective flows of commodities across economies, local and foreign (DAFF, 2012a:42).

1.3.4 Land reform

Land access, tenure systems and the administration thereof impact heavily on agricultural practice and production. This section provides a brief summary of the status of and issues pertaining to the White and Green Papers on Land Reform. Policy highlights the complexity of constitutional tensions between civil and customary systems. There have been substantial attempts to decentralise administration mechanisms on communal land, to localise land administration systems and better control and facilitate land-exchange processes with the goal of increasing productive land-use practices. The Department of Land Affairs strategies have moved from primarily focusing on the transfer of land to recognising that more attention needs to be given to the whole farm enterprise system, not only land.

The persistence of these problems, particularly in rural areas, is closely linked to the legacy of a bitter history of land dispossession, and land reform is essential if the structural roots of rural poverty are to be addressed (Kleinbooi, 2010). Land reform is understood as "a set of policies and frameworks which govern secure access to and use of land and which seek to restructure inequitable, socially inefficient and unsustainable existing land relations" (PLAAS, 2011:5).

While land reform has always been part of the African National Congress (ANC) and South African Government's transformation agenda, in practice its implementation has fallen far short of expectations. However, in 2009 and for the first time, 'rural development, food security and land reform' became one of the five priority areas listed in the ANC's election manifesto (Hall & Aliber, 2010). This committed the Party to address food security and to expand access to food production schemes in rural and peri-urban areas. The project objectives align with these policy intentions. A more detailed analysis of policy on land and food production as it pertains to the project is presented in Chapter 6.

Land and tenure security: Tenure security is acknowledged as being vital to secure an income for existing farmers and new entrants. The National Planning Commission's National Development Plan (2011) also emphasises the need for tenure security, particularly within communal systems. The situation of tenure security for black farmers, especially women, in communal areas and under the land reform programme is cause for concern that the various mechanisms essential for a thriving land market do not exist (Shipton, 2009). To facilitate the growth of farming production, a vibrant land market is essential to facilitate that farmers move off their land and allow new owners interested to farm to enter into the sector (i.e. either by securing use-rights through formal lease, or acquiring full rights through purchase of land). It remains difficult to secure loans for agricultural production without title to the land.

Flexible systems of land-use for different kinds of farming on communal land are listed, for example by the National Planning Commission, as interventions that need to be investigated (NPC, 2011). Further, the Commission motivates that discussion on the land-tenure system must consider alternative kinds of land-use rights to those presently in place within communal tenure systems (NPC, 2011).

The Commission presents a stance that would appear to be in line with those promoting 'local land administration systems', rather than relying on national legislative changes which have major social and political impact. This was evidenced by the ongoing uncertainty in relation to the Communal Land Rights Act 11 of 2004 (CLaRA), promulgated in 2004 and subsequently declared unconstitutional, showing that these changes can take time. Local land administration approaches in a South African context are motivated by Denison and Manona (2007) and Manona et al. (2010), and internationally by Green (2008) and de Soto (2000), among others.

While highlighting the key issue of tenure security generally, and promoting local administration, the Commission's strategic position is still not entirely clear on tenure, and suggests that "...the focus should be on cooperating with traditional leaders to secure tenured irrigable land supported by fully defined property rights. This will allow for development and give prospective financiers and investors the security they require" (NPC, 2011:220). The extract talks about cooperating with traditional leaders (i.e. suggesting a local land administration solution), but then proceeds to link tenure to security for financiers (i.e. to provide collateral for bank loans). Further confusion is created in that the role of Traditional Authorities in administering land is potentially in conflict with the Constitution's commitment to gender rights, as this would formally recognise Traditional Authorities with unelected members (Movik, 2012).

The uncertainties in South Africa's land legislation and the diversity of evolved practices in land administration in areas under traditional tenure systems are well documented in Chapter 6 of this report. Research work undertaken in this project, and on other WRC projects in Limpopo (WRC Project No. K5//2179/4, forthcoming) shows that a combination of democratisation and modernisation influences, plus historical gender roles in relation to field agriculture, have created new, more equitable avenues for women to access arable land. Notwithstanding institutional

challenges of access – differentially gendered or not – tenure security, transferability of land in particular, are key issues that are widely recognised as being critical to enable increased land-use.

1.3.5 Gender policy

The National Gender Policy Framework (RSA, 2008) is a document that defines the country's vision and states in a general way what it plans to do to achieve this vision. It addresses needs by proposing mechanisms articulated by women and men who engaged in the consultative process that resulted in enshrining gender equality into the National Constitution. Until women and men have equality of opportunity with regard to access, to control and decision-making in the economy, to the provision of services, to the sharing of resources and employment, and to fair treatment, policy and decision-makers will need to draw distinctions between gender issues and women's issues so that resources can be set aside to meet the specific needs of women. Women's empowerment is thus a means to achieve gender equality rather than an end in itself.

Department for Women, Children and People with Disabilities (DWCPD): In the Gender Policy Framework no specific mention is made of the gendered aspects of water and land, and the strategic agenda is not well-developed. Marginal progress has been made since the 2009/2010 operational plan which notes that a Draft Discussion Document on "Women and Rural Development: Seeking a Strategic Direction" has been developed. This suggests a significant gap in the Department's influence on key rural development issues which impact primarily on women.

Health and well-being: Health and food availability are closely interlinked. Key legal and policy documents in the Department of Health include the National Health Act (RSA, 2003) and the National Strategic Plan on HIV and AIDS, TB and STIs 2012-2016 (RSA, 2012). These are relevant to the study, given the direct links between food production, nutrition and health, particularly in the context of HIV/AIDS. The National Health Act specifically focuses on women as part of vulnerable groups.

National Health Act 2003 (No. 61 of 2003): The Health Act outlines the responsibilities of government to provide treatment for those eligible to access free health services, and protects the rights of vulnerable groups such as woman, children, older persons, and persons with disabilities. This is aligned with the focus on poverty alleviation and enhanced food security within the National Strategic Plan (RSA, 2012), which is the guide for a response to HIV/AIDS. HIV is widely understood in policy as a human rights issue – the denial of human rights increases the risk of HIV infection, and HIV infection increases the risk of human rights violations. A human rights approach has been a core principle of the HIV response.

Women, food security and nutrition are closely linked to HIV, as having a healthy diet through a variety of affordable, locally produced, fresh food is crucial to sustaining longer and healthier lives. Rural health is also a particular focus of the strategy. The research team took an approach that recognises these varied contexts of rural health. The report integrates the findings, as these can be aligned to offer practical solutions to policy strategy. There is certainly opportunity for greater synergy between departments, which require better articulation in policy. The National Strategic

Plan provides a strong framework to achieve goals of improved health through better nutrition, but there is the stated concern that even with regulatory frameworks in place, achieving better nutrition for the wider populace could be difficult. It is noted that provincial and municipal departments are limited in their capacity to implement the strategy.

1.3.6 The impact of climate change

The National Climate Change Response White Paper (NCCRWP) (RSA, 2011) has significant implications for knowledge dissemination on sustainable agricultural water-use. It identifies increases in overall temperature and changes in rainfall patterns, with increased frequency of heavy rainfall and extreme weather events with longer and more intense droughts. South Africa is vulnerable to these changes. Climate change will impact on agriculture and food security, especially amongst smallholder and more vulnerable farming communities. The NCCRWP projections for South Africa are that temperatures will increase between 1-2 degrees on the coast, and between 2-3 degrees in the interior. By 2100, warming is projected to reach around 3-4 degrees along the coast, and between 6-7 degrees in the interior. The NCCRWP states that:

With such temperature increases, life as we know it will change completely; parts of the country will be much drier and increased evaporation will ensure an overall decrease in water availability. This will significantly affect human health, agriculture, other water-intensive economic sectors such as the mining and electricity generation sectors as well as the environment in general. Increased occurrence and severity of veld and forest fires, extreme weather events and floods and droughts will also have significant impacts. Sea-level rise will negatively affect the coast and coastal infrastructure. Mass extinctions of endemic plant and animal species will greatly reduce South Africa's biodiversity with consequent impacts on ecosystem services.

(RSA, 2011:9)

The NCCRWP consequently outlines a number of commitments to mitigation and adaptation. Those which affect agricultural water-use knowledge dissemination most substantively are:

- **Integrated planning:** Prioritise the mainstreaming of climate change considerations and responses into all relevant national, sector and provincial development plans.
- **Behaviour change through choice:** Prioritise education, training and public awareness programmes to build the general public's awareness of climate change so as to empower all South Africans to make informed choices that contribute to an economy and society that is resilient to climate change.
- **Technology research, development and innovation.** Prioritise co-operation and the promotion of research, investment in, and/or acquisition of adaptation, lower carbon and energy-efficient technologies, practices and processes for employment by existing or new sectors and sub-sectors.

Adaptation plans will be integrated into major national plans such as the Strategic Plan for South African Agriculture and the National Water Resources Strategy, amongst others.

Water: The NCCRWP states that South Africa is a water-scarce country with a highly variable climate and one of the lowest run-offs in the world – a situation that is likely to be significantly exacerbated by the effects of climate change. Based on current estimates, South Africa will exceed the limits of economically viable land-based water resources by 2050. Water availability in South Africa is a key climate change-related vulnerability, and negative impacts on the availability of water will be felt by people, ecosystems and the economy, including smallholder farmers. In terms of water-based adaptation actions relevant to this project and smallholder farmer agricultural water use in particular, the NCCRWP suggests, among other things, the need to:

- Integrate climate change considerations in the short-, medium- and long-term water planning processes across relevant sectors including agriculture.
- Reduce the vulnerability and enhance the resilience to water-related impacts of climate change in communities and sectors at greatest risk.

Agriculture is also identified as a key adaptation priority in the NCCRWP. It is said that climate change significantly impacts agriculture and commercial forestry but that there is significant potential for adaptation to improve a response to climate change through these industries (RSA, 2011:17). Certain climate-resilience sectoral plans have the potential to directly address the plight of those most impacted by climate change – the rural poor. Climate-resilience strategies address needs to improve food security, water, health and land reform. Policy further highlights that “...under-resourced, small-scale and subsistence farmers are particularly vulnerable to the impacts of climate change” (RSA, 2011). The adaptation priorities defined for agriculture in the NCCRWP that are the most relevant to this project include:

- Integrating agriculture into climate-resilient rural development planning to address job creation, food security and livelihoods, with a particular emphasis on building climate resilience. Through leveraging synergies between adaptation and mitigated practices there is optimal opportunity for positive social and economic change.
- Using the results of available risk and vulnerability studies to support the agricultural sector’s proactive efforts to exploit new agricultural opportunities, new areas and new crops.
- Investing in and improving research into water, nutrient and soil conservation technologies and techniques, climate-resistant crops and livestock, as well as agricultural production, ownership, and financing models to promote the development of ‘climate-smart agriculture’ (CSA). Climate-smart agriculture is defined by the FAO (2010) as agriculture that contributes to the development of sustainable development goals. It integrates the three dimensions of sustainable development (economic, social and environmental) by jointly addressing food security and climate challenges. It is composed of three main pillars: 1) sustainably increasing agricultural productivity and incomes; 2) adapting and building resilience to climate change; and 3) reducing and/or removing greenhouse gases emissions. The CSA approach is designed to identify and operationalise agricultural development within the explicit parameters of climate change (FAO, 2010).

- Investing in education and awareness programmes in rural areas and linking these to agricultural extension activities to enable both subsistence and commercial producers to understand, respond and adapt to the challenges of climate.

This means that strategies in support of the project objectives must consider 'climate-smart' agriculture, and formulate intervention solutions which provide resilience to climate change.

1.3.7 Policies responding to skills training

Skills development in the agricultural sector, including entrepreneurship training, is highlighted as critical. This includes the training of a new cadre of extension officers to respond to the needs of smallholding farmers, contributing to their ability to engage in market systems and particularly the value chains related to food. Again, the NCCRWP indicates that climate change elements must be included in the review of the National Skills Development Strategy and all Sector Education and Training Authorities (SETAs). There is indication of the importance of adding climate change as a priority for skills development programmes in the formal, informal, and non-formal sectors related to education and training. This will be accompanied by requisite resource re-allocation to support training initiatives. The Long Term Adaptation Scenario (Department of Environmental Affairs, 2013) recommends certain adaptation interventions in the SA agriculture sector should integrate future planning to address expected problems, with a focus on training.

Thus, the Sector Education and Training Authority for Agriculture (AgriSETA) is supposed to provide grants for skills training, but has suffered from insufficient revenue (AgriSETA, 2010). In 2002, AgriSETA did create a bursary scheme and internship programme aimed at training, but the full extent of its impact has yet to be evaluated. Internship bursaries are still fairly new (instituted in 2004), making it difficult to measure the overall success of programmes (AgriSETA, 2010). More training colleges within a more robust skilled development funding model were noted as being needed. This could likely help train those interested in the sector determine useful strategies forward (AgriSETA, 2010).

1.3.8 The National Development Plan

The National Development Plan (NDP), adopted by Cabinet in January 2013, sets out the strategic direction across all sectors of South African society and states that between 2012 and 2030, better and more sustainable infrastructure should be constructed. Issues related to smallholder agriculture, rural livelihoods, women, food security and markets are of interest here. The main focus of the NDP vision is that more opportunities for rural communities to participate in economic, social and political life in the country must be turned into reality. The NDP envisages the expansion of smallholder agricultural development and integration of smallholder farmers with the dominant and highly commercialised large-scale agricultural economy. Such integration is seen as critical to improved livelihoods. The plan presents a wide-ranging analysis of the water-agricultural complex and of factors to consider in smallholder irrigation farming. The rural development vision rests heavily on 500,000 ha of new smallholder irrigation, and that smallholder irrigated agriculture will be the 'driving force' of growth and change in the country's

rural areas to achieve job creation and poverty alleviation: *To achieve this (job creation and poverty reduction impact), irrigated agriculture and dry-land production should be expanded, with emphasis on smallholder farmers where possible. The 1.5 million hectares under irrigation (which produce virtually all South Africa's horticultural harvest and some field crops) can be expanded by at least 500 000 hectares through the better use of existing water resources and developing new water schemes (NPC, 2011:218).*

The NDP aligns well with the idea that there are varied smallholder farming practices and scales in South Africa, and articulates broad support strategies for sustainable agriculture. Improving or conserving agricultural water is highlighted as a priority. The wide reach of strategic responses also addresses some of the key concerns raised by Kemerink et al. (2011) which were identified as limiting reform, including: institutional chaos, in the former homelands in particular; the tendency of government to force people to work in groups, often acting as a disincentive; the disconnected reform programmes at policy and implementation levels; and finally, the fact that many people with land and water resources are not farmers nor interested in farming.

Among the priority target groups of the NDP are rural people in general and women in particular. Skills development of young people to expand opportunities and unlock potential for economic growth, increased employment, better health, and food security, among other things, are of central importance. The Commission observed the high prevalence of poor land-use practices in communal areas, and the need to reverse this to improve the livelihoods of the rural communities. One aim has been to curb the high migration from rural to urban areas. If rural people engage in agriculture as an economic activity, there is potential to increase the number of real jobs created by the sector, from production through to processing. A more detailed review of the NDP is presented in Chapter 8, as a framework for the intervention strategies that emerged from the study.

1.4 Strategic Direction and The Challenge At Hand

The policy and strategy review concludes that the agricultural section of the NDP, as it pertains to smallholders, is closely aligned to various sectoral policies and strategies which aim to address a national crisis of rural unemployment and hunger. While critical institutional gaps systemically entrench the status quo of a struggling smallholder sector, not least land tenure inadequacies, lack of access to farming knowledge and market dislocation, the NDP provides clear direction and reflects a coherent summary of overall Government policy intent to expand the sub-sector. One important disjuncture is the political target for the development of 500 000 ha of smallholder irrigation, which contrasts sharply with the National Water Resources Strategy 2 (DWA, 2013) discussed in detail in Chapter 5, along with Water Allocation Reform strategies. The appendices of the NWRS-2 describe, province by province, the available water for smallholder expansion of between 80 000-82 000 ha nationally, which is less than 17% of the water needed for the irrigation expansion target set in the NDP. While this difference appears to be a fatal flaw in this particular aspect of the NDP, or in communication between the Department of Water Affairs and Sanitation and the National Planning Commission, the work in this study views the NDP target as a political vision of a massively expanded

irrigated smallholder sector and thereby a challenge to the development community to find ways of supporting intensive smallholder agricultural expansion.

This expansion must be scalable (therefore cost effective and founded on grassroots development), water efficient, and centred on existing smallholder resources to achieve maximum rural development impact. This call has informed the study and provided a frame of reference within which the proposed interventions have been formulated, based on evidence derived from the intensive research process.

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Chapter 2 Approach and Conceptual Frameworks

C Murata, J Denison, L Conde & T Jacobs

2.1 Introduction

This chapter explains the research approach and discusses the methodology, methods, frameworks and instruments that were adopted for the project. The research was conducted using a case study approach, for which three villages were selected as case study sites and within that, the household as a social and physical entity was the main unit of analysis. Due to the multiple themes within this study and the need to gain in-depth insight into a range of factors, mixed research methods were used as the methodological paradigm. The research process was conceptually framed by the Sustainable Livelihoods Framework, a gender framework, and the New Institutional Economics Framework, which informed thematic work where relevant and useful. Quantitative and qualitative data was obtained using a number of questionnaire-based instruments, participatory observation, measurement and techniques. Integration of findings to achieve an inclusive analysis across the themes of land, water, food production and women's empowerment was achieved through an iterative process of combined fieldwork and frequent team interaction.

Terminology

In the domain of social research, the challenge to develop scientifically sound and coherent research requires terminology to be clearly defined. Confusion amongst both the authors and readership of social research is created when terminology or words are used differently or mean different things, depending on the context. The definitions of a few key terms that are used in this research are presented below (O'Leary, 2004).

Methodology: The framework associated with a particular set of paradigmatic assumptions that one uses to conduct research; examples include ethnography, mixed-methods, and action research.

Methods: The techniques the researcher uses to collect data, such as interviews, surveys, participative observation, etc.

Tools or instruments: The devices used by a researcher to help collect data, for example questionnaires, observation checklists, interview schedules, etc.

Research Design or Methodological Design: The overall plan for conducting the study that includes all of the above.

Oosthuizen et al. (2005) likens a research design to an architectural blueprint or a plan for assembling, organising and integrating information (data), a process which results in a desired end product, in the form of research findings and a report. Durrheim (2006) gives a slightly different opinion. He argues that research is an iterative process which is best conducted using a flexible

design to facilitate coherent engagement with the research questions. This is done with qualitative and mixed methods studies, heeding Durrheim's caution against adopting a blueprint approach because it can be restrictive and often fails to adequately address complex research problems (Merriam, 1988; Creswell & Plano Clark, 2011; Huberman & Miles, 1994). In this research, Durrheim's definition of a research design as a strategic framework provides guidance to the research processes and activities so that scientifically sound and defensible conclusions can be drawn. A case study design was chosen as a frame for the whole research enterprise; within this, a mixed methods paradigm was adopted as the methodological philosophy.

2.2 Theoretical Basis for the Case Study and Mixed Methods Design

The concept of using a case study research design is understood differently by scholars of different methodological denominations. Although it is widely acknowledged that a case study entails an intensive investigation of a study unit (Babbie & Mouton, 2001), defining the exact nature of the unit is the linchpin of the problem. In some instances, especially in deep ethnographic and psychoanalytic studies, this unit can be a single person, while in others it can be a social segment such as a household or an ethnic group. In other instances, especially in phenomenological studies, the case study unit can be a community or a village (Durrheim, 2006; Babbie & Mouton, 2001). In addition, the case study design does not necessarily restrict the researcher to studying a single case study unit. To the contrary, several units can be studied, in which case the approach is called a multiple case study design. In this research project the case study unit was the household, which were selected from three villages using qualitative selection criteria.

According to Oosthuizen et al. (2007:71), "a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used". Given that it involves intensive study of a selected unit, the case study design allows for an investigation of multiple variables and thereby provides for a holistic understanding of phenomena.

By allowing for use of multiple research methods that include surveys, interviews, field observations and even experiments, case study designs not only spread wide the net of evidence, but also offer a valuable flexibility for researchers to use, without restriction, the study tools that are deemed most appropriate for a particular research problem. In fact "case study does not claim any particular method for data collection or data analysis. Any or all methods of gathering data from testing to interviewing can be used, although certain techniques are used more than others" (Oosthuizen et al., 2005:74). A case study therefore allows for the mixing of quantitative and qualitative methods to investigate a single research problem. However, because the case study design is so flexible, accommodating multiple techniques, tools and methods, it lacks a precise and universally understood definition. This presents both a valuable opportunity and a serious scholarly risk. The opportunity is that researchers can apply it adaptively in order to respond to complex and emerging problems in a pragmatic manner. The risk, however, is that the concept is often misinterpreted, which could lead to misinformed and unwarranted criticisms.

Given that the case study design accommodates multiple research methodologies, methods, tools and techniques, it can be used to study virtually any phenomenon. However, some research problems present a more pressing need for a case study design than others. Typically, applied research projects with the intent of studying contemporary issues, whether social, economic or political, about people in their natural settings, are often best conducted using the case study design because they present thematic complexity in the sense that they are multivariable and composite. In order to do justice to research such as this, the study approach needs to be intense and make use of a variety of data-gathering techniques (such as numeric, narrative, deductive and inductive) that are capable of tackling and interpreting the problem from several angles.

Depending on the nature of the research problem, case study designs may use a single or multiple research methodology (qualitative, quantitative and mixed methods), research methods (surveys, interviews, focus groups, experiments, etc.), data collection instruments (questionnaires, interview schedules, observation checklists, etc.) and data analysis tools (interpretive, excel, statistical packages, etc.). These choices should not be made based on subjective inclination, but should follow from theoretical reasoning of the overall research problem, objectives and questions and be informed by a practical understanding of the research context.

2.2.1 Limitations of case studies

A case study is “...a single bounded system or an instance of a class of phenomena and not a representative of a class” (Oosthuizen et al., 2007:72). This observation has led to a frequently cited argument that findings and conclusions from case studies are difficult to generalise. However, the concept of generalisation must not be limited to the classic principles of statistical significances and numeric quantities. In case studies, generalisation is legitimate as long as the limits of the generalisation are made clear. Instead of providing statistical generalisations, case studies provide the basis for analytical generalisations in which single or multiple cases are used to illustrate, represent, or be generalised to a theory. Moreover, case studies can legitimately generalise on the basis of the extent to which a case is representative of some larger population. In this case, what matters is not the number of cases studied, but rather the *kind* of cases or units which are studied, as it is the nature of the phenomenon that is the true measure of the population to which one seeks to generalise (Oosthuizen et al., 2005).

The case study design has two major qualities that are considered critically relevant to this study. Firstly, it allows for an intense, holistic study of a case unit by looking at many or all of its variables. This presents a perfectly good fit to the composite nature of the overall research problem of this work, which seeks to describe constraints to women in achieving their agricultural aspirations, empowerment opportunities regarding food production, and use of available land and water. Doing justice to this multi-variant problem calls for multi-methods and a flexible design to identify and respond to emergent findings within the research themes, with the ultimate aim of integrating findings into a single coherent research product. Secondly, by allowing the use of multiple methods and epistemologies to collect data and make meaning of study phenomena, the case study design

provided the scholarly legitimacy to use both quantitative and qualitative approaches, as well as the methodological guidance to do so.

2.2.2 Mixed methods design

The mixed methods research approach has been gaining in popularity among researchers and authors since the 1980s. Specialised journals have been dedicated to the publication of mixed methods scholarship, and interest groups around the concept are growing. To this effect, the mixed methods approach has become a distinct methodological formation. In some circles it is called the “third methodological movement” in recognition of the development first of quantitative and then qualitative approaches, while in others it is called the “third research paradigm” and even a “new star in the social science sky” (Creswell & Plano Clark, 2011:1). The concept of mixed methods offers a fundamentally new epistemic tool of interpretation and knowledge generation that is both intuitive and truthful of the way humans interact with and understand the universe. At the heart of the mixed methods research approach is the understanding that statistical facts and qualitative narratives can be used together beneficially to investigate a study phenomenon and present the findings thereof.

By virtue of the fact that it allows for the use of a variety of methods in a single study, the mixed methods approach can be used in a variety of disciplines, especially in the social and health sciences (Creswell & Plano Clark, 2011). There are research topics, however, that may best be studied using either qualitative or quantitative methods alone. For example, the use of qualitative methods alone would be sufficient for an ethnographic study where a researcher wants to understand how people of a certain ethnic group share culture, whereas quantitative methods alone are enough in cases where a researcher wants to understand the relationship between variables (Creswell & Plano Clark, 2011).

Over the years, various understandings leading to correspondingly different definitions of mixed methods have characterised the developments that have taken place in this methodological strand. During its formative phase in the 1980s, an understanding of the mixed methods approach was generally limited to a simple process of mixing two different methods, one a quantitative and the other a qualitative method. An early definition captures this observation, defining mixed methods as a research method “that includes at least one quantitative method (designed to collect numbers) and one qualitative method (designed to collect words), where neither type of method is inherently linked to any particular inquiry paradigm” (Creswell & Plano Clark, 2011: 2). But after two decades, the concept grew from simply mixing two methods to mixing methods through all the stages of the research process, including philosophical orientations, inferences, and interpretation of findings. This development gives the mixed methods approach the status of a distinct research orientation with an independent worldview and a separate set of vocabulary.

Creswell and Plano Clark (2007:5) succinctly capture this essence when they define mixed methods in the following way:

Mixed methods research is a research design with philosophical assumptions as well as methods of inquiry. As a methodology it involves philosophical assumptions that guide the direction of the collection and analysis and the mixture of qualitative and quantitative approaches in many phases of the research process. As a method, it focuses on collecting, analysing, and mixing of both quantitative and qualitative data in a single study or series of studies. Its essential premise is that the use of quantitative and qualitative approaches, in combination, provides a better understanding of the research problem than either approach alone.

This definition elevates the practice of mixed methods research to a distinct methodology which encapsulates all elements of the research process, including epistemic orientations.

There are core characteristics of mixed methods research that any design based on this orientation must incorporate, including that the researcher:

- collects and analyses persuasively and rigorously both qualitative and quantitative data (based on research questions);
- mixes (or integrates or links) the two forms of data concurrently by combining or merging them sequentially, by having one build on the other, or embedding one within the other;
- gives priority to one or both forms of data (in terms of what the research emphasises);
- uses these procedures in a single study or multiple phases of a programme of study;
- frames these procedures within philosophical worldviews and theoretical lenses; and
- combines the procedures into specific research designs that direct the plan for conducting the study (Creswell & Plano Clark, 2011).

Multi-phase mixed methods: There are several types of mixed methods research designs that researchers can use, depending on the demands of the research question they aim to address. These are: convergent parallel, explanatory sequential, exploratory sequential, embedded, transformative, and multiphase. The merit of any particular research design is inherently embedded in the nature of the research question to be addressed. Of the six typologies stated above, this work adopted the **multiphase design**, which is illustrated in Figure 2.1.

In a multiphase design, research activities are carried out in sequential phases. This project was an empirical study aimed at investigating and reporting on contemporary phenomena studied in their natural settings with the multiphase design as follows; first deciding on suitable case study sites, then conducting a contextual socio-economic survey, and finally working with case study households in depth, across the themes.

There were three fundamental motivations for the team to adopt a mixed methods approach for this study. Firstly, a single data source would be insufficient to address the multiple themes

embedded in the research problem. Secondly, findings needed to be explained, and where appropriate, statistical facts had to be used.

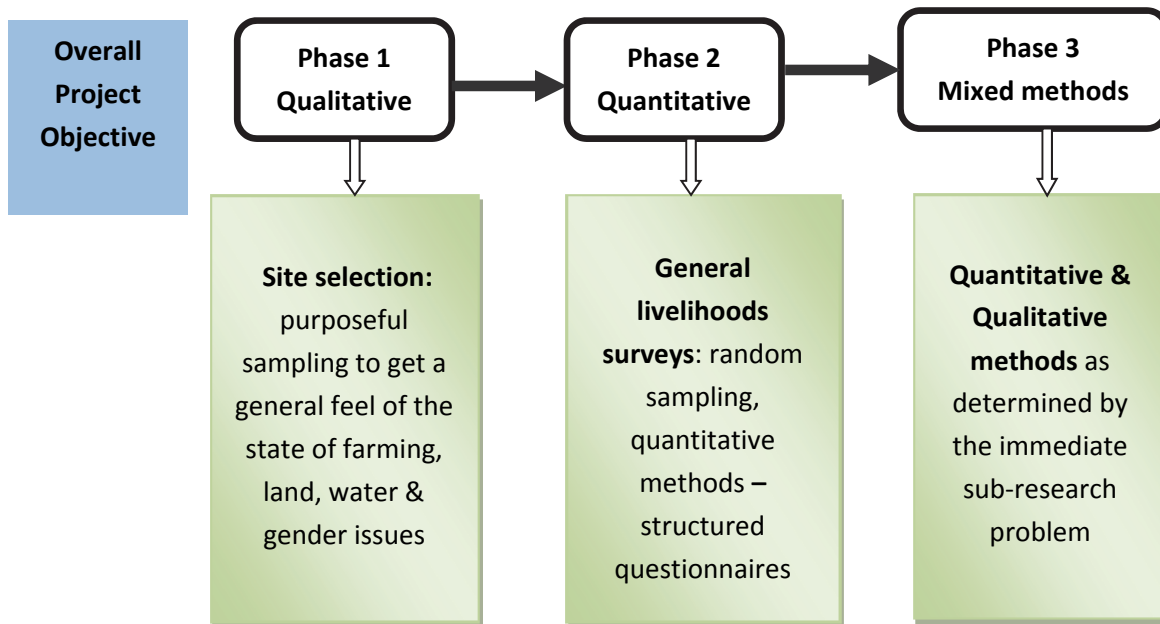


Figure 2.1: The Multiphase Mixed Methods Design

Thirdly, the overall research aim could only be addressed by using multi-phase study exercises. The mixed methods approach is most applicable to problems of a composite nature in which findings need to be presented in statistical form (to give precision) as well as narratives (to give explanations of processes and outcomes).

2.3 Application of the Case Study Approach Using Mixed-Methods

2.3.1 Phase 1 – Site selection

The process of site selection marked the first phase of the study and was done in a qualitative manner. Sites were selected purposefully, with suitability being assessed on the basis of a set of criterion. Selected sites were required to be one rural village in each of three District Municipalities of the Eastern Cape. Clusters of homesteads in villages, some planned and some traditionally settled, with surrounding fields and grazing commonage, are the norm in these areas. Land parcels in the form of home-gardens within the homestead boundary (or 'umzi' in isiXhosa), and adjacent or more distant fields, are also typical. The focus was thus on these types of villages, as opposed to those immediately adjacent to major towns with a more peri-urban character. The selection was considered with an awareness of the pervasive urban-rural linkages that characterise the former homelands, linked to limited local economic activity and migrancy and facilitated by waves of modernisation and better transport access. Thus all villages within the population of interest needed to have a predominantly 'rural' location i.e. be an appreciable distance from a major town, and, as is

most always the case in such locations, have smallholder arable land (gardens or fields). Details of the site selection process and site descriptions follow in this chapter.

After selecting and scoping the key relevant characteristics of the sites, appropriate methods for data collection and other engagement exercises with the participants were designed, using the mixed methods approach. The scoping information obtained also informed the second phase of the study.

2.3.2 Phase 2 – Socio-economic survey

Phase two involved a quantitative village survey to describe the socio-economic context of each case study village. The contextualisation included, among other things, a demographic overview; socio-economic information; and scoping level information on farming practices, resources and assets. Information from the survey also informed the selection of households which would participate in subsequent detailed research work.

The survey used probability sampling for the selection of study participants. Probability sampling strives to provide an efficient and scientifically unbiased method for selecting study participants who can adequately reflect relevant characteristics that are contained in the broader population of the study site (Babbie & Morton, 2001). There are two major driving tenets of probability sampling that were found to be relevant to this study. Firstly, it gives every population unit from the sample frame equal opportunity to be selected, and secondly, it strives to achieve a situation in which the selected sample becomes closely representative of the broader study population.

Informed by the first principle, a physical count of the homesteads at each site was conducted using Google[®] satellite maps of the sites. By reading these satellite maps, the research team could determine whether the villages contained geographical sub-divisions which would need to be taken into account when applying the probability sampling technique. Where villages were found to contain spatial sub-divisions (Lutengele and Mbekweni), cluster sampling – a branch of probability sampling – was conducted. Cluster sampling involves grouping the sample frame population into sub-groups of either a qualitative nature (such as sex, age, study level, religious affiliation), or a quantitative nature (including geographical blocks) in order to facilitate the conducting of probability sampling (Blanche, Durrheim & Painter, 2006). At Lutengele and Mbekweni, the study population was grouped into geographical sub-sections in order give equal chance to households in every sub-section to be selected for the study. By ensuring that all spatial sub-sections of the study villages were involved in the final study sample, the study strived to achieve analytical representation of the broader population.

The physical count of homesteads at each site was used to determine suitable sample sizes in accordance with the positivist principles of sample representation. There are several principles that can be applied to determine appropriate numerical representation of sample sizes. According to Bless and Higson-Smith (2000), a larger sample size of 30-50% should be used for smaller populations such as 100 households, while Blanche, Durrheim & Painter (2006) recommend a

sample of at least 30% for a population of approximately 1000 units. However, other social research studies with analytic representation (McAllister, 2000; Fay 2011) have successfully based their studies on much smaller sample units. In consideration of the literature and the general context of the research sites, a sample size of 15-20% of the village homesteads was set for the socio-economic scoping survey, achieving adequate numeric and analytic representation for the purpose of the project. Table 2.2 shows the sample percentages and units per study site.

Table 2.2: Sample percentages and units per study site for the socio-economic survey

Site	No. of Household (HH)	Sample Size	Sample %
Lutengele	272	53	20%
Sirhosheni	263	51	19%
Mbekweni	380	60	16%
TOTAL (<i>average</i>)	915	164	(18%)

Surveys are suitable for collecting original data about a population that is too large to observe directly. Because the aim of this survey was to construct a solid socio-economic backdrop to the study, it was conducted using a closed-ended-questionnaire as the data collection instrument, providing uniformity to answers across all the respondents.

The preliminary qualitative study that was done to select and establish study sites showed substantially low literacy levels in the villages. Questionnaires were thus administered face-to-face between researchers and respondents to ensure understanding and minimise mistakes in recording responses. The data was analysed using various quantitative instruments including Excel and statistical packages.

The analysis of the socio-economic survey provided insights, highlighted further questions and exposed numerous qualitative and quantitative gaps in the research. In order to address these gaps, the research team conducted a third sampling exercise.

2.3.3 Phase 3 – Mixed methods

This third phase of the study sought to define and select (using mixed methods) a sample of case study participants at the level of the household unit who would be engaged in-depth for the remaining three years of the study to address various research problems. Due to the fact that a priority objective was to explore aspirations in regard to food production, it was an essential criterion that these people had real interest in crop production or engagement with them would be pointless in regard to establishing aspirations, understanding constraints and formulating suitable interventions with them. As such the group of case study households were selected from agriculturally active households who were identified from data obtained in the wider random survey in Phase 2. Agriculturally ‘active’ was defined as having engaged in crop production (in gardens or fields) in the previous year. This led to a mixed methods sampling technique informed by

quantitative and qualitative sampling considerations, where a set of ten case study households was selected at each site. The set of informants from the 30 households consisted of people considered to be information-rich, including some of those who occupy positions in their local traditional leadership structures.

By choosing ten households at each site, the sampling sought to ensure that the three-year process of research collaboration with these households involved a greater number than was thought to be needed to achieve saturation, and it was accepted that some redundancy in findings would occur. The thirty detailed case descriptions, when combined, were expected to be sufficient to reflect the diversity among the three villages and provide a basis for making wider qualitative inferences and quantitative approximations. Importantly, findings in relation to land-parcel size, and land and water institutional aspects were expected to closely reflect the wider village situation as these factors were expected to be sufficiently common across the sample, and further informed by a range of key informant interviews. Findings in relation to land and water utilisation however, would have to be interpreted in relation to the fact that these were selected as part of an agriculturally active subgroup and contextualised accordingly.

In order to achieve gender representation, the samples were divided into equal parts of male- and female-headed households. A gender-disaggregated sample was key to unlocking narratives and constructing talking points. It also provided a methodologically appropriate platform to investigate and engage with the theme of women's empowerment.

All the spatial sub-divisions of the study sites had to be represented. Geographical spread was considered a valuable factor here, because position or location can have a bearing on several aspects relevant to this study, such as natural endowments (including water resources and soil quality), as well as administrative constraints or opportunities presented by the immediate local leadership regimes. Another qualitative consideration was that the selected household had to be participating in crop cultivation. By taking cognisance of this factor, the study was appropriately positioned to address research problems embedded in the project, including processes and institutions of land access and use, as well as water-use practices, opportunities, and constraints. In addition, studying farming households presented a golden opportunity to investigate and elicit experientially-informed responses around gender-disaggregated roles and responsibilities, and resource control, use and ownership in the domain of agrarian livelihoods practices within the studied households units.

The research was an empirical study so it was also important to prevent as far as possible participants giving hypothetical responses to research questions. The information obtained from engagement with these 30 case study households was augmented by purposefully selecting a number of key informants at each site including traditional leaders, local politicians and community organisers, amongst others. In-depth sessions with these key informants added to the collection of quantitative and qualitative data over the research period.

2.4 Data Collection and Analysis

2.4.1 Cyclical process

The processes of data collection and analysis were framed by, and conducted in line with, the central epistemic paradigm of the mixed methods design, which argues that social research problems are best investigated and findings presented using models that seek to foster a complementary integration of quantitative and qualitative techniques to arrive at findings. Creswell and Plano Clark (2011) regard this way of conducting research as an intuitive way of reconstructing the social world, blending together quantitative and qualitative techniques in a manner that is both technically sound and seamlessly coherent requires skill. The research team set out to facilitate a reflexive movement between the overall research problem on the one hand, and emerging findings and fieldwork practicalities on the other.

This continuous reflexive movement was achieved by designing and using an iterative and cyclical data analysis and presentation method that was both deductive and inductive regarding its philosophy of knowledge construction. This allowed the researchers to take note of and explore emerging themes in a scientifically guided frame of action that was capable of anticipating the unfolding of the broader research process.

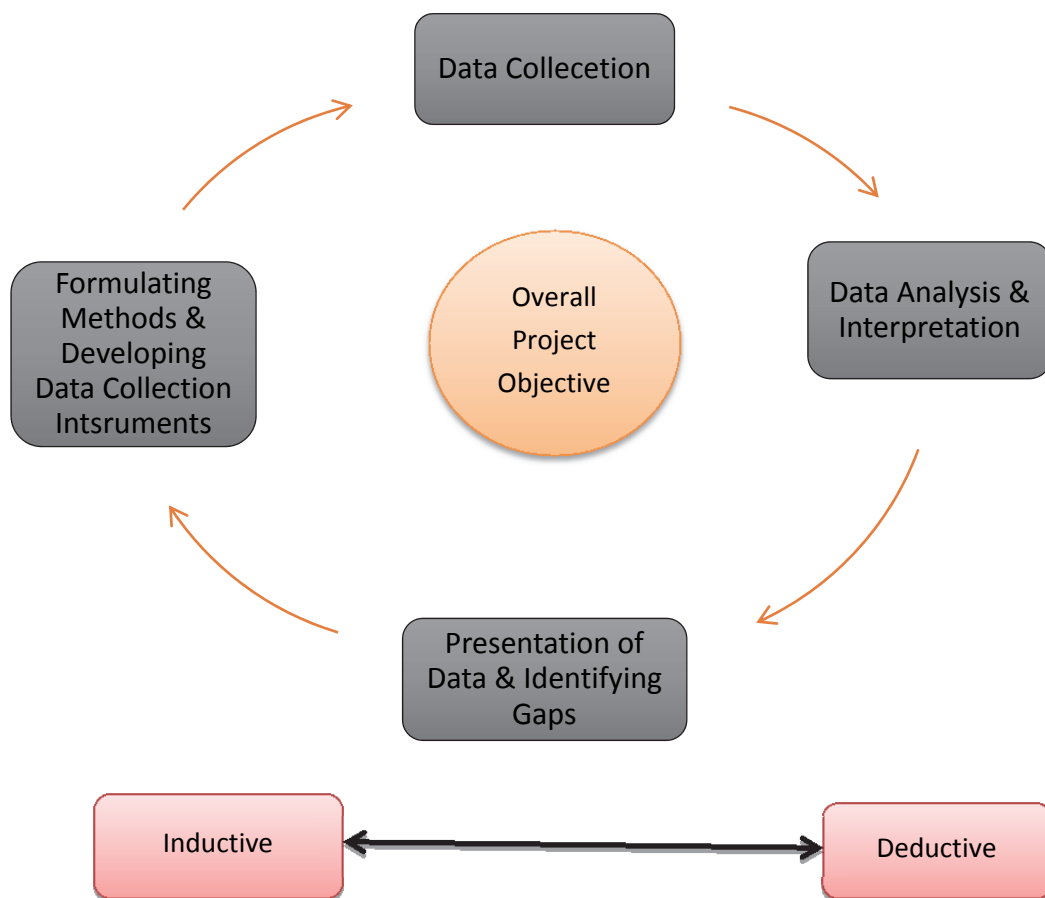


Figure 2.2: A cyclical and iterative data collection and analysis model

The process of data collection was cyclical, constantly moving between the unknown and the known. For instance, some of the results that were found during the quantitative survey study about categories of land parcels and sizes were taken back to the field for verification using qualitative methods of conversational interviews and focus group sessions. Apart from serving a corroborative function, the qualitative methods elicited rich descriptive and explanatory narratives that answered questions of both process and causality behind the statistical facts obtained from the quantitative surveys. Several authorities in the field of qualitative research methods describe this process as adding meat on the dry bones of quantitative figures (Huberman & Miles, 1994; Babbie & Mouton, 2001).

During the course of these verification sessions, some unexpressed themes emerged that were relevant to the study but had not been included in the talking-points sheet of the researcher. These sessions formed the beginning of inductive studies as emergent themes were scrutinised interactively with participants, and in cycles of analysis and reformulation of more detailed questions to facilitate greater understanding.

Such a complementary and reflexive interaction between deductive and inductive techniques necessitated adopting an iterative and systematic procedure that involved a succession of data collection and analysis cycles (Huberman & Miles, 1994).

2.4.2 Units and tools of analysis

As discussed in the sections on thematic integration and study design, the research theme was multi-dimensional, with multiple embedded variables and sub-themes that could not be untangled, investigated and reported on using a simple one-way research method. This observed reality had direct influence on how the research team defined and organised target units and tools of analysis. The final decision was to use two units of analysis: the household, and the household head. In cases where the household head was absent from home for significant periods of time, the person in the household who was involved in making farming decisions was involved instead.

The rationale for adopting the two units of analysis was that an analysis at household level would shed light on the way farming was conducted in different households, and more significantly perhaps, illuminate differences and similarities regarding access rights and agricultural practices in the context of household resources. Furthermore, an intra-household analysis was found valuable in that it provided a platform to expose gendered responsibilities, dynamics, opportunities and constraints that shape the day-to-day lives of different household members within the domestic sphere (Walker, 2011).

2.5 Thematic Integration and Research Frameworks

There are many variables embedded in the research problem. The team set out to address these through parallel but connected research activities, worked on by different researchers, using different methods. The complex was simplified by defining integrated themes which cut across all aspects of the work, and specific themes where enquiry was focused on one aspect only. The cross-cutting themes were embedded in the research by the adoption of three frameworks which informed the work in general: livelihoods (from a capabilities and empowerment perspective), gender, and New Institutional Economics. These were common and parallel frames of reference for enquiry and analysis, shown schematically in Figure 2.3 and expanded on below.

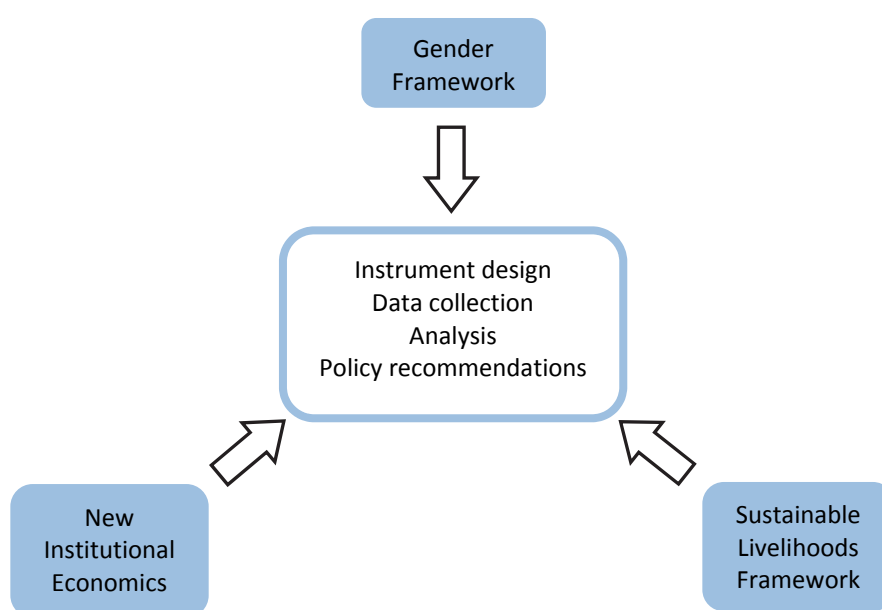


Figure 2.3: Frameworks common to all thematic research on the project

The specific themes of enquiry conducted within the above frameworks were:

- **water** – access to and use of water for crop production, and impact of policy;
- **land** – access, use, and related institutions;
- **roles** and **responsibilities** in household units regarding water use and crop production; and
- **aspirations, knowledge, skills** and **capabilities** in relation to crop production.

Instruments and methods that were used only in relation to a specific theme (e.g. water study, land study, etc.) are described in detail in the relevant chapter of the report. Integration of findings across the specific themes was achieved through an ongoing iterative process of information exchange within the team during seminars, workshops and combined fieldwork visits.

2.5.1 Understanding the livelihoods framework

Core to this study is the notion of establishing strategies and pathways that would help to enhance rural women's capabilities towards improved livelihoods, with a particular focus on agriculture. There have been several attempts to define a livelihood but the definition used most commonly is one produced by Chambers and Conway in 1992 for the Institute of Development Studies Institute (DSI). This states that:

A livelihood comprises the capabilities, assets (including both material and social resources) and activities for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintaining or enhancing its capabilities and assets both now and in the future, while not undermining the natural resource base (Carney, 1998:2).

Appendini (as cited in de Haan & Zoomers, 2005:24-25) expands on the above definition by quoting that the term livelihood "best expresses the idea of individuals or groups striving to make a living, attempting to meet their various consumption and economic necessities, coping with uncertainties, responding to new opportunities, and choosing between different value positions". A livelihood thus refers to the means of making a living with the resources available, and the capability to turn these resources into positive outcomes in a context influenced by organizational and institutional arrangements as well as vulnerability. This resonates with Nobel prize-winner Amartya Sen's contributions on capabilities, which have provided a major source of inspiration to livelihoods researchers and practitioners (Sen, 1985).

One of the most widely-used frameworks is the Sustainable Livelihoods Framework (SLF), used by the United Kingdom's Department for International Development (DFID, 2000a). The DFID-SLF has been adopted in this study as a guideline to analyse rural livelihoods and develop agricultural strategies to improve food security in the selected areas of study (See Figure 2.4).

Figure 2.4 also provides insight into the five main capitals or assets found in the DFID framework. These are human, physical, social, financial, and natural, in the context of vulnerability and institutional processes in order to achieve optimal outcomes or agricultural aspirations. Here, the livelihoods framework draws upon Sen's *entitlement* approach by making the connections between a set of concepts: endowments, entitlements and capabilities (Scoones, 2009). With this in mind, "endowments refer to the rights and resources that social actors have; environmental entitlements refer to the alternative sets of utilities derived from environmental goods and services over which social actors have legitimate effective command and which are instrumental in achieving well-being; and capabilities are what people can do or be with their entitlements" (Leach & Scoones, as cited in Scoones, 2009).

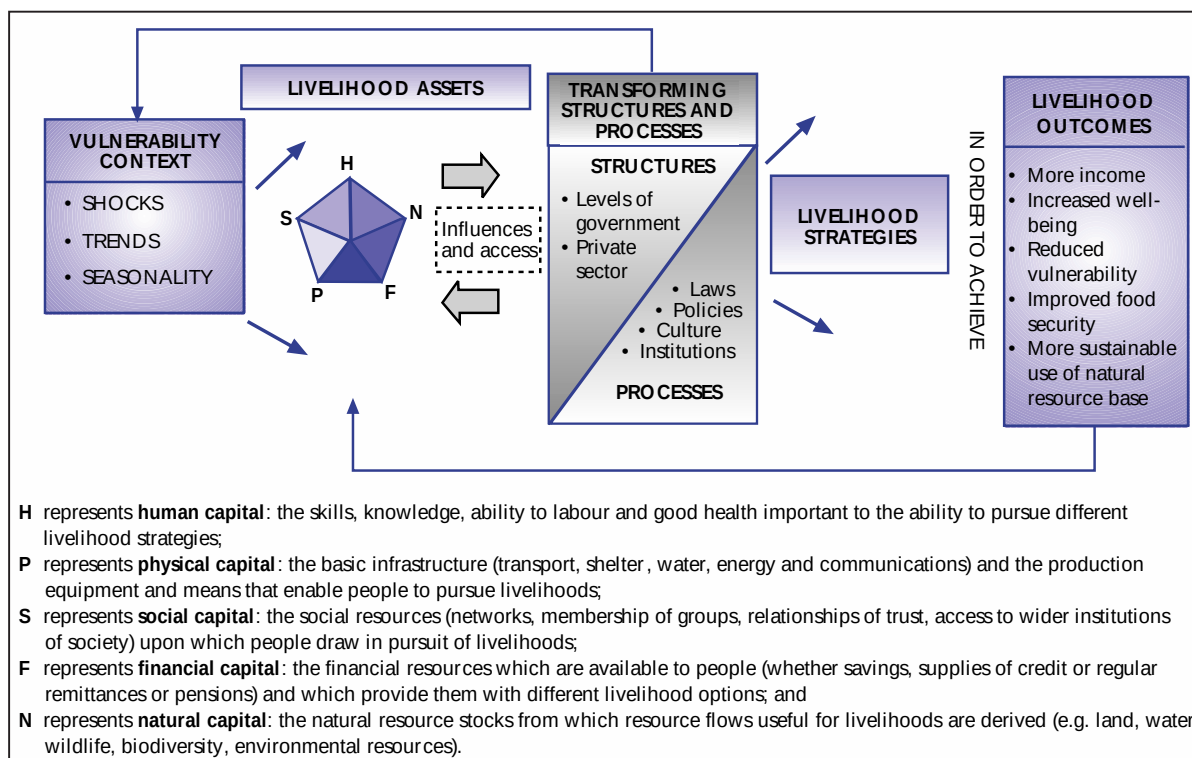


Figure 2.4: The DFID Sustainable Livelihood Framework

In other words, the potential she or he has to convert entitlements over goods and services into a range of “functionings”. According to Rao & Walton (2004:12-13):

“The translation of potential into functionings is a product of active choice by the individual as an agent – as someone who acts and brings about change in economic, social, and political domains, making use of their capabilities; and indeed influencing personal and public action in ways that determine the future formation of capabilities. The extent to which such agency can be effective depends on the broader institutional context, and especially the extent to which the political, governmental, and social institutions of a society allow for all agents to have an influence.”

Although the different range of assets or capital endowments available in an agricultural or farming system may not determine success or failure for the family, they are nevertheless critical inputs for individuals to exercise their capability towards their desired outcomes. The five core assets identified in the livelihoods framework are represented in what is known as the *asset pentagon*. The pentagon was developed in order to visually represent the inter-relationships between the various assets affecting people and their livelihoods, herewith described in more detail (DFID, 2001):

- *Human Capital*: the skills, knowledge, ability to labour and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives.
- *Social Capital*: the social resources upon which people draw in pursuit of their livelihoods objectives through the development of networks and connections, membership of more formalised groups, and relationships of trust, reciprocity and exchanges. Social capital is the most intimately connected to transforming structures and processes.

- *Natural Capital*: the term used for the natural resources stocks from which resource flows and services (e.g. nutrient cycling, erosion protection) useful for livelihoods are derived. These could range from intangible goods such as the atmosphere, to productive resources such as water, land, trees, etc.
- *Physical Capital*: comprises the basic infrastructure and producer goods needed to support livelihoods. These may include infrastructure that people need to be more productive as well as other producer goods such as agricultural implements.
- *Financial Capital*: the financial resources that people use to achieve their livelihoods objectives. These may contribute to consumption as well as production, generated from available stocks or regular inflows of money.

The institutional element within the SLF has two implications. Firstly, the contribution of various types of arrangements at both the micro and macro levels must be recognised; secondly, the institutional arrangements need to be viewed as being in a state of flux, continuously changing in response to the emerging needs of variously positioned actors in a given development process.

Building on the above *asset pentagon*, there are five mutually related domains of institutional arrangements which interact, evolve and adapt over time:

- The *political domain* refers to democratic rights, political power and participation that define the citizenship relationships vis-à-vis the state.
- The *social domain* refers to the formal and informal social networks and ties – based on trust, reciprocity and solidarity – that could provoke collective action.
- The *economic domain* covers the access to markets and services, the organisation of livelihood strategies and the relationships with corporate actors.
- The *cultural domain* particularly covers the identity constructions that shape one's sense of belonging.
- The *ecological domain* refers to responsibilities and responsible stewardship for the natural environment (DFID, 2000b; De Satge' et al., 2002).

The asset component of the livelihoods framework takes as its starting point the assets that people have rather than those they lack, and builds on the following facets:

- *Appreciative inquiry*, which identifies and analyses the community's past experiences to strengthen capacity and thus inspire desired action.
- *Social capital* within communities, which examines and builds on existing social networks, informal linkages and the relationships built over time within the communities so as to leverage the power of association for desirable outcomes.
- *Participatory approaches* to development, which are based on principles of empowerment and ownership of the development process.
- *Community economic development* models that place priority on collaborative efforts between communities, their networks, and pertinent institutions so as to make best use of their resource base.

- *Civil society* strengthening efforts on how to engage people as citizens rather than clients in development (food security), and how to make local governance more effective and responsive.

To apply the SLF to this assignment, the multi-faceted nature of women's disempowerment in rural areas must be acknowledged and considered:

1. **Financial disempowerment** – reflected by the inability of many women to attain a minimum standard of living, where their monthly income is less than their monthly expenditure. Financial disempowerment is also evident in stock (assets of animals, land, buildings) and financial flow (spending, debts repayment).
2. **Lack of access to essential services** – indicators include the adequacy of housing; child care facilities (crèches, schools); clinics/hospitals; roads; dams and irrigation canals. Other considerations are access to communication, energy, water, sanitation, tools and technology.
3. **Shortfall in human capital** – the deprivation of knowledge and skills which disempowers women can be established by determining whether women can read, write, count, make calculations, keep records of income-generating activities, and communicate and negotiate for fair prices and loans. Are they healthy and physically able to learn, adapt and work?
4. **Limited access to and control over natural resources** (mainly land and water).
5. **Limited social networks** – social networks are essential to support livelihood strategies, and can be established from the number of support groups the women belong to and the ease with which they take part in institutional and governance processes.
6. **Unsupportive institutions and policy processes** – these undermine women's ability to operationalise their livelihood strategies by limiting or excluding them from: active participation in decision-making; access to education; access to and control of productive resources; and access to the justice systems and other supportive institutions.
7. **Vulnerability** – many women have limited coping strategies to recover from shocks to their lives, including natural events such as floods or droughts, social unrest, and death in the family (De Satge' et al., 2002).

De Satge' et al. (2002) emphasise two additional aspects of livelihoods that influenced the study. They highlight the importance of participatory data collection and analysis in regard to livelihoods assessments, and they accentuate systems thinking; attention must be paid to the interactive linkages to and influence from the wider system (agricultural, institutional, markets, finance flows etc.) that impact on livelihoods. While the initial scoping survey was conducted conventionally using questionnaires administered by the team, and in this differs somewhat from the approach of De Satge et al., the *analysis* of all thematic areas of the study was conducted with intensive

participation in multiple sessions with the case study household members, embracing a systems view (see Chapter 7).

2.5.2 Gender framework

In this section, key gender concepts are set out, along with a description of factors considered in the gender analysis which underpins the research effort. The section concludes with a general discussion of gender in the areas of development, agriculture and water.

Gender refers to the socially determined division of roles and responsibilities and power between men and women (UN, 2014). These socially constructed roles are usually unequal in terms of power, decision-making, control over assets and events, freedom of action and ownership of resources. Gender inequality and poverty are fundamental issues in development work and the empowerment of women and girls is central to the eradication of poverty. Amartya Sen's perspective (Sen, 1999:87) on poverty and development is presented as a deprivation of basic capabilities, shifting its primary attention away from *means* to *ends* that people have reason to pursue, corresponding to the *freedoms* to be able to achieve these ends. In other words, "the substantive freedoms he or she enjoys to lead the kind of life he or she has reason to value". Here, deprivations are also seen at a fundamental level of social justice, of equity and human rights. Asymmetrical aggregation and distribution of access to resources as well as other aspects such as self-respect, dignity, empowerment, belonging, and participation, require legal and structural reform for advancing the status of women. This requires an understanding of power relations that affect access to, and control of, goods and services (ECLAC, as cited in Chant, 2007). In a few words, poverty "is as much about agency compromised by abuse, stress, fatigue and voicelessness as it is about lack of resources" (Sweetman, 2005:3). Both individual and collective agency determine how differently people gain access to assets for the pursuit or advancement of livelihoods capabilities in a context mediated by power relations, such as those generated by patriarchal gender relations in the family or household, as well as, for instance, regulatory frameworks and other structural factors or institutions (Chant, 2007).

A gender analysis can help to understand power dynamics and provides a basis for the institutional and organisational changes necessary to ensure that an ongoing commitment to gender equality is made by communities and the State alike.

Key gender concepts

Some key concepts of the Gender Framework were adopted to provide theoretical guidance to the series of research activities, including the development of methods, data collection instruments, data analysis and presentation. Brief discussions of these concepts are drawn and compiled from multiple references (March et al., 2005; UNO, 1995; World Bank, 2012; UNDP, 2006; Oxaal & Baden, 1997) and expanded on below.

Sex and gender: Sex refers to the *biological* differences between men and women, which are universal and unchanging. Gender refers to social attributes that are learned or acquired during

socialisation as a member of a given community. Because these attributes are learned behaviours, they can and do change over time (and with increasing rapidity as the rate of technological change increases), and they vary across cultures. Gender thus refers to the socially-acquired attributes, roles, activities, responsibilities and needs connected to being men (masculine) and women (feminine) in a given society at a given time, and as a member of a specific community within that society. Women and men's gender identities determine how they are perceived, and how they are expected to think and act. Furthermore, gender is one of the principal intersecting variables (along with race and caste or class) deployed in the distribution of privilege, prestige, power and a range of social and economic resources.

Sex-disaggregated data: Sex-disaggregation of data means collecting data on women and men in such a way that it can be analysed *separately* in relation to all aspects of their functioning, ethnicity, social class, caste, age and location.

Gender relations: These are the social relationships between women and men. Gender relations are simultaneously relations of co-operation, connection and mutual support, as well as of conflict, difference, inequality, separation and competition. Gender relations are concerned with how power is distributed between the sexes, as these relations create and reproduce systemic differences in the positions of men and women in a given society, and define the ways in which responsibilities and claims are allocated and the way in which each is given a value.

Changes in gender identity and gender relations: Gender roles and characteristics in almost all societies have undergone many recent changes in response to technological and political developments which have led to massive global economic and social changes. Changes in gender roles and relations often meet resistance, particularly from cultural forces of tradition. Gender analysis can demonstrate that positive changes in certain aspects of social roles and relations between women and men can improve the quality and conditions of life for everyone.

Sexual division of labour: In all societies, specific tasks and responsibilities are typically undertaken by either women or men. This allocation of activities on the basis of sex is known as the sexual division of labour, which is learned and clearly understood by all members of a given society, as are the circumstances under which the typical practices can be varied, and the limitations of this variation. Change usually takes place when a society is under some form of stress, for example when community members migrate to find work and their tasks must be undertaken by other members of their families. The sexual division of labour is perhaps the most significant social structure governing gender relations.

Productive work: This is work that produces goods and services for income exchange in the market place. Some analysts, especially those working on questions of equality between men and women, include the production of items for consumption by the household under this definition, even though they never reach the market place, regarding this as consumption of a form of non-monetary income. Both men and women contribute to family income with various forms of productive work, although men predominate in productive work, especially at the higher echelons of remuneration.

Historically in most societies, changes in economic structure and hence in the structure of productive activities have led to changes in the sexual division of labour and gender relations.

Reproductive work: This work involves all the tasks associated with supporting and servicing the current and future workforce – those who undertake or will undertake productive work. It includes child-bearing and nurturing, but is not limited to these tasks. It has increasingly been referred to as “social reproduction” to indicate the broader scope of the term than the activities associated with biological reproduction. Socially reproductive activities include childcare, food preparation, care for the sick, socialisation of the young, attention to ritual and cultural activities through which the society’s work ethic is transmitted, as well as engaging in community relations that engenders wider social support essential for the family to survive economic stress. The fact that reproductive work is the essential basis for productive work is the principal argument for the economic importance of reproductive work, even though most of it is unpaid and therefore unrecorded in national accounts. Women and girls are mainly responsible for this work. The intersection of people’s productive and reproductive responsibilities with policy priorities, which has repercussions at all levels of an economy and society, is the principal focus of a gender analysis.

Differential access to and control over resources: It is important to distinguish between access to resources and control over them when examining how resources (land, labour, credit, income, etc.) are allocated between women and men. *Access* gives a person the use of a resource (e.g. land to grow crops), whereas *control* allows a person to make decisions about who uses the resource, or to dispose of the resource (e.g. to sell land).

Base-line data in a complete gender analysis establishes whether there is any differential in men’s and women’s access to three key categories of resources: *economic/productive* (land, credit, cash income, employment); *political* (education, political representation, leadership); and *time* (a critical resource, which increasingly acquires a monetary value).

Practical gender and strategic gender interests and needs: Women and men have different roles and responsibilities and different interests and needs. Practical and strategic gender interests and needs should not be seen as separate, but rather as a continuum. By consulting women on their practical gender interests and needs, an entry point to address gender inequalities in the long term (strategic gender interests and needs) can be created.

Practical gender needs are gender needs that women and men can easily identify because they relate to living conditions. Women may identify safe water, food, health care and a cash income as immediate needs which they must meet. Meeting women’s practical gender needs is essential in order to improve living conditions, but in itself will not change the prevailing disadvantaged (subordinate) position of women. It may in fact reinforce the gender division of labour.

Strategic gender interests and needs are those which women identify because of their subordinate position to men in their society. They relate to issues of power and control and the gender division of labour, and may include: changes in the gender division of labour (women to take on work not

traditionally seen as women's work, men to take more responsibility for child care and domestic work); legal rights; an end to domestic violence; equal wages; and women's control over their own bodies. Strategic gender needs are not as easily identified by women themselves as their practical interests and needs; they may therefore need specific opportunities to do so.

Condition and position: Development projects generally aim to improve the condition of people's lives. From a gender and development perspective, a distinction is made between the day-to-day condition of women's lives and their position in society. In addition to the specific conditions which women share with men, differential access means women's position in relation to men must also be assessed when interventions are planned and implemented.

Condition refers to the material state in which women and men live, and relates to their responsibilities and work. Improvements in conditions can be made by providing, for example, safe water, credit, and seeds (practical gender needs).

Position refers to women's social and economic standing in society relative to men, for example, male/female disparities in wages and employment opportunities, unequal representation in the political process, unequal ownership of land and property, and vulnerability to violence (strategic gender interests and needs).

Transforming gender relations: Changes in gender relations transform long-standing patterns: one change is acknowledged to bring others, and the nature and the degree of changes that occur in the lives of women and men as a result of successful interventions explain why "transform" is the active construct chosen in this model. Transformation of this kind requires an understanding of and concurrent attention to practical needs and strategic interests. The choice is not "one or the other"; the challenge is how to work with both – strategically and practically.

Gender equity: Gender equity is concerned with the promotion of personal, social, cultural, political, and economic equality for all. The term *gender equity* emerged out of a growing recognition in society of pervasive gender inequities. Continuing stereotypical conceptions and discriminatory practices have resulted in the systematic devaluation of attitudes, activities and abilities attributed to girls and women.

Gender equality: In the context of international human rights, the legal concept of gender equality is enshrined in the 1948 Universal Declaration of Human Rights and the 1979 United Nations Convention on the Elimination of All Forms of Discrimination against Women. The Convention, which has been ratified by 100 countries, states clearly discrimination against women violates the principles of equality of rights and respect for human dignity. The governments of the world reaffirmed their commitment in 1995 to "the equal rights and inherent human dignity of all women and men" in the Beijing Declaration and Platform for Action (UN, 1995).

Systemic discrimination

Systemic discrimination is caused by policies and practices that are built into the ways that institutions operate and have the effect of excluding women and minorities. For example, in societies where people believe that whatever happens in the household is the concern of household members only, the police force and judiciary – organisations within the institution of the state – are likely to avoid addressing issues of domestic violence, leading to discrimination against all women who experience violence within the home (UN, 1995; Oxaal & Baden, 1997; World Bank, 2012).

Gender analysis: A gender analysis is an organized approach to examining factors related to gender throughout a research process (from program conceptualization to implementation and evaluation) (March et al., 2005). These factors can include the different activities of men and women, access to and control of resources and benefits, and decision-making power. A project can have unintended effects if gender roles and responsibilities are not clearly and consciously understood, so the purpose of a gender analysis is to ensure that development projects and programs fully incorporate the roles, needs, and participation of women and men. The use of a gender analysis involves:

- Understanding the gender-differentiated systems for access to resources, knowledge, labour, water, land uses, water rights, and the distribution of benefits and produces. Sex-disaggregated data and the documentation of unpaid labour are important here.
- Focusing on gender relations. Although many analyses draw attention to women (since it is generally women who face disadvantages and women's views that tend to be overlooked), a gender analysis looks at the relations (differences, inequalities, power imbalances, differential access to resources, etc.) between women and men. The position of women cannot be understood in isolation from the broader relationships between women and men.
- Understanding that gender is a factor that influences how people respond both individually and collectively. Men and women face different obstacles and draw on different resources when, for example, they participate on a water committee, access land or water resources, or attend a training session.
- Understanding the gender dimensions of institutions at all levels in the society (within the household, community-based organizations, water-users associations, local governments, national civil services, etc.). These formal and informal institutions play fundamental roles in water resources management yet they can all have gender dimensions: Who makes various decisions? Does the structure facilitate or hinder women's participation? Is there the capacity to reduce inequalities between women and men? How are different needs and perspectives negotiated inside institutions?
- Confirming or rejecting assumptions in each specific context, ideally using participatory methodologies. Assumptions from one country or project cannot be carried over into another region or initiative. Furthermore, power relations, working arrangements and resource availability can change over time (World Bank, 2012).

Key questions to be asked to ensure a gendered analysis of all aspects of the research process:

- Who is the target (both direct and indirect) of the proposed project – women, men, or both? Who will benefit, who will lose? Which women? Which men?
- Does the research describe the needs and priorities of women and men? Do these differ?
- Have women and men been consulted on the “problem” the research/intervention is to address? How have they been involved in the development of the “solution”?
- How are the experiences of men and women reflected and recorded in the research project?
- Does the intervention challenge the existing division of tasks, responsibilities and resources among men and women?
- Which needs of women and men will the intervention address: practical, strategic, or both?
- What is the relationship between the proposed research/intervention and other activities, and with national, regional and international organisations?
- Where do opportunities or entry points for change exist and how can they best be used?
- What specific mechanisms can be proposed to encourage and enable women to participate in the research, despite their traditional roles?
- What is the long-term impact in terms of women’s increased ability to take charge of their own lives, and to take collective action to solve problems?
- What is the best way to build on and strengthen the government’s commitment to the advancement of women?
- Is the research framework based on an understanding of gender differences in the target group/s?
- Have gender-sensitive indicators (indicators that track gender-related changes over time) been identified to clarify objectives and facilitate monitoring?
- Does the research team have the expertise to look at gender issues in the specific context of the project?
- What activities are required to ensure attention to gender issues?
- Is gender mainstreaming training required?
- Is data disaggregated by sex?

It is also essential to consider gender-sensitive indicators in order to facilitate monitoring and evaluation of the gender component of development initiatives, in particular (Alkire et al., 2013):

- The impact/effectiveness of activities targeted to address the practical gender needs of women or men (e.g. skills, knowledge, resources, opportunities or services in the context of their existing gender roles).
- The impact/effectiveness of activities designed to increase gender equality of opportunity, influence or benefit e.g. targeted actions to increase women’s contribution to decision-making, and opening up new opportunities for women/men in non-traditional skill areas.

2.5.3 New Institutional Economics Framework

The New Institutional Economics (NIE) theory, although an old school of thought, gained significant prominence in the 1980s as an analytical tool of the economic performance of societies, with Douglass C. North as one of its leading proponents. North (1973) argues that the presence of efficient property rights is a prerequisite for economic growth; he later argues that the reason why men devise institutions in economic societies is to reduce uncertainties in transactions and individual economic behaviours (North, Wallis & Weingast, 2009). This work does not present an in-depth description of the NIE; rather, it explains the use of the analytical apparatus of the NIE to investigate and explain the influence of local land organisations and institutions on opportunities and/or constraints local farmers are subjected to when they need to access land for crop cultivation. Much has been written about smallholder farmers' access to land in communal areas, but most of this has centred on the need to add more land to these communities through, amongst other things, land reform programmes. As a result, little is known about the influence of local land organisations and institutions in incentivising or constraining farmer access to existing productive communal land.

The explanatory power of the NIE hinges largely on the existence and interplay of institutions and organisations in economic societies. Institutions can be considered the rules of the game, and organisations the players (North, 1993). Institutions can be formal or informal. Formal institutions include written rules and agreements that govern contractual relations, and corporate governance, constitutions, laws and policies. Informal institutions include codes of conduct, societal norms, culture and beliefs (Menard & Shirley, 2008). Organisations are constituted groups or structures of people whose mandate is to formulate and enforce their institutions. These include parliaments, political parties, trade organisations, civic organisations, traditional leadership, municipalities and marketing boards. Organisational arrangements are the different modes of administration that organisations implement to support economic activities such as resource acquisition, exchange and production. The interaction between institutions and organisations provides for the institutional environment or order in the economic society, so the performance of a market economy depends upon the formal and informal institutions and modes of organisations that facilitate private transactions and cooperative behaviour. Economic choices are thus embedded in institutions (Menard & Shirley, 2008).

Like any other economic theory, the NIE is underpinned by specific concepts and hypotheses, some of which are listed below:

- **Methodological individualism.** NIE acknowledges that people are different with varied preferences, tastes, goals, purposes and ideas. The implication is that organisations (the State, marketing boards, leadership structures etc.) should not be understood as collective entities behaving in a single homogeneous manner. Focus needs to be shifted from the collective to the views and behaviours of individual members whose actions give rise to the phenomenon under study.
- **The maximand.** Individuals seek to pursue self-interest and tend to maximise utility, "...subject to constraints established by the existing institutional structure. It follows, therefore, that a decision maker, whether he be a manager of a capitalist firm, a state

bureaucrat, a politician, or whatever, is presumed to make his own choices and pursue his own goals within the limits allowed by the organisational structure in which he is operating” (Menard & Shirley, 2008:3).

- **Imperfect individual rationality or bounded rationality.** Preferences of decision-makers are always incomplete and subject to change over time (North, 1978). Decision-makers are not completely informed about the universe of transactions and it is impossible for them to acquire and process unlimited amounts of knowledge. “Thus while people may be seen as intendedly rational, they are not hyperational” (Menard & Shirley, 2008).
- **Opportunistic behaviour.** Man is a resourceful, evaluating and maximising being. Some individuals are dishonest; they can disguise preferences, distort information, and deliberately confuse issues. Such individuals are “self-seeking with guile” and it can be difficult to distinguish them from non-opportunistic actors, hence the need for institutional arrangements such as comprehensive contracting when entering into transactions.
- **Economic society.** This is made of individuals and a set of rules that assign property rights to members of society. Property rights are “rights to use and gain benefits from physical objects or intellectual works and the right to demand certain behaviour from other individuals”; society “must be concerned with contract rights and the social arrangements that regulate the transfer of property rights” (Menard & Shirley, 2008:5).
- **Governance structure.** Property rights configuration in any economy is determined and guaranteed by a governance structure or order. Order refers to a system of rules plus the instruments used to enforce them. The NIE considers a system that regulates individual behaviour using sanctions to be of concern, as “...the sanctions are themselves established either by law or custom including the social enforcement of ethical and moral codes of conduct” (Menard & Shirley, 2008:6).

The existence of resources, including land, demands regulatory mechanisms among men and women regarding their appropriation and use. In fact, the concept of property rights allocation is indispensable in an economic society. The economic individual aims to maximise on opportunities, but society with its institutions provides limitations to self-thinking behaviour. The peace of the economy and society thus hinge on three fundamental laws of economic behaviour: (i) the stability of possession, (ii) the transference of possession by consent, and (iii) the performance of promises.

North (2008) points out that it is not enough to rely on the market to foster economic growth, and that the State must play a part in establishing efficient property rights and institutions. In this research work, a review of state agricultural land policies was undertaken with a strong emphasis on communal lands lying in the former homelands. The purpose of the review was to see if the institutional ethics set by organisations (including the State, departments of the State and traditional leadership) provide an enabling or a constraining milieu for access to and control over productive land by smallholder farmers.

The NIE framework is not a-historical. Rather, it acknowledges that time is the framework in which institutions evolve, as well as the dynamic motor through which they evolve. The beliefs and mental models that individuals and societies hold are learned cumulatively through time and passed down

generations through culture and tradition (North, 1994). Even when the institutional setting and the state is bad for the economy it is not easy to change them, due to path-dependence. Here path dependence is understood to mean that the past decisions and consequences partly define, or limit, what decisions can be made, or actions can be taken in the future. The informal institutions and mental models inherent in individuals and societies are one the main reason for path-dependence. Thus, path-dependence explains why economies get stuck in an institutional framework that does not induce economic growth; it is the story of how past knowledge and culture influences the present.

2.6 Research Site Selection

2.6.1 Factors in site selection

Site selection was based on the consideration of the general and specific objectives set out in the project Terms of Reference (TOR). One of the main objectives stated in the research contract is: “To describe and analyse social relations, demographics, gender dynamics, roles and responsibilities of women in rural villages in three selected district municipalities (in the Eastern Cape)”.

The contract thus required that rural villages be located in three different municipal districts of the Eastern Cape. These Municipalities were selected to ensure the opportunity that research sites could be located that were relevant to the objectives, that fieldwork would be logistically practical, and that results could be achieved timeously using the allocated budget. Guiding factors for site selection were developed by the team based on previous experience in fieldwork-based assignments and in full consideration of the project context and scope. These included:

Prior working relationships. While not a pre-requisite for constructive engagement, good prior working relationships between team members/NGO partners and communities facilitate progress. Good prior relationships have other advantages: they significantly reduce the start-up time with the community; the engagement is built on a platform of trust; the risks of unexpected community situations developing is reduced, because both parties are known to each other; and the team is able to assess local dynamics more accurately and thereby better manage expectations.

The availability of baseline demographic information. The research effort is greatly improved when existing information is substantive and available. This could be contextual, or it could be relevant baseline data from prior research that can be used to inform and enrich the present study. The availability of substantial, locally relevant data and information from each of the selected sites added value to the project outcomes.

Logistical considerations. Travel time and distances significantly impact on budget. In addition, sites that are close to key team members are quicker and easier to respond to than distant sites and can be visited more often. Where community relationships are strong, local accommodation and security

arrangements can also be made. The safety of team members, particularly women who would at times be travelling and working alone in the field, was also factored in.

Technical feasibility.

Existing agricultural activity and/or the availability of arable lands. The project aimed to get insight into women's aspirations in relation to food production, and thus presupposed that there would be women who are interested in field or garden food production. As there would be little point engaging in this assignment with people who have no interest in agricultural production, the presence of some agricultural activity in a village was considered an indicator that at least some members of the community were likely to want greater access to land and water.

Organised community structures. Local dynamics can undermine external initiatives, be they research or developmental in nature, whereas stable communities with organised community structures are easier to engage with and present a lower risk of problems developing.

Willingness. It is essential that local people are willing to participate in the research process, particularly as this initiative engages with power dynamics within the household as well as in the broader community.

Relevance and contribution to development. The context of the research site must reflect a wider development situation for which solutions are being sought through this assignment.

2.6.2 Selection process

Initial fieldwork trips were made to 5 short-listed villages to meet principal gatekeepers who included headmen, chiefs and ward councillors, and even local district officers of Agriculture and Land Reform. The purpose of these meetings was to establish a basic understanding of the state and nature of crop cultivation and productive water use practices in the short-listed villages through conversation-style interviews with the gatekeepers and officers.

The information that was gathered was enough to construct a scoping-level site description and provided justification for the site selection in relation to the aims and objectives of the research project. An analysis of this qualitative data was done with a focus on village homestead population, village spatial layout, agrarian aspect of livelihoods, as well as local leadership politics and structures of governance.

2.7 General site description of the selected sites (pre-survey)

The above factors were considered carefully and several assessment visits were made to five possible study sites: Lutengele village (near Port St John's), Chata village (near Keiskammahoek), Sirhosheni village (near Willowvale), Mbekweni village (near Whittlesea) and Ha Nkai village (near Matatiele). Of the five, Lutengele, Sirhosheni and Mbekweni were finally chosen. Summary data of

the selected sites is included in Table 2.2, their locations are shown in Figure 2.5, and rainfall data is presented in Figure 2.6.

Table 2.2: Selected summary data on the three research sites

Town & village names	District	Local Municipality	Main agricultural water-use context	Average annual rainfall
Lutengele Village, Port St Johns	OR Tambo	Port St Johns	Gardens – prevalent and intensive WHC systems – roof-water and extensive use of WHC and supplementary irrigation (hand-watering) Field cropping – gardens are effectively combined with fields due to steep terrain and dispersed settlements Irrigation – highly suitable river terraces alongside the Umzimvubu River, but little irrigation practised	1029 mm
Sirhosheni Village, Willowvale	Amathole	Mbashe	Gardens – available but in limited use WHC systems – roof-water collection evident. Field cropping – land available but underutilised. Highly suitable slopes and soils for rainfed maize, and possible WHC interventions Irrigation – limited opportunity given local water resources	808 mm
Mbekweni Village, Whittlesea	Chris Hani	Lukanji	Gardens – small for lambing pasture and kitchen veg WHC systems – roof-water harvesting evident, other systems not observed Field cropping – mainly rain-fed summer maize and winter oats Irrigation – old, partly functioning systems on Trust land from Ciskei incorporation era (1970's) and communal holdings	534 mm



Figure 2.5: Location Map of the three selected research village sites

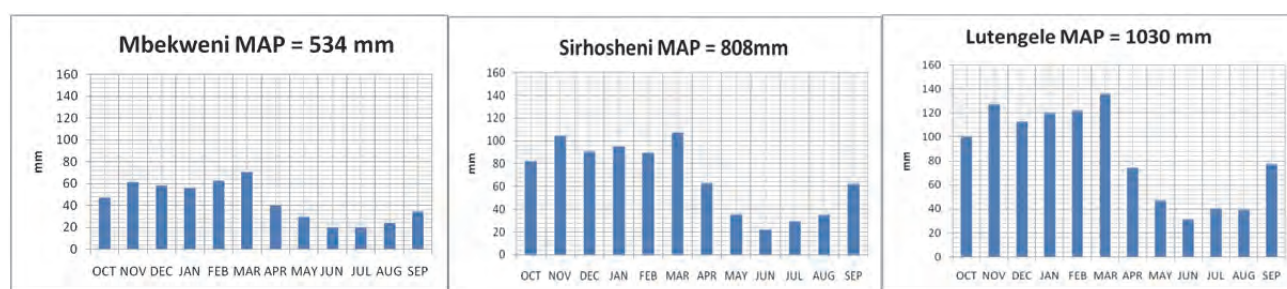


Figure 2.6: Mean Annual Precipitation (MAP) for the three selected research sites

2.7.1 Lutengele Village

Lutengele village comprises two sub-villages of Qobosendlini and Tyityane, and is located about 25 km inland of Port St John's in the coastal part of the Eastern Cape. By road, Lutengele is 330 km north-east of East London. There is predominantly good access, but high-clearance vehicles and four-wheel drives during wet weather are needed to access the more remote households deep in the hills above the Umzimvubu River gorge. The village coordinates are 31° 37' south, 29° 32' east.

Lutengele is predominantly home to Xhosa-speaking people of the amaPondo Clan who have a strong and independent cultural identity but, like many communities in the rural Eastern Cape, are also characterised by substantial poverty. The area is classified as ultra-poor. Infrastructure and basic services are poor, unemployment is high and male migrancy to the commercial centres is common. Although gender inequality is traditionally entrenched, collaborative groups have been established within the agricultural sector, predominantly comprising women. Traditional leadership plays an important role in decision-making processes, but this is balanced by the strength of local civic

organisations and an increased practice of balanced representation in local governance and development-related structures.

Crop cultivation is both intensive and extensive in home-gardens and fields within the village, but nearly absent in fields beyond the village boundary. Homestead food production seems important and contributes to family food needs. Food production over the dry season is impossible without supplementary irrigation. Securing household water for domestic consumption and crop irrigation often requires considerable human energy because of the sources, which include small dams, springs, and the Umzimvubu River (located some 200-250 metres below the settlements and some 1-3 kilometres in distance).

There have been a number of initiatives in Lutengele in support of household crop cultivation livelihoods, especially in areas of crop cultivation, soil fertility management, water harvesting and conservation, and farming knowledge and skills. These initiatives have been driven by external organisations that include the Wild Coast Farm and Forest Organisation, the Wildlife Environmental Society of South Africa (WESSA) and the Umhlaba Consulting Group Pty (Ltd).

2.7.2 Sirhosheni Village

Sirhosheni village is situated near Willowvale town in the Mbashe Local Municipality, which is in the Amatole District. It is approximately 155 km from East London with good access, although in wet conditions 4x4 vehicles are needed in places. Coordinates are 32° 16' south, 28° 19' east.

The villages around Willowvale and Centani are known for their cultural richness and strong adherence to the traditional practices of the amaBomvana (a Xhosa-speaking clan). Similar to other sites, Sirhosheni has a socio-economic makeup characterised by a high population density, high unemployment, underdevelopment, and poverty. Homesteads tend to populate the upper flatter slopes of a generally undulating topography with steep-sided river valleys. Infrastructure and basic services are poor, and traditional leadership is hierarchical and influential.

Agrarian livelihood practices including crop cultivation and large and small livestock are widely observable throughout the village. Aerial photographs show that a high percentage of households have garden plots and fields. However, the sale of surplus produce from household gardens is negligible. Government investment into the region's infrastructure (recent electricity and road development) has led to hopefulness that the agrarian sector will similarly receive support. Access to water, especially for agricultural uses, remains a concern. An irrigated vegetable community project in the village came to a halt in 2012 after facing various challenges, including the cost of pumping water from springs. Domestic water is from traditional communal sources, mainly roof-water tanks and springs.

2.7.3 Mbekweni Village

Mbekweni village is located in the former Ciskei homeland, 140 kilometers inland of East London and 12 km from Whittlesea town. It is located in Lukanji Local Municipality, and there is reasonably good access to the village on gravel roads. The coordinates for the village are 32° 14' 25" south, 26° 43' 40" east. Mbekweni has some peri-urban characteristics, with people living in a resettled village with a formalised rectangular layout and relatively smaller homestead plot sizes, but has substantial agricultural resources. There is irrigated farming in arable fields that are located outside of the village (residential) area, and every residential plot has a backyard garden.

Mbekweni village came into being as a result of the forced removals and territorial consolidation that dominated the National Party government's agricultural and settlement policies and programmes. The original households of Mbekweni comprise people who were moved from the Lady Frere district. The initial site-scoping work indicated that area experiences high unemployment rates, although periodical government-initiated activity at the nearby Shiloh irrigation scheme has had some positive impact in the area, though not immediately evident at Mbekweni. Unemployment rates remain high, with a very marginal economically-active segment of the local population being employed in the local town of Whittlesea. There are high incidences of male labour migrancy to more distant economic hubs, cities and mining nodes, with women, the elderly and children usually being left behind.

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Chapter 3 Socio-Economic Context and Gender Roles

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Chapter 3 covers the socio-economic and livelihoods findings; the process and findings of the skills audit; and the findings on roles and responsibilities in the context of water and agricultural practices. The first section presents summary data on demographics and socio-economics, providing a socio-economic picture of the three villages. Section 3.2 provides a spatial description of three differentiated crop production spaces were documented during the survey. Each space has a different name in the local (isiXhosa) language, reflecting distinctly different ways of farming, with different crops, intensity, sets of resources, opportunities and constraints. These spatial domains played an important role in formulating typologies; they provided structure for the detailed discussions with farmers regarding their resources and agricultural aspirations, and gave direction to appropriate intervention responses and guided the formulation of intervention responses. In section 3.3, a literature review in relation to agricultural skills is presented, with findings in relation to self-assessed competencies for a range of agricultural tasks. Section 3.4 contextualises and reports on the roles and responsibilities, particularly of women, in relation to water and food production.

3.1 Scoping Level Socio-Economic Survey

The socio-economic context was established through three separate bodies of work conducted during the first half of the project. The scoping-level socio-economic survey was conducted on a representative sample of the three village populations (n=164; equivalent to 18% of the total population of the three villages). The findings and analysis of the survey provided a basis for the selection of the 30 case study households, which in turn facilitated in-depth quantitative and qualitative investigations of the multiple themes of the study. A description of the research sites and the methodology, methods and instruments used for the survey are presented in Chapter 2.

3.1.1 Key findings at the research sites

The socio-economic scoping survey confirmed what is widely known to be the case in densely settled rural areas of South Africa occupied mainly by Black South Africans. The sites are characterised, in socio-economic terms, by substantial material poverty, high unemployment and high dependency on social grants and remittances. However, the situation at the three selected villages is significantly worse on key indicators than the average situation in the Eastern Cape. The findings of the survey are detailed in this chapter.

Women-headed households (Figure 3.1): There is a high number of women-headed households at each of the three sites. Lutengele and Mbekweni are similar with 53% and 52%, while in Sirhosheni the figure is much higher, at 76%.

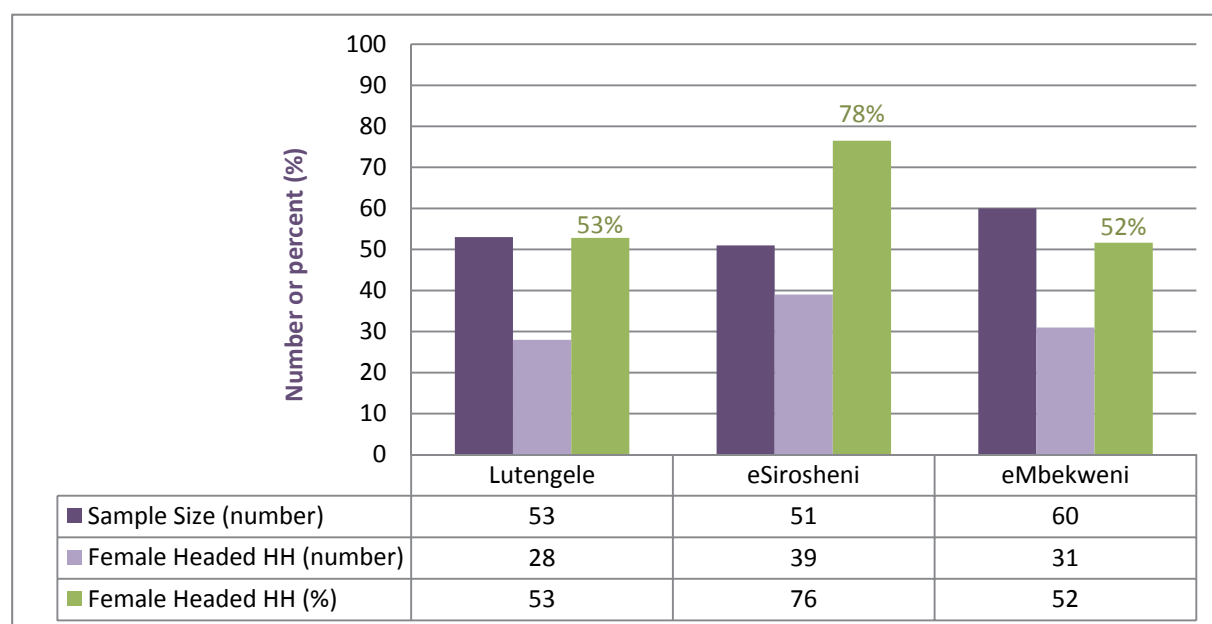


Figure 3.1: Sample size and women-headed household (n=164)

Household size and dependents (Figure 3.2): The household size in all three villages is high compared with the average for the Eastern Cape of 3.9 people per household (STATSSA, 2013). Households at Sirhosheni and Mbekweni are similarly-sized with 5.5 and 5.7 members, while Lutengele is significantly higher, with 7.1 members. Across the three study sites, between 85% and 93% of household members are dependants (children or unemployed).

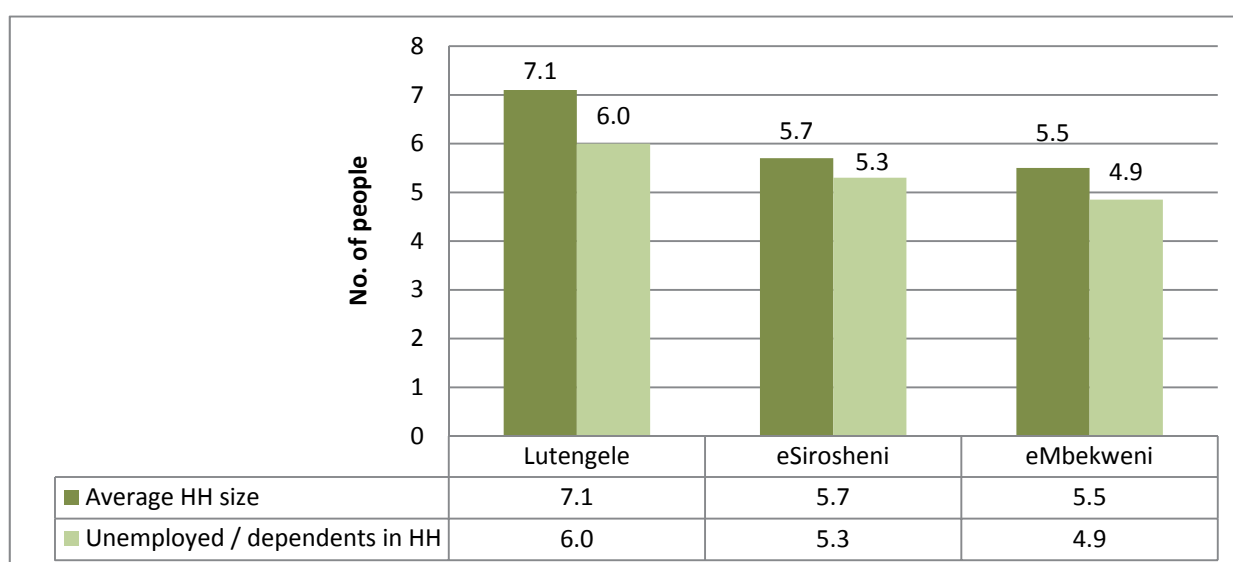


Figure 3.2: Household size and dependents (n=164)

Incidence of full-time employment, formal education and prevalence of grants (Figure 3.3): Between 22% and 28% of the households have someone who is in full-time formal employment, translating to a local unemployment rate of between 72% and 78%. This is significantly higher than the average across the Eastern Cape, where the 2011 Census concluded that the expanded unemployment rate (i.e. including discouraged work-seekers) was 51.2% (STATSSA, 2013).

Levels of formal education of household heads are lower than the STATSSA Eastern Cape average of more than 71% of people over 20 years of age having completed primary school (STATSSA, 2011). In Lutengele, Sirhosheni and Mbekweni only 58%, 61% and 78% respectively have completed Grade 4 or higher (Grade 4 being sufficient for basic numeracy and literacy but lower than the STATSSA criteria of primary school completion). Most households receive child grants – 89% at Lutengele, and 67% and 63% at Sirhosheni and Mbekweni respectively.

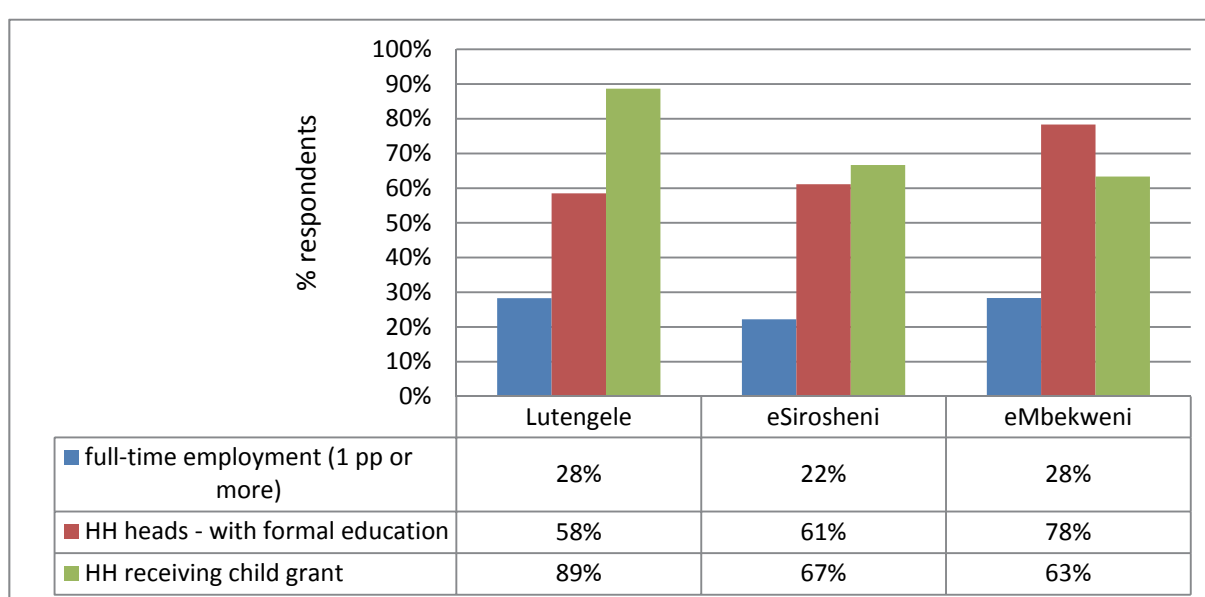


Figure 3.3: Employment, education and grants (n=164)

Water storage infrastructure (Figure 3.4): Ownership of one or more water tanks in Lutengele and Mbekweni is significant at 58% and 47% of households, but at Sirhosheni only 22% of households have one or more tanks. The high prevalence at Lutengele (58%) is to some extent explained by the DWA-funded programmes in the area which included provision of roof-water collection tanks to some households, but this was not widespread in the area, nor has it been the case at Mbekweni, where people have invested in their own tanks (47%).

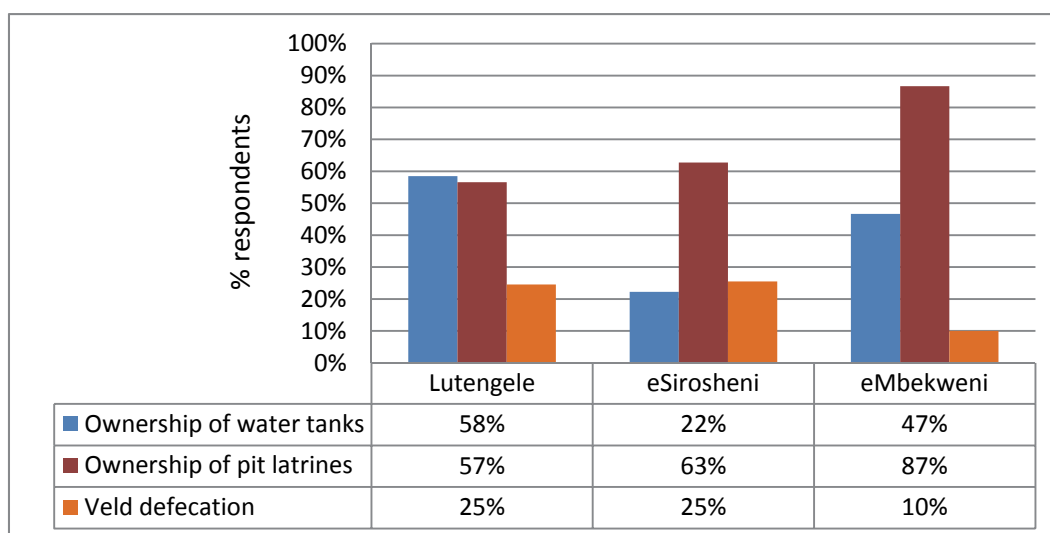


Figure 3.4: Water and sanitation assets (n=164)

Latrines and veld defecation (Figure 3.4): Sanitation data presented in Figure 3.4 reflects a dire situation which impacts on quality of life and on water pollution. The percentage of households with latrines of some sort (typically pit latrines) ranges from 57%-87%. It was recorded that some people use neighbours' latrines, and a separate question on open outdoor defecation showed that in both Lutengele and Sirhosheni a high number of respondents (25%) defecate in the veld, while at Mbekweni the number is lower but still significant, at 10%. The general context of physical poverty at the three sites is thus exacerbated by a loss of human dignity, safety and privacy for those who still use the veld as an open latrine, particularly in the case of women.

Access to arable land and land-use (Figure 3.5): Most households have access to gardens (between 80% and 93%). Garden use for at least one crop a year is high in Lutengele (83%) relative to the other two sites (53% and 55%), averaging 64% across the three sites.

This is contrasted with access to fields, which in Lutengele is lowest at 57%, which is partly explained by the limited arable land on the steeply sloping terrain, and in turn also accounts for the relatively higher garden utilisation at that site. Access to arable fields at both Sirhosheni (67%) and at Mbekweni (82%) is significant, and matched to a degree of utilisation of these fields, where 58% and 63% respectively had used *some* (not necessarily all) of their arable field in the last 2 years. The details of land access, land size available and land utilisation is further interrogated in the selected case study households in Chapter 6.

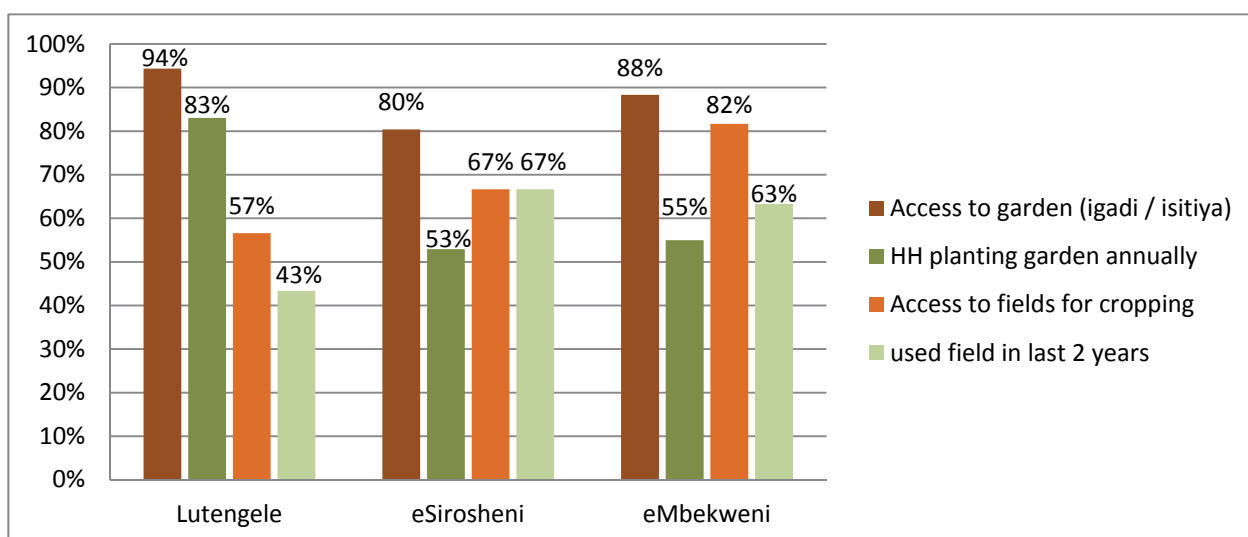


Figure 3.5: Access to land and intensity of use (n=164)

Reasons for crop production (Figure 3.6): The responses show that people grow crops for different reasons and that a simple dichotomy of subsistence and commercial does not apply and is best avoided in the project discourse. The main reason for growing crops at present across all three sites is for home-consumption, with 92%, 67% and 82% of people planting to obtain food to eat. The findings also show that people grow crops for multiple other reasons. The number of households sharing food they produce with neighbours is significant, ranging between 20% and 41%, reflecting the 'ubuntu' and sense of community that prevails. In all three villages some people farm for sale and it is notable that 57% of people in Lutengele produce for sale, though this was for a localized market within the village. At all three sites only a small percentage of households produce food for distant markets (7% and less). These findings generally concur with those of the 2011 general household survey (STATSSA, 2013).

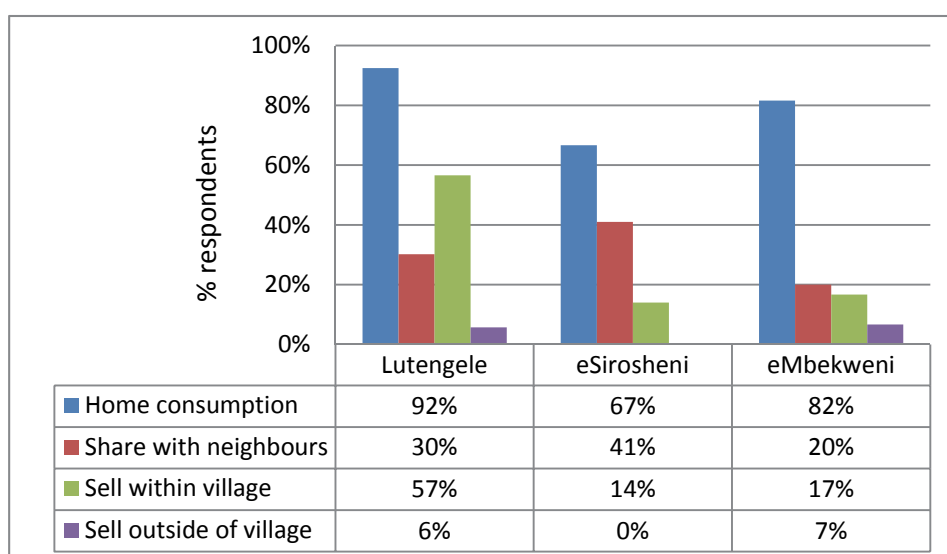


Figure 3.6: Reasons for growing crops (n=164)

Ownership of assets (Figure 3.7): In general, Mbekweni presents a picture of a community with the highest cattle, vehicle and television ownership. Donkey ownership at Lutengele is relatively high (42%), explained by the use of donkeys for water-portage from rivers and springs, and the absence of municipal supply (no communal tap-stands). Given the general picture of poverty at Lutengele, TV ownership there is high (55%), while the low television ownership at Sirhosheni can be explained by the absence of Eskom power.

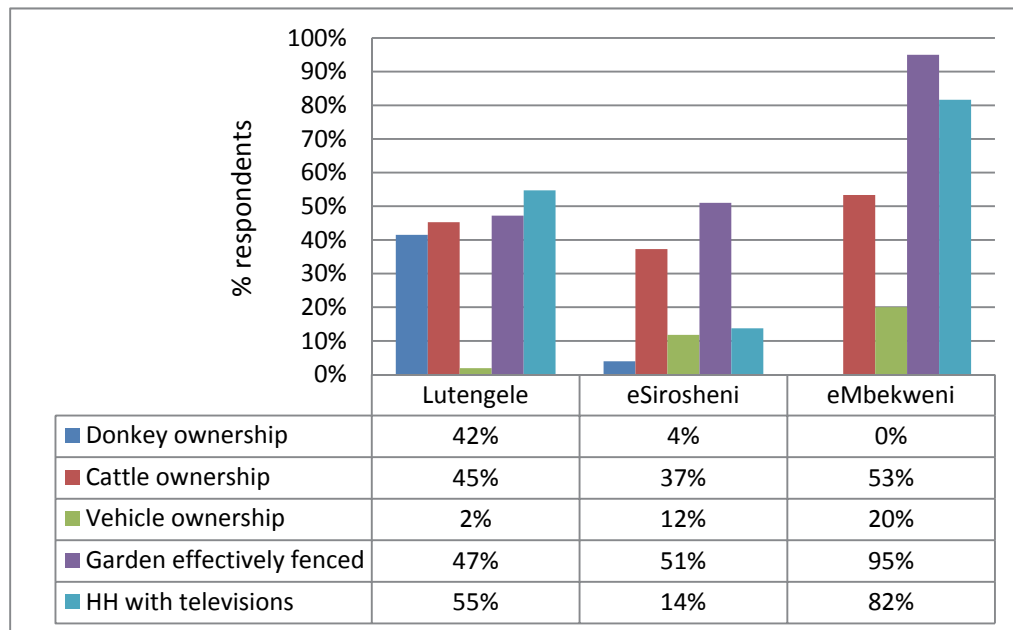


Figure 3.7: Ownership of assets (n=164)

Food availability (Figure 3.8): The summary data presented next shows a situation of food shortages across all of the research sites, with Lutengele respondents communicating severe circumstances. It is notable that 30% of households in Lutengele had had no food for one or more days in the previous month, compared with 17% at the other two sites. This is perhaps a motivating factor for food production, given that the percentage of Lutengele households that engage in food production is highest, both for personal use and for the market. It is noted that the survey was conducted in winter, the time of year when locally-produced food in fields and gardens, albeit a small contributor to overall livelihoods, is minimal.

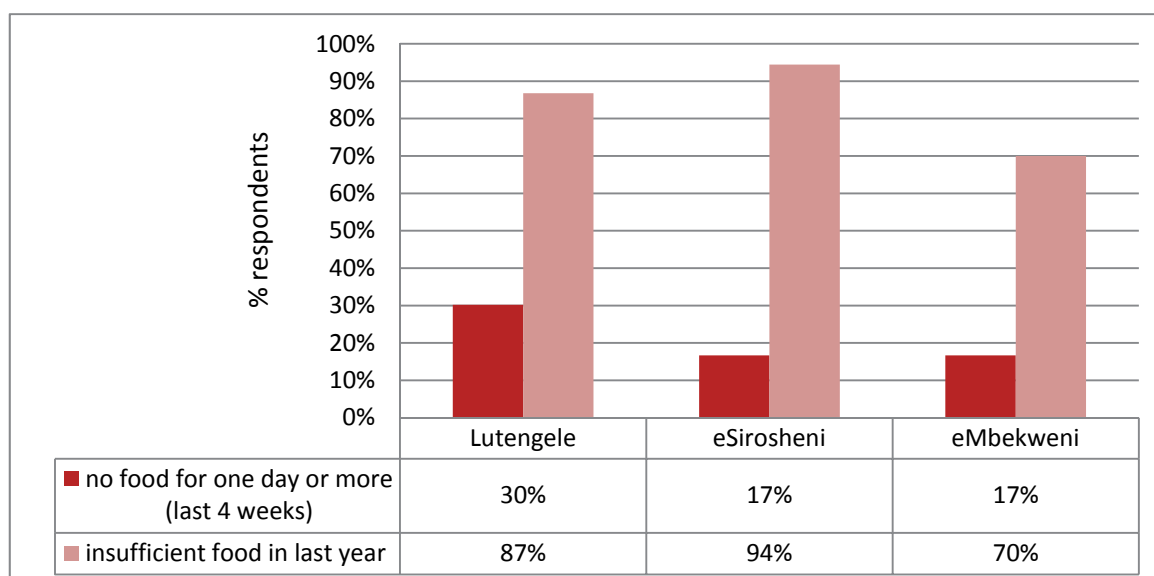


Figure 3.8: Food shortage in the household (n=164)

Household income (Figure 3.9): In South Africa poverty is defined variously, but the Lower and Upper Bound Poverty Line (LBPL and UBPL respectively) are widely used (STATSSA, 2014). The lower boundary requires that individuals sacrifice food in order to obtain essential non-food items (e.g. electricity, transport, air-time, etc.) and was calculated at R 443 per person per month at 2011 values. The upper boundary is where people can purchase adequate food and non-food items to survive, calculated at R 620 per person per month (STATSSA, 2014). When adjusted to 2012 values using the Consumer Price Index for 2012 (5.75%) and multiplied by average household occupancy at the sites, the Lower Bound Poverty Line at Lutengele, Sirhosheni and Mbekweni is R 3326, R 2670 and R 2577 per household, respectively. While a definitive analysis has not been conducted to arrive at exact percentages below the LBPL, Figure 3.9 shows that severe poverty predominates. The percentages of residents living below the LBPL are greater than 85%, 81% and 84% at Lutengele, Sirhosheni and Mbekweni respectively.

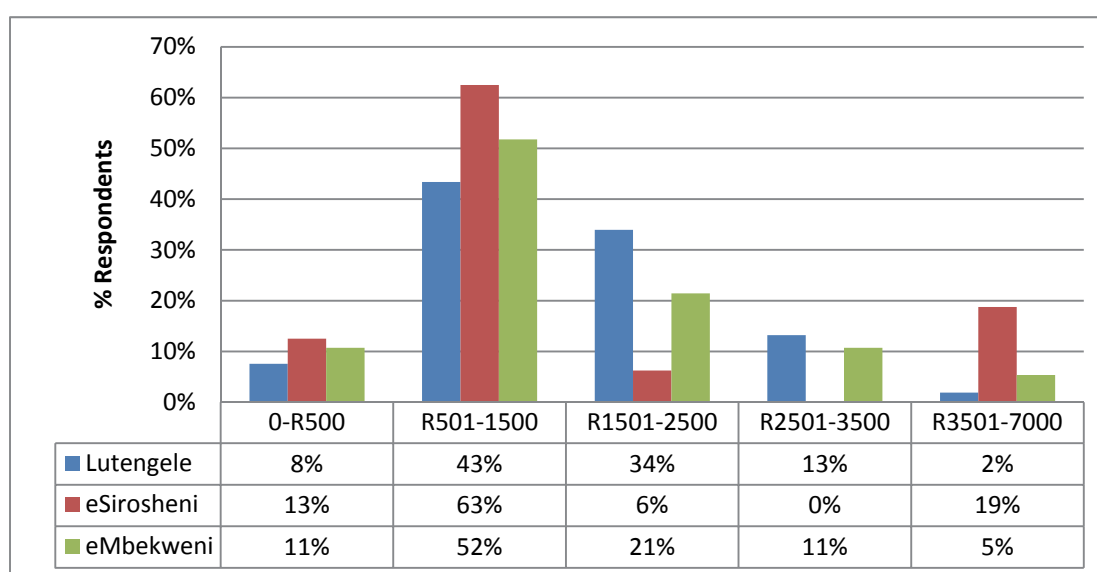


Figure 3.9: Income distribution for three villages

3.1.2 Concluding statement from the socio-economic scoping survey

The overall picture from the socio-economic survey of 164 households in the three villages is worse than the typical situation in the Eastern Cape when compared with data from the 2011 census household survey. The majority of households in the three villages live below the poverty line (with more than 80% below the Lower Bound Poverty Line). Most households are female-headed (between 52%-76%), and households face high unemployment levels with only 22% to 28% having one or more persons employed full-time. There is high dependency on grants and remittances. Hunger is significant with more than 21% of households reporting having no food for one day or more per month.

Household heads have low education levels with 34% having less than Grade 4 education. Personal dignity is compromised by inadequate sanitation, with an average of 20% of respondents reporting that they defecate in the bush. The majority of people grow crops for their own consumption, with 29% growing for sale within the village (skewed slightly by the higher value at Lutengele's of 57%), and only 4% on average growing food for sale outside of the village, concurring with national trends (STATSSA, 2012).

In Lutengele which is the poorest of the three sites, 83% of households plant crops once or more per year in their home-gardens, though the data from the socio-economic scoping survey does not give insight into how much of the garden or field was used – just that some cropping took place. The findings on incidence of land utilisation in gardens and fields are discussed in detail in Chapter 6, where they are combined with findings on use and intensity from the in-depth surveys of the 30 case study households and provide a holistic view of the extent of utilisation of the land resource.

Despite the obviously overall dire situation of material poverty, the people of these communities cannot be characterised by these socially and economically disturbing facts alone. Importantly and from a development perspective, the team observed a sense of resilience amongst people, enthusiasm and energy, willingness to participate, and curiosity in where the research might lead. Laughter and humour characterised interactions, rather than the depression often associated with evident hardship and material suffering.

3.2 Farming Location and Related Scale Gives Direction to Interventions

During the first two years of the research process the research team conducted numerous visits to the three sites for initial scoping surveys, the socio-economic survey, and various follow-up visits in relation to land and water resources. It became evident that across the three sites, though not entirely consistently, respondents spoke of different farming spaces and related water-use practices and importantly, used different isiXhosa words to separate these. The spatial terms of *umzi*, *isitiya*, *igadhi* and *intsimi* (explained below) became important in discussing and understanding how the household views its land-assets, and how they use them differently for crop production. These

spatial zones of crop production have thus informed the research process in general and also influenced the development of the proposed implementation strategies.

The key spatial elements and terminology embedded in the research:

- The **umzi** is the boundary of household and includes the houses and other built infrastructure (kraal, outbuildings, etc.) as well as the *isitiya* and *igadhi*.
- The ***isitiya*** is an intensive vegetable garden close to the house and is usually watered.
- The ***igadhi*** is a larger, typically more extensive rainfed farming area still within the umzi boundary.
- The ***intsimi*** (singular) or ***amasimi*** (plural) are the fields that are typically located away from the homestead boundary itself; they are usually rainfed, but may be irrigated.

The elements of the umzi are shown in the two schematics below. Figure 3.10 shows a sketch layout, and Figure 3.11 is an overlay onto a typical household in the project scope, using Google-earth imagery.

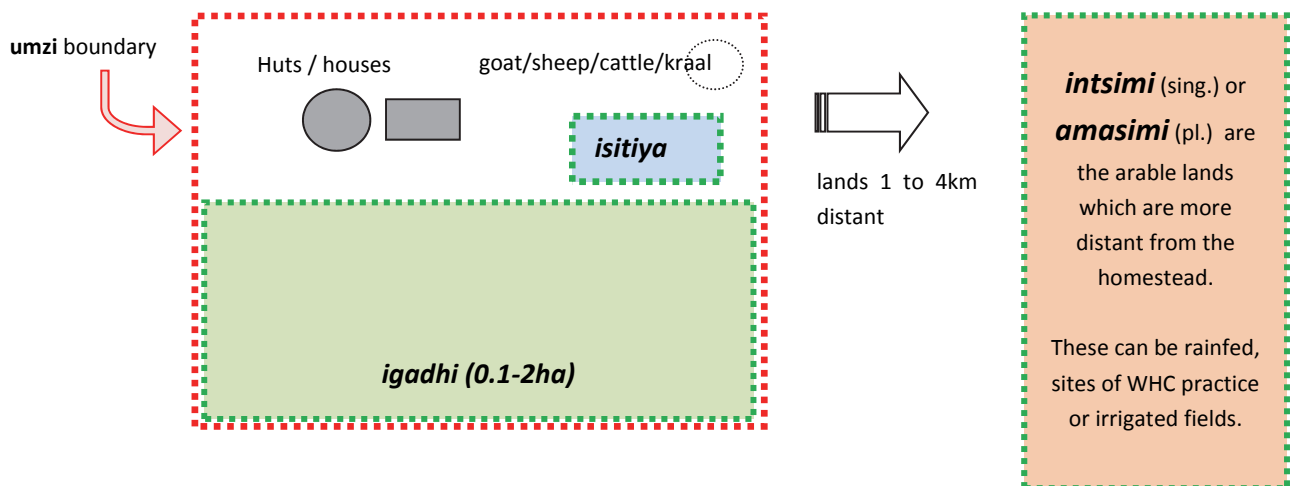


Figure 3.10: Illustration of typical umzi layout demarcating settlement, livestock and cropping zones

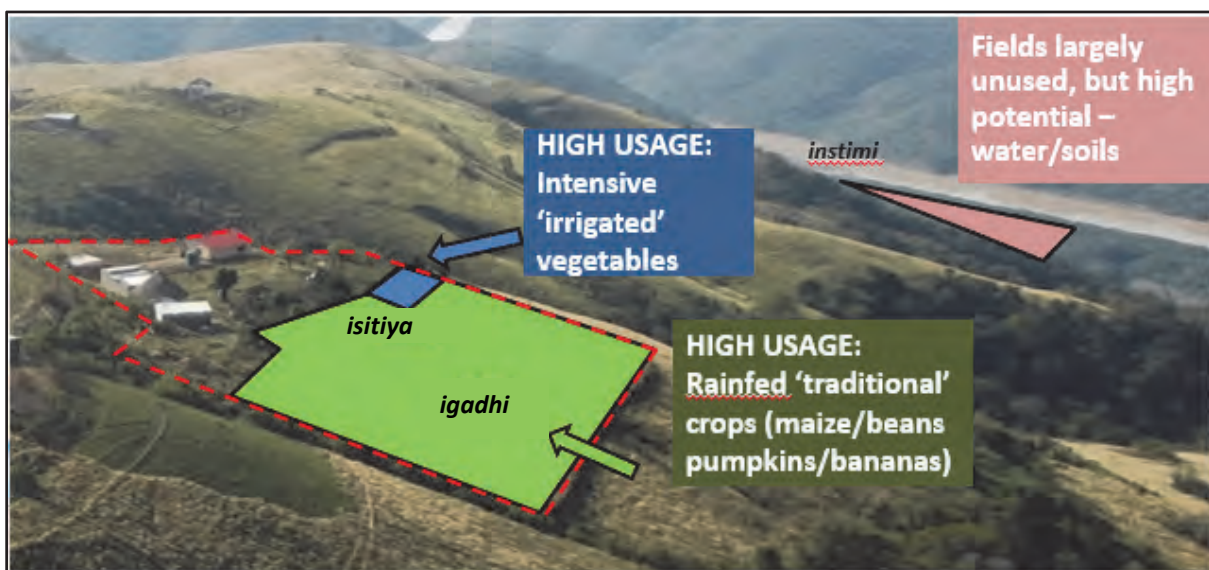


Figure 3.11: Differentiated cropping zones superimposed on Google-earth imagery.

The umzi in sociological perspective

The umzi is literally translated as the 'homestead' but in a broad sense it has other significant connotations linked to concepts of home, a place where the family is sustained emotionally and physically. Perry (2015:48) defines it thus:

The umzi, or homestead, can be characterised as having several huts (or residential sites), a garden plot adjacent to the huts, a cattle kraal and livestock, tools and equipment, agricultural storage huts, other implements for farming, and agricultural land (isitiya and igadhi). Establishing the homestead is culturally considered a sign of social maturity and economic prosperity, and the homestead holds material, social, and religious/symbolic importance for its members. Establishing the site for building (inxiwa) is also important, as it relates to one's connection to the ancestors, and land rights to burial sites. The identification with land is therefore fundamentally linked to the material homestead, which ideologically connects one to a place, thereby giving some sense of meaning to ones' life. Such a physical representation of clustered dwellings around important features is relevant when conceptualising the socio-symbolic and economic functionality of rural Xhosa culture, not to mention the advantages that the umzi pattern has historically developed in responding to the surrounding physical and climatic environment. The homestead, or the umzi, can therefore be regarded as a both a "unit of production" and a physical space to reflect on values that are important.

The isitiya – a homestead agricultural tradition

The isitiya is best translated as the *irrigated kitchen garden*. This was documented by Makalima, a Xhosa anthropologist some 70 years ago in Shaw and van Warmelo (1972:32) who note the "*Izitiya: Igadana ezincinci zikho emzini. Zenziwa phambi komzi kufuphi. Zisebenza ukulima imithi yeziqamo, namatapile, nama kapetshu, neminqate njalo ke*" which reads "Gardens (*i.e. Isitiya*): There are small gardens in a kraal (here kraal is an 'umzi'). They are made in front of it and not far away. They are used for planting fruit trees, potatoes, cabbage, carrots, etc." While many people do not distinguish between the isiXhosa words 'isitiya' and 'igadhi' as they both mean smaller gardens as opposed to larger fields, it was noticed during fieldwork that many interviewees made clear distinctions in the location and their use in terms of crops grown in these spaces, and water use practices. The isitiya is clearly the smaller, closer, kitchen-garden vegetable patch with more intensive watering, indicatively 50 m² to 2000 m² in size.

Farming in the different spaces

To an extent, the spatial descriptor (or locator) also captures inherent resource availability. Within the umzi it is typical that fencing is better than in the fields, that soil fertility is higher than in the fields, due to its proximity to the kraal and animal manure (van Averbek et al., 2008), and that family labour is closer and thus more readily utilised than in distant fields. Participant households relate to and use different portions of land that they have access to, often quite differently. A difference in food-production practice was observed, from more intensive practices at the homestead (particularly the isitiya) to more extensive practices in the fields.

One critical factor in the changed farming style that was narrated by participants is the availability of the regular water supply needed to support the production of fresh vegetables, typically grown in the *isitiya*. The *igadhi*, in participant households, is in some cases extensively farmed but in others,

particularly where higher rainfall or harvested water is available (such as Lutengele), farmed intensively. It was a predominant finding that in most households the current practice of growing maize, beans and pumpkins in a traditional intercropping mix remains a robust and widely prevalent choice of food crop in the *igadhi*.

The observed importance of these three spatial domains was adopted as a necessary analytical tool over the remainder of the research work. The studies on water and land resources, existing agricultural practices and aspirations have been conducted in relation to these three domains, and similarly the proposed interventions are linked to typologies of farming which are, to a significant extent, also tied to the spatial location of the farming activities.

3.2.1 Implications for the selection of the case study households

One of the main reasons for conducting the socio-economic survey was to provide an informed basis for the purposive selection of 30 case study households that would provide insight into agricultural aspirations in relation to crop production, given available land and water resources, skills and capabilities. The 30 case study households were thus selected first and foremost from those households with demonstrated interest in pursuing agricultural activities, as the selection of households with no interest in agriculture would not be useful in an exploration of farming aspirations.

Interest in farming: Of the 164 homesteads included in the initial socio-economic scoping survey, 25 of these homesteads (14%) either had no interest in farming at all, or were non-respondents to the question on agricultural interest. The remaining 141 households (86%) expressed interest in practicing agriculture, although the nature or seriousness of this interest was not defined in any way and narratives were often accompanied with nostalgic stories of a successful past agricultural era rather than reflective of the present. So this interest alone was not considered sufficient for inclusion in the case study group. The survey also yielded information on recent agricultural activity in households, both in the gardens and in the fields – for those who had access to land (gardens or fields).

Access to arable land: The survey identified access to arable portions either garden or fields. It was recorded that 87% of respondents had access to a small garden (*isitiya*), 51% had access to a large garden (*igadhi*) and 69% had access to an *intsimi* (distant field) noting that many respondents have access to all three spaces, though more typically two. At Lutengele for example, most had access to an *isitiya* and *igadhi*. At Mbekweni, the small settlement plot sizes were sufficient only for an *isitiya*, thus all of those homesteads had an *isitiya*, and most had a field, but none had an *igadhi*. The survey also showed that of those households with access to arable land, 63% had cropped in their *isitiya* or *igadhi*, while 49 homesteads (44%) had planted in their fields in the previous year (2012-13 cropping season). To ensure meaningful engagement only with people genuinely keen on crop production, the 30 case study households were purposefully selected from those homesteads which indicated that they had recent cropping activity either in gardens or fields in the last year.

Institutional and wider resource commonalities: Despite this necessary segmentation, it was expected that the findings on land and water resource availability surrounding the village, and land and water institutions and access, would reflect the wider situation of the villages; though with gender considerations carefully attended to by selection of equal male and female-headed households in the case study set.

Particular land utilisation and water utilisation findings: The findings in relation to *water and land utilisation* must, however, be understood to derive from that smaller part of the population which has been agriculturally active in their gardens and fields over the previous year.

While useful inferences can be and are drawn in relation to the study population as a whole, it was not the intention of the research team to develop a quantitatively representative data set through the in-depth case study evaluations. Rather, the intention was to engage with households interested in crop production, with foundational knowledge of their socio-economic context, in order to identify their available resources, skills, capabilities and aspirations, leading to the formulation of suitable intervention strategies to increase food production.

3.3 Gender Roles and Responsibilities: Perspectives from the Literature

The role of women in the research sites, in particular within the boundaries of the homestead, requires the carrying of multiple responsibilities including that of spouse, child-rearer, income generator, food-producer, health-carer and carer of the aged, as well as assuming wider social and cultural responsibilities. Understanding aspirations and obstacles to increased food production requires full appreciation of the diverse role of agriculture within this shifting mix of responsibilities and in a resource-limited context.

This sub-section provides an overview of the literature on the issues and pressures resulting from multiple roles and responsibilities, as relevant to the research sites. The changing gender roles resulting from modernisation, globalisation, cultural integration and male migration is juxtaposed with the resilience of cultural institutions that impact on women's roles. These dynamics play out particularly within the *umzi* (homestead) and within the less accessible domain of the marriage institution. The literature shows that while women are increasingly empowered through role-evolutions which are part of modernisation, cultural dynamism and democratisation, they also face new and increasing gender-based challenges that do not necessarily reduce the heavy load that is squarely on their shoulders.

3.3.1 Family life: Home-styles, roles, and expectations in (rural) South Africa

Defining characteristics of the African family

Rural South Africa is viewed in the context of powerful rural-urban linkages which impact on change and continuity, particularly within social institutions such as 'family', 'home', and 'church' (Amoateng et. al., 2007; Bank et al., 2011).

South African processes of migration for work and urbanisation have often been thought of as relational to household circumstances and change. These forces impact on the family make-up and have or could have radically altered family characteristics (Crush, 1999; Kok et al., 2003; Posel, 2001; Wilson, 2001). African homes are felt to have shifted from 'extended' by nature to 'nuclear' by default. Many authors, however, are sceptical of such a shift, and both rural and urban homes are believed to constitute dynamic forms, representing their dynamic characteristics to either express 'extended-family' formations, 'single-headed family' formations, 'nuclear-type' formations, or versions of these (Naidoo et al., 2008). What appears salient in the literature is that there has not been a linear shift from traditional African extended family characteristics to versions of European/Western 'nuclear' family forms (Posel et al., 2011). The precarious livelihoods context of (these areas in) South Africa means that extended family dynamics make categories of 'single-parented' or 'nuclear' headed household difficult to determine without detailed investigation. 'Single-headed' categorisation in surveys may in fact hide diversity in relation to decision-making, particularly in the case where the male household members are migrant workers (Grieger et al., 2014).

Ziehl's (2001) contribution to the debate is important. She outlines the limitations that both census data and smaller case-study material may have in understanding family dynamics if one does not understand 'context' and 'culture'. Ziehl articulates the need for scholars to fully understand contextual dynamics. These, as related to African family practices for instance, are important to understand, given that at the time of an interview, certain members of families may carry varied roles and responsibilities beyond those which are often assumed to be the role of the absent head of the household. Ziehl also cautions that with census forms one loses the nuanced appreciation of relational information between members of families, given divorce, extended family dynamics, or senior roles of family heads being misconstrued. Siqwana-Ndulo's (1998) expands on how rural families are constituted and shows how Eastern Cape migrant members are connected to the realities of home even though they work and live elsewhere. Households can be headed by either men or women who may be working elsewhere but are still responsible for major decision-making at the distant homestead (Budlender, 2003).

Such 'social institutions,' as recognised and written about in much earlier ethnographic literatures of Africa, demonstrate the important distinctions and make-up of African family, social and material practices, and styles. These social practices and styles can help to affirm and define domestic roles over social and material space (in and over time), where respect is offered to one's senior (Hunter, 1936). In some ways, Africanised gender roles uphold these interrelationships, which are distinctive compared with patterns of 'nuclear' marriage forms elsewhere (Fortes, 1960). Rather, contemporary connections and extended familial relations can remain important, as often a rural family ethic or belief in 'home', 'heritage' and 'tradition' commits to the protection of certain social space and land that is symbolic of security and socialisation. According to Ngwane (2003:681), "Exploring rural family life as a process whereby there are multifaceted ways in which contemporary and historic meaning is important to older patterned social and material styles recognises that while there are separations between family members for work and opportunity, there is also need to connect as family in homes traditionally African." This does not negate more difficult and contemporary family

realities of tensions, divorce, or family breakdown as people abscond from fulfilling their traditional obligations in order to pursue new desires and lives of change in a democratic South Africa.

3.3.2 Socialising the youth: Roles and responsibilities expected of women

What the literature speaks to earnestly is that women have varied tasks and roles in home and society (Cook et al., 2009; Lewis, 1998; May, 2008). Roles include raising children, caring for the elderly, caring for the sick and dying, cooking, cleaning, and catering for senior and married men (Bak, 2008; Davison, 1988; Duflo, 2003). This collection of roles is generally viewed as drudgery though part and parcel of survival, and is sustained by the belief that dividing roles between the genders could also support other important values, most importantly the ability to sustain family members' growth and development over time (Moore, 2013:151-170; Roberts, et al., 2013).

In rural South Africa, raising children is interconnected to welfarism, particularly since South Africa's political transition after 1994 (Burman and Barratt, 1993). Many authors note the link between child grants, pension pay-outs or other state grants, and raising children in rural areas (Case et al., 2005; Delany et al., 2008; Department of Social Development, 2008; DSD, SASSA, and UNICEF, 2012). Despite many positive reflections of the impact social welfare grants has made, there are some challenges and concerns raised about the long-term realities of welfare support (Hall and Posel, 2012:43-47; Hall, 2007; Hearle and Ruwanpura, 2009; Neves et al., 2009; Meth, 2004; Zembe, 2013). For example, Surender et al. (2007 & 2010) question social assistance as it creates dependency within South Africa and shapes attitudes of avoiding taking paid employment given the persistence of such support. Makiwane et al. (2006) have even suggested that child grants and support may be associated with an increase in teenage fertility. However, Fay (2013) shows that cash grants such as these play an important role in financing small-scale agriculture, and notes that the catalysing effect of these grants should not be discounted.

The literature has much to say about the specific roles and responsibilities of women living in rural areas. It is argued that mothers generally provide better and more effective care in rural homes, particularly if they have control over support grants or other household wages (Posel, 1997:49-60). Posel (1997) notes, for example, that in households headed by women the nutritional caloric intake is greater for children compared to households headed by men (see also Leibbrandt et al., 2013). It is well-recognised that women provide labour which is unpaid. A domestic division of roles and home duties can translate to lost potential for women to integrate into more active positions as workers within the labour economy. Many women engage in multiple tasks and can be expected to cultivate crops, collect firewood, collect water, cook, clean, and brew beer, etc. but often these social functions are not recognised in economic terms, but in social terms as duties which are integral to a family's survival.

The literature offers some debate about the altruistic nature of rural co-operative engagements. On the one hand, there is recognition of distinctions between roles of men and women in field and garden cultivation (Reza, 2013; Van den Bold, 2013). In some instances however (and as this current research recognises), distinct roles mesh together as families share, live, eat and struggle together

(Mosoetsa, 2011). Given that women generally live longer than men they are also subject to suffering the deprivations of rural poverty, i.e. lacking needed care-facilities, clinics, or hospitals. A final challenge to rural women is that income generating is for the most part limited to either local work in other's gardens, cleaning or caring for children, and/or engaging in informal or craft economies. In addition, there are limitations to the kinds of work that many women living in rural areas can engage in because they lack certain basic modern infrastructures and/or telecommunication. Even business-orientated women who desire to increase their garden sales, for example, tend to face limitations – around access markets because of the distances to towns and poor road conditions, or from having multiple roles and responsibilities to family care and home-life which entraps them with duties such as child-rearing.

3.3.3 Times of insecurity and vulnerability: What does this mean for livelihoods?

Much of the literature that raises issues of contemporary insecure realities in South Africa suggests that conditions of HIV and AIDS and the realities of rape, early death and dying in the rural Eastern Cape are recognisably problematic (Hosegood et al., 2007; Niehaus, 2013; Thornton, 2008; Wood and Jewkes, 1997). These realities are hidden but felt social undercurrents impacting on (masculine and feminine) identity, and could further condition what possibly anchors women to their so-called historic and traditional roles and responsibilities of home-life to care for the ill and infirm (Hunter, 2004; Morrell, 2005; 1998). For example, the challenges of dealing with HIV/AIDS, or high incidences of violence, as they are recognised, places added stress on rural homes. This likely entrenches the need for some stability via gender divisions, for example, as older patterned social realities and material structures (such as the homestead) offer practical and symbolic responses and support to the success of the family. Perry (2015) argues that contemporary social breakdown and the high incidents of death and early dying in the Eastern Cape influences the need for positive social expression, which reasserts gendered roles and family traditions of the homestead as a response to stress and a need for pragmatism. Other literature speaks to social and gender change as women bargain more for equity in their relationships because they have found paid labour that is empowering to their economic security outside of marriage (Morrell, 2002). This may be the reason why some authors recognise that there are hindrances to marriage even as there is less desire for marriage among young adult African men and women (Morrell, 2002).

3.3.4 Local agency, livelihoods, and trends in women's work

Neves and Du Toit (2013) recently characterise rural livelihoods in South Africa as complex, vulnerable and diverse. Women and their agency have equally played a part in securing wages by gaining multiple opportunities in paid employment in urban areas, or through local agrarian practices which generate food and small opportunities. Other small informal-type trade, such as in the craft-making economy, is equally important, even as more steady state support provides longer-term financial security via pension or Child Support Grants (CSGs). These streams of income contribute to one's overall livelihood strategies (Fay, 2011). Recent work by Grieger et al. (2014:147) reiterates the importance of literature that understands "...compositional changes because of the clear links between oscillating migrant labour and split and stretched household structures, with

consequent distortions in the functioning of households of many South Africans at both the urban and the rural ends of this migration”.

Grieger et al. (2014) emphasise evidence related to short-term household change in South Africa from an analysis of the National Income Dynamics Study (NIDS). What is interesting is the extent to which South Africans are mobile; it is stated that between rural and urban areas, “...one in 10 [are] moving to a new household in a two-year period” (Grieger et al. 2014:151).

Subsequent similar work by various authors found that women have more mobility than men into and out of the labour market and employment, while evidence from the NIDS data suggests that women are less mobile between certain kinds of higher-paying employment (Cichello et al., 2012). For instance, women have difficulty moving from casual work to full-time formal employment, as they often change the kind and type of casual work they do. Women with formal or regular work have difficulty returning to work once they have left, and are likely to leave formal employment when they have children. However, women’s work around the home is factored as less economically significant compared with paid employment in either formal or informal sectors. In South Africa, women generally have difficulty securing better-paid employment, are expected and take on roles of care within family homes, and are tasked with multiple and strenuous duties.

3.3.5 Engendered and generational “power”: social relations and household dynamics

This section of the report explores social relations within the household and between members of households and outside agents in order to identify constraints to women’s engagement in food production, and opportunities within the social sphere that have emerged from the study. An understanding of organisations and institutions is presented, and the role of institutions in agency generally, and of women in agriculture in particular, is framed. The findings from the research in relation to social relations and gendered power dynamics are then expanded on in relation to the literature.

The research work is framed by the Capability Approach which stipulates that an evaluation of individual or social states should focus on people’s real or substantive freedoms to lead the lives they find valuable. This real freedom is called a person’s capability. Someone’s capability refers to their empowerment, the power that he or she has to be the person they want to be and to have the kind of life they want to lead. This represents an individual empowerment towards well-being and freedom and requires access to opportunities available to the individual to choose from; in other words, an act of choice (Robeyns, 2001). Sen (2001) refers to the above as *choice-mediated* control. It requires “the power within” or agency. This is the ability to define one’s goals and act upon them. Sen’s (1985) capability approach takes into account the individual characteristics and the impact that social arrangements may have on a person’s ability to convert resources or commodities into valuable functions. As such, capabilities often have a distinctively interdependent dimension (e.g. household members, kinship networks, community or nation) conditioned by social expectation, culture, traditions, social norms and beliefs.

With this in mind, the term ‘institutions’, as understood and applied in this study, are the constraints developed by people that regulate social, political and economic interactions, or the rules, norms and values that shape our behavior (North, 1990; DFID, 2001). ‘Institution’ is often used interchangeably with ‘organisation,’ but here ‘organisations’ are defined as the groupings or agencies that associate, interact and engage within both the public and private sector (e.g. the Department of Agriculture; a local NGO; religious organisations; a village committee; a clan). Where institutions are the ‘rules of the game’, organisations are the ‘players of the game’.

3.3.6 The mediating role of formal and informal institutions

According to Farrington et al. (1991:1), “...the assumption is that people pursue a range of livelihood outcomes (health, income, reduced vulnerability, etc.) by drawing on a range of assets to pursue a variety of activities. The activities they adopt and the way they reinvest in assets-building are driven in part by their own preferences and priorities...Options are also determined by the structures (such as the roles of government or of the private sector) and processes (such as institutional, policy and cultural factors), which people face. In aggregate, their conditions determine their access to assets and livelihood opportunities and the way in which they can be converted into outcomes”.

Institutions and livelihoods

Understanding organisations and institutions is central to achieving livelihoods outcomes. This is embedded in the Sustainable Livelihoods Approaches, as a result of the extensive work carried out by Leach and Scoones since the 1990s, who also recognised the multidisciplinary nature of livelihoods and the complexity of bringing these factors into livelihoods analyses and implementation (Scoones, 2009). Its operationalisation is still challenging and requires a holistic understanding of livelihoods where *power* plays a major role in inducing positive and equitable outcomes, requiring an improvement of theoretical depth in order to, for instance, pinpoint the underlying factors affecting women’s empowerment and livelihoods interrelations. This kind of livelihoods strategy may positively draw on elements from development sociology and gender studies, amongst others (de Haan & Zoomers, 2005).

According to Douglas North (1990), institutions can be formal (e.g. laws that govern land tenure, market transactions, or civil rights); or informal (e.g. social customs, routines, taboos, traditions or ‘the way things are done’). The World Development Report 2012 on Gender Equality and Development (World Bank, 2012) expands on the definition of formal institutions above as “...all aspects that pertain to the functioning of the state, including laws, regulatory frameworks, and mechanisms for the delivery of services that the state provides (such as judicial services, police services, basic infrastructure, health, and education)”. The report also expands on the above understanding of informal institutions as being the mechanisms, rules, and procedures that shape social interactions but do not pertain to the functioning of the state, as they relate to gender roles, beliefs, social norms, and social networks. Informal institutions, it states, include those embedded in and developed out of the *culture* of communities or larger societies. Both types of institutions, but informal ones in particular, are deeply connected to culture and beliefs.

Culture will often include widely recognised hierarchies of power relations that confer a particular status on people and constrain their behavior and opportunities by factors that are essentially beyond their control (age, gender, race, etc.). Anthropologists such as Arjun Appadurai brought a culture lens into the development discourse which resonates with both livelihood frameworks as well as Sen's capability approach regarding its mediating influence on capability or livelihoods achievements. Appadurai (in Rao & Walton, 2004:9) notes that "a culturally informed perspective... sees individuals as driven by a culturally influenced set of motives, incentives, beliefs, and identities that interact with economic incentives to affect outcomes". Bourdieu and Swartz argue that culture is a form of capital as it "represents an extension of the idea of capital to all forms of culturally derived power. Cultural, social, and symbolic resources can be drawn on by individuals and groups in order to maintain and enhance their position in the social order" (Bourdieu & Swartz, as cited in Rao & Walton, 2004:9-10). They continue by stating that the challenge for development is to transform the "voice from the past" that may be holding us or preventing us from embarking on a desired trajectory or pathway. This resonates with the idea that historical trajectories have significant determinism, and understanding history and culture (with a dynamic character) better facilitates the identification and facilitation of new desired pathways. Such a historical perspective has been central to the research work in the gendered analysis of land, water and social dynamics and learning.

3.3.7 Understanding household bargaining and women's agency

The household is the unit of analysis of the research work, but the views of the household are reflected variously by its component members, and the dynamics and decision-making within the household is often contested. Cheryl Doss (2013) confirms that intra-household decision-making may affect production decisions in household enterprises, as well as individual levels of distribution and consumption over, for instance, household budget spent on food, education, recreation, health, and other goods.

It is especially important and insightful to understand *bargaining* within agricultural households. Household bargaining power is shaped by social norms as patterns of behavior constructed from socially shared beliefs and informally reinforced by members of a household. These affect women's voices and bargaining in different ways: i) they set limits on what can be bargained about; ii) they can be a determinant of or constraint to bargaining power; iii) they can affect how bargaining is conducted; and iv) they themselves can be subject to bargaining (World Bank, 2012). Therefore, informal institutions governing the household's power dynamics, as well as organisations, policy and legislation, effectively determine access (to various types of capital, to livelihood strategies and to decision-making bodies and sources of influence); the terms of exchange between different types of capital; and returns (economic and otherwise) to any given livelihood strategy (DFID, 2001).

In the household, or the institution of the family, interdependencies are particularly pronounced and extensive conflict often coexists with prevalent cooperation (Sen, 1999). "Domestic power imbalances, often with a gender connotation, generate inequality and mediate opportunities to achieve well-being among household members" (Iversen, 2005:96). These imbalances thus affect individual capabilities, as it requires agency or "power" to negotiate a way to desirable outcomes or

aspirations. Households are usually composed of people living together in groups, as members of coveted units of social organisation, sometimes made up of multi-person families (Iversen, 2005:96). Furthermore, when household studies come into play as a means of capturing behavior within this unit for the collection of empirical data, households are also considered as "... not merely places to live/eat/work/reproduce, but as sources of identity and social markets. They are located in structures of cultural meaning and differential power" (Guyer & Peters, 1987: 209).

A household, especially in the rural areas, often includes multiple adults from several generations. It is a unit of production or consumption, where allocation and distribution of resources is at times unequal. Households, therefore, are not appropriate units of analysis unless each individual's needs are addressed and livelihoods outcomes and benefits examined. For example, the food available in a household does not necessarily benefit person A and person B nutritionally unless each individual's requirements are met. In these situations, fair livelihoods outcomes or the consumption of resources may depend on the bargaining skills of those affected by inequalities. Here, agency can take the form of bargaining and negotiation (Kabeer, 1999). It affects the conversion of commodities into functionings, or conversion of endowments (e.g. land) into well-being. It requires an in-depth understanding of the "pluralistic aspect of female agency that enable women to mediate intra-household power relations in order to improve their opportunities for achievement of well-being" (Iversen, 2005:100).

Furthermore, households are dominated by domestic hierarchies or power imbalances (Rice, 2014). In rural areas, a household usually includes a husband and wife and in many cases also multiple adults of different ages (Doss, 2013). The husband is generally considered to be the "breadwinner", adopting a traditional masculine or patriarchal behavior which, according to Rice (2014), can lead to greater male control over female members of the family unit or household. Rice argues that women are often so invested in practice and the patriarchal culture that they accept this kind of powerless relation as the norm. These power norms for authority are constantly reproduced and recreated by intergenerational and gendered relations.

3.3.8 Gerontocracy, voice and status

Age and gender hierarchies persist in many rural communities in South Africa where *gerontocratic* authority and rights are found alongside the ability of other family members to overturn this authority. Liebenberg (as cited in Rice, 2014) notes that the authority structure is based on hierarchical relationships structured by gender and age. Male authority is a reality in a married woman's daily life but male dominance should not be taken for granted, as dominance is as much a function of seniority as of gender. For instance, in the Eastern Cape, older men command the greatest authority, but older women often command considerably more authority and respect than younger men. In rural Eastern Cape, status, authority and voice are often translated into how individuals participate in, for example, community meetings. Older men often do the vast majority of the talking, but when older women attend, they usually voice their opinions much more than younger women and sometimes even more than young men.

3.4 Roles and Responsibilities of Women: Findings and Analysis

The findings explore how the observed informal institutional arrangements, particularly those that relate to power relations and norms found in households or family institution, contribute to general constraints affecting women and their access to productive resources, as well as decisions pertaining to the distribution and consumption of livelihoods outputs. Empowerment of women is also examined by looking at intra-household dynamics, rooted in social relations embedded in culture and history, creating traditions, social norms and customs, including habitus and styles. The analytical approach acknowledges the dominant historical trajectory affecting labour migration and the breakdown of the family, modernisation, and globalisation, all of which have led to the emergence of new roles and responsibilities for women (and men) in the household and community, as well as new power dynamics. Given the sociological and anthropological nature of these embedded themes, and particularly the difficulty of meaningful research engagement within the domain of intra-household power dynamics, which is beyond the scope of this research, the approach has been to fully elucidate issues arising from relevant literature and juxtapose these with the findings from the fieldwork.

3.4.1 Family contracts and *lobola*

Lobola involves the transfer of wealth in the form of cows – or more commonly today, their cash-value equivalent – from the groom or his family to the bride’s parents. *Lobola* is one key institution that raises the status of a female to full womanhood, and acquiring a wife by paying *lobola* confers considerable status on a man. While women start playing their roles when they are still girls, the study is particularly focused on adult women. Traditionally, *lobola* establishes ties of kinship (blood relationship) and obligation between the families, but in current times it may also be accepted as a compensation to the bride’s family for the loss of their daughter’s (re)productive labour, dismissing the ancestral and kinship-connecting value between families. In some instances, *lobola* allows the family to acquire a daughter-in-law of their own by using the daughter’s *lobola* to pay bridewealth, and thereby ‘acquire’ a son (Rice, 2014). However, today’s economic challenges and unstable employment opportunities affect young men’s opportunities to accumulate *lobola* in order to marry, secure land and form an independent household (Mongomery et al., 2006).

The research study undertaken showed that across the three sites in the Eastern Cape, culture and tradition still dominate over more contemporary views of marriage and engagement. The practice of *lobola* is widely supported by young women as well as their mothers or female elders.

"Yes lobola must be paid for girls, men used to pay 6-8 cattle during our days, today they only pay 3-4." (Grandmother of three)

"The mother of the girl feels proud of her daughter when lobola is paid. You also earn respect in your new family. Other makotis will laugh at you and call you names like ugabule igumbi meaning you took a short cut." (Young mother working outside the home)

"Yes I still believe that lobola must be paid for a girl when she gets married. Failure to do that results in a girl called names like ugabule and she loses her dignity." (Single mother of two children, living with her mother)

"I feel good because if lobola is not paid when you get married, other women call you names. It is important for the men to pay lobola for a woman. You are respected when your husband pays Lobola." (Makoti living with her mother-in-law; moved from urban area).

Historical and recent literature clarifies the implications of this prevalent practice. In general, a young man in rural Eastern Cape is truly recognised as a man through marriage and by supporting a wife and legitimate children; people become "suspicious" of single young men otherwise (Mongomery et al. 2006). Marriages in the Eastern Cape are patriarchal, with the obligation falling on the eldest son to bring a wife into the household.

This son will remain at the family home as the family grows, and his wife will carry out domestic work for the entire extended family unit. "Ideally, daughters will leave the homestead by marrying into other families" (Rice, 2014:386). In this arrangement, *lobola* is a central component of marriage. The sexual relationship between the individuals is part of a socially-negotiated relationship between families, with marriages formalised through the payment by men of *lobola*, the bridewealth (Jewkes & Morrell, 2010).

Despite the status that *lobola* holds for young women, social studies conducted in the Eastern Cape present a different view of this tradition, with negative connotations which include subordination on the part of the women. Although *lobola* is widely culturally-acceptable to women, for a large majority this arrangement also means a contract of ownership, requiring submission to and dominance by the husband in the relationship (Jewkes & Abrahams, 2002). According to Rice's study, although marriage marks the transition into full womanhood, a decline in the quality of her life within the family arises, particularly during her early years of marriage as a makoti. In this context, it is through marriage and entering the hierarchical family institution that women are subject to subordination, reduced autonomy and reduced agency, exacerbating gender inequalities and resulting in considerable financial, physical, psychological and emotional cost to the female counterparts (Chant, 2007). The high prevalence and acceptance of *lobola* thus points to the institutionalized subordination of women within the homestead, particularly but not exclusively as a makoti. The ability to access and mobilise the necessary resources for agricultural production, including that of one's own labour, is thus a limiting factor emanating from intra-household

dynamics, including women-headed households where gerontocracy combines with patriarchy in the form of dominant, older family men influencing intra-household dynamics. How to respond and facilitate change within such delicate developmental terrain is discussed later.

3.4.2 Gerontocracy and status

In this study it was found that there is a difference of status – and thus of voice and authority – of women that is determined by age and marital status. This is apparent in the relationships found at both household and community level for the following groups: young single women, young newly married women or *makoti*, middle-age/elder married women, widows and divorcees.

Younger married women, for instance, practice a “silent voice” as they almost never speak in public or at community meetings, particularly when their husbands are also present. To the contrary, middle-aged and elder women participate more openly in public meetings or ‘imbizos’.

Voice and decision-making:

“No I am still shy but now I am getting used to them...it is only the older women and old men who participate in public meetings.” (Young mother in Lutengele)

“Thina mama siyaxelelwa izigqibo ezithathwe ngamadoda kwimiba yamanzi nezi zokwakhiwa kwendlela.” – “We are only informed by the decisions taken by men in issues concerning water and road development.” (Newly married woman in Makoti)

Despite the above, final political, community and household strategic decisions are made by men or the household head. No female traditional leadership was found at the research sites.

3.4.3 The burden of ‘free’ domestic work

Women are feeling the burden of domestic work, where men seem to spend more time than women on recreational activities and have more time to themselves. It was observed in all participant households that domestic labour continues to be an almost exclusively female domain; this concurs with recent literature, notably Rice (2004). The findings of Chant (2007:337) also resonate: “men...are managing to retain their traditional privileges, including the exercise of authority, distancing from the time and labour efforts necessary for household survival,” without distinctive signs of changing over generations, to the point where young women are expressing highly conflicted feelings about marriage and their willingness to enter into such relationships. Those who do, might be young women submitting to their parents’ wishes as a way of obeying and showing respect (Rice, 2014). This unwillingness to marry or re-marry is evident in the accounts provided by respondents across the different study sites, particularly those women who are separated or widowed.

3.4.4 Aspirations and hierarchical influences

Furthermore, hierarchies or power relations may also mould preferences or preferred outcomes (Iversen, 2005; Doss, 2013) as well as aspirations (World Bank, 2012), habitus and identity. “Women in traditional societies may lack a notion of personal welfare because their identities are too closely tied up to the interest of the household” (Iversen, 2005:99) or the family. As a result, and according to Chant’s study, “most women have...injected more effort into households livelihoods than have men, there seems to be a growing unevenness in gendered contributions” (Chant, 2007:333). The findings that emerged from the study confirm these perspectives in that women tend to see themselves and their aspirations realised in the well-being of their children. Their interest lies in providing support for their children to accessing education in order to further their opportunities later on in life.

Aspirations:

“I would like to build my house and be able to educate my child who is at Cicira training college.” (Grandmother with eight dependents).

“Having my own household not my in-laws household, having my own furniture. Unfortunately my husband is a first born it is difficult for us to leave.” (Makoti with children, arranged marriage, husband working away).

As a result, women usually take on a great deal of responsibility and obligation in caring for their children, maintaining the household and financially contributing to school-related costs (e.g. uniforms) when the circumstances permit. Societal expectations on women are closely linked to the reproductive activities that come with the “job” or marriage arrangement. They tend to put the interest of “others” over their own well-being and work intensely to secure a “safety-net” for the family.

Expectations:

“As a woman I am expected to behave decently, to make peace, to educate children...bear children and instill discipline.” (Grandmother with eight dependents)

“To fix whatever that is wrong, build the house and take care of sick and old.” (Young mother)

“I am expected to rebuild and plaster my household and keep it neat, look after children and groom them, to respect adults and not to loiter around.” (Widow looking after a grandchild and two foster children)

The prevailing aspirations of women involved in this study with regard to agricultural production thus boils down to producing enough food for their family, with some cash surplus to complement their family needs (e.g. renovate their home, purchase furniture, etc.) but particularly to meet the needs of their children (e.g. school fees, uniforms, etc.). With regard to the newly married women or

makotis interviewed during this study, having their own homestead and breaking away from their in-laws' authority, as well as looking after their children, seems to be their main priority.

It is important to recognise that women make decisions around family well-being, particularly on how much education or healthcare to provide to individual children, and therefore hold an influencing role in the “intergenerational transmission of poverty and the potential for upward mobility across generations” (Doss, 2013:58). **An investment in mobilising women’s agency at the intra-household level, and the resultant empowerment, therefore makes sense as it impacts not only on economic development but also human development outcomes of future generations** (World Bank, 2012).

Greater control over household resources by women leads to more investment in children’s human capital, with dynamic positive effects on economic growth. Improvements in women’s own education and health also have positive impacts on these and other outcomes for their children. Women’s lack of agency – which shows, for example, in situations of domestic violence – has consequences for their children’s cognitive behaviors and their own health as adults.

Global evidence shows that families benefit when women have greater status and power within the household (Smith et al. as cited in FAO, 2011). In other words, stronger bargaining skills over agricultural decisions regarding production, investment and consumption positions women in a more influencing role over their family’s well-being. The facilitation of agency of women within the household, through awareness and targeted attitudinal-change strategies, is one arena of engagement that a gender-centered intervention (for women’s empowerment in order to achieve increased food production) must consider.

3.4.5 Assets and bargaining power

Doss (2013) presents a strong case for the relationship between assets and bargaining power by speculating that owning and controlling assets provides women with more bargaining power, greater options, and a sense of security over those women who are restricted from productive endowments and resources such as land, water, livestock, agricultural equipment, technical support and financial capital. However, it is worth noting that although the general global assumption is that an increase in access and control over productive resources will result in an increase in women’s agricultural production (FAO, 2011), the risk is that with it may also come an increase in social and familial expectation or constraints – in a few words, more demands. Sylvia Chant (2007:336) puts this point across as follows:

“While young women’s growing personal asset base might be expected to strengthen their bargaining power and aspirations, potential gains are frequently circumscribed by weighty social and familial constraints which lay them open to greater exploitation.”

The following section briefly outlines the “empowering opportunity” that each of the above productive resources or livelihoods investments and services might bring about to women’s agency,

and thus towards leveling the power relations over access and decision-making over these resources.

The “power of land” on uplifting women’s status and production opportunities. Land is one of the most important assets for households which depend on agriculture for their livelihoods. Access to land is a basic requirement for farming, and control over land is synonymous with wealth, status and power (and security) in many areas. Strengthening women’s access to land and securing land tenure is an important means of raising their status and influence within households and communities, as well as having a direct impact on farm productivity and thus broader implications towards improving household welfare (FAO, 2011). In the research sites it has been found that women have access to land regardless of their marital status (discussed in Chapter 6).

The “power of water” to bring about household dignity and overall well-being of the family as well as free up women’s time for (re)production and leisure activities. The Human Development Report (2006) states that water for life in the household, and water for livelihoods through production, are two of the foundations for human development. It presents the view that the roots of the crisis in water can be traced to poverty, inequality and unequal power relationships, as well as flawed water management policies that exacerbate scarcity. Overall, easy access to sufficient quality and quantities of water is directly linked to gender empowerment and poverty reduction as i) it improves livelihoods and food security for women; ii) reduces water-borne diseases; iii) reduces time spent accessing distant water sources; and iv) contributes to overall dignity (UNDP, 2003). It is manifest in the research sites that homesteads with roof-water tanks use more water, making life easier for women, particularly during the dry season when water is a scarce and costly resource.

Agricultural equipment, technology and relevant infrastructure increases production, market access and security opportunities. Gender gaps are also evident regarding women’s access to a wide range of agricultural technologies, including machines and tools, improved plant varieties, management techniques, etc. (FAO, 2011). Access to new technology can assist women in maintaining and improving agricultural productivity, thus increasing, for instance, crop production and water security and resulting in higher levels of resilience.

The water storage infrastructure found in Lutengele has positively impacted on women’s productivity throughout the year. In households where such infrastructure was installed, food gardens have been developed over the course of time. Having easy access to water has also reduced the time and effort invested in collecting water from nearby sources such as springs and rivers. Furthermore, it was also identified that the lack of appropriate fencing, particularly around fields, has restricted crop production. Disputes with cattle owners over the detrimental impact of cattle on their crops are avoided, resulting in people not producing on unfenced areas. Household investments in unlawful household connections (to the bulk water system intended for field irrigation at Mbekweni) have a similar empowering and time-saving effect for women, and also increase the garden production of oats, used for lambing ewes. At a simple level this translates to investing in quality of life (women-managed assets, leverage, more time, food, income) as an empowering measure.

Linked to the lack of agricultural technology found at the three research sites is a dependency on local labour. Most women in rural Eastern Cape are middle-aged with limited financial resources to employ labour for cultivation. Traditional ways of collectively assisting each other with cultivation, such as *ilima*, still function in all three areas but it has become an expensive practice as nowadays those involved expect to be provided with food and traditional beer (*umqomboti*). The lack of labour heavily impacts on women's abilities to engage in crop farming productively.

Livestock is a sign of status and wealth, provides security, and contributes to labour inputs.

Livestock is one of the most valuable agricultural assets and represents a source of income and wealth accumulation, as well as an important source of resistance against shocks. While livestock ownership is generally very low and draught animals seldom used to plough, the evidence of livestock ownership points to systemic gender inequalities. While women carry the responsibility of looking after small animals such as goats and chickens, they have shared control when it comes to slaughtering or selling, as this is done in consultation with their husbands. Decisions on how financial benefits are invested or used also take place through shared agreements with their counterparts.

Furthermore, women traditionally refrain from accessing cattle, which is one of the only local available means to plough the fields due to the lack of agricultural technology (e.g. tractors) available. This cultural norm puts women at a disadvantage over men when it comes to agricultural capability.

Financial services and investments increase security and opportunities for farm productivity.

Financial services such as savings, credit and insurance provide opportunities for improving agricultural output, food security and economic vitality at household, community and national levels. Evidence shows that credit markets are not gender-neutral. In addition, women generally have less control over the types of fixed assets (such as land) that are usually necessary as collateral for loans (FAO, 2011).

In general, most respondents have not been able to make sufficient financial investments in their agricultural activities, nor have they attempted to access financial support, either out of lack of knowledge on how to access financial services, or simply the lack of such services. Women and their families are thus restricted to expand their farming enterprise when financially limited regardless of whether the money comes from their crop cash-sales, grants, employment income or remittances from family members.

Furthermore, a lack of access to essential infrastructure or a lack of service delivery and basic social services (e.g. housing, roads, water and sanitation, communications, electricity, childcare facilities, hospitals, schools, communications, electricity) can perpetuate poor living conditions, well-being, security, efficiency and functionality, thus impacting on agricultural productivity. The lack of basic services such as appropriate roads has been highlighted in Lutengele and Sirhosheni, where the villages are a fair distance from the main commercial centres and the present gravel and mud roads are particularly bad in wet conditions. This lack of infrastructure increases transaction and financial costs and reduces opportunities to enter the marketplace and bring income into the household.

3.4.6 Income and employment opportunities: Escape from material deprivation

“Women’s work, both paid and unpaid, is critical to the survival and security of poor households and an important route through which households escape poverty” (UNMP/TFEGE as cited in Chant, 2007:338).

Most women on the project sites are not formally employed, but there are incidences of informal “wage” jobs in the Enhanced People’s Work Program and other small opportunities, including road-maintenance, cutting grass, plastering, and making garments. However, it is evident from discussions that the spending power within the household still lies with the male head of the household.

“I do not make final decision – I have to give that respect/honor to my husband.” (Elder woman with retired husband staying at home).

Furthermore, in some cases, young married women with children reported being discouraged to take employment outside the home out of ‘respect’ to her husband’s dignity. The husbands are perceived by the larger community as the breadwinner, and being seen as ‘not being able to provide for the family’ is potentially embarrassing. **Most women have indicated that they prefer to work from home rather than entering into agricultural cooperatives.** In this way they can look after their families and attend to their well-being.

Income-based approaches to address poverty argue that financial capital leads to empowerment and thus a better quality of life, represented by evidence of material well-being or ownership of commodities such as land, as well as financial flows translated into spending power or even lack of debts. An improvement of income in the household is often generated through employment outside the home, either through “wage” jobs or more stable and long-term employment contracts. The data bears out the globally applicable finding that women tend to engage in the formal or informal wage sector or unpaid family employment, but have fewer opportunities to operate at the same agricultural level as men (FAO, 2011).

In contemplating implications for interventions, it is noted that employment outside the home may also increase women’s overall workload and may put them in unsafe or difficult situations (Doss, 2013:61-62), particularly young women who may have greater opportunity for employment, yet larger reproductive work demands and obligations relative to elder women. Broadly speaking, “women...are working outside the home, as well as continuing to perform the bulk of unpaid reproductive tasks for husbands, fathers, brothers, and sons” (Chant, 2007:334). Furthermore, women’s labour-force participation may increase their control over household decision-making, but it may also have some repercussions in triggering greater male need for exercising their “masculinity” or dominance in decision-making, putting women’s emotional and physical well-being at risk (Tacoli, 2012).

3.4.7 Division of labour: The generational nature of roles and responsibilities and their effect on gender equality

Women at the research sites generally accept their socially constructed responsibilities as the ‘norm’ and as what is expected from them. Their role as rural women looking after their families and the household at large range from domestic chores (e.g. cooking, fetching water, collecting wood, cleaning the house, etc.) to attending cultural community events.

“I cook, clean, instil discipline to children, teach them how to clean and cook, how to behave at home and in public.” (Older woman in Lutengele looking after eight dependents)

“Everything is done by me, during the day I take care of my husband, I clean and also go to the fields.” (Woman living with pensioner husband and three grandchildren)

“I wake up early in the morning and start by cleaning the household, cook porridge for kids, work in the garden, irrigate the garden, go to fetch water, cook for people and dogs and then late I go back to the garden.” (Young mother working outside the home)

Overall, the engendered roles and responsibilities for rural women tend to include the management of complex households and the pursuit of multiple livelihood strategies. Although some of these responsibilities are shared with men and children there are some distinctive divisions of labour associated with cultural norms and beliefs, as well as the adoption of new roles. These additional roles and responsibilities combine with existing ones and are typically known as the “triple-burden”, a combination of productive, reproductive and community roles described by Moser (1993:230) as follows:

- *Reproductive* work refers to childbearing responsibilities and maintaining the house (e.g. fetching water and firewood, cooking, cleaning the house, etc.).
- *Productive* work is the work done by both women and men for pay in cash or kind.
- *Community* roles are associated with activities undertaken primarily by women at the community level as an extension of their reproductive role in order, for instance, to ensure the provision and maintenance of scarce collective resources such as water, health care and education.

These culturally-entrenched gender roles and responsibilities or divisions of labour are evidently embraced by women; they are considered “the norm” and determine which activities women perceive to be acceptable. This resilience to role change, also well-reported in the literature, has the negative effect of restricting women’s capacity to aspire, and is further reproduced across generations (World Bank, 2012). Reproductive and community work is seen by themselves and the people around them as “natural”, but it is often “invisible” to others and is generally not valued as “work” as such, both by them and others.

During this study it was found that although there is a prevailing patriarchal division of labour in agriculture, roles and responsibilities are increasingly interchangeable as men have migrated to non-farming activities. Women are not only caring for the needs of household members but also involved in home-based agricultural production and in some instances, cash income jobs also. The gender roles and responsibilities in these subsistence economies are dynamic and have changed with new economic situations. **When men move to non-farming activities, women become more involved in cash cropping.**

In general, the agricultural roles and responsibilities found at the three research sites are traditionally divided between household members, with some exceptions, as presented below:

- i) **Production:** The roles and responsibilities relating to the three spatial agricultural lands traditionally in possession of the family – the *isitiya*, *igadhi* and *intsimi* – are distinctive. Agricultural production in the *isitiya* falls primarily under the domain of the women, whereas ploughing in the *igadhi* and *intsimi* tends to be the responsibility of the men, with women doing the sowing, planting and harvesting. Ploughing requires male labour and access to cattle, without which women farmers face delays that result in losses in output or a complete move away from farming in the *intsimi*. Labour availability depends on the amount of family labour that a household can mobilise as part of *ilima*, or the amount of labour that can be hired at local labour markets. This makes it difficult for women to increase their agricultural aspirations towards a more productive farming enterprise.
- ii) **Livestock:** Traditionally men are involved in managing and herding grazing animals such as cattle. Goats and chickens are the responsibility of the women and decisions around these are mainly made by the women. However, due to the prominent migration of males to economic centres, women and children are found to be involved in looking after the household livestock in the absence of the household head. Under no circumstances, however, are cattle sold without the consent of the male counterpart.
- i) **Irrigation:** Irrigation of the *isitiya* is predominantly the responsibility of women and girls, who fetch water for irrigation as well as for multiple other uses. In some instances, particularly during the dry season when water is scarce, they are assisted by men in the household. Men fetch water mainly with donkeys or bakkies from nearby water sources such as rivers and springs. These are sometimes over a kilometre away from the household, as is the case in Lutengele.
- ii) **Marketing and selling:** Women tend to control the use of eggs, poultry meat and vegetables for home consumption, and they often have control over marketing these small products, and any income derived there-from. Decisions regarding crops from the *igadhi* and *intsimi*, as well as cattle and other valuable assets, fall under the domain of the family unit or at times solely on the male counterpart, whether he is resident or migrant. In some circumstances, when the head of the household is not present, operational decisions such as selling cash crops (e.g. maize and potatoes) are made by the women alone. In the case of single women or widows, consultation with the head of the kinship or family is traditionally

required when making final decisions regarding cattle, land, and other household and agricultural assets.

When women added up all of their productive and reproductive roles, responsibilities and activities, they evaluated that they typically work more hours than men, with most of them carrying a “triple-burden,” which has consequences on their leisure time and wellbeing. The women tend to devote more time each day to care and housework than their male partners, and even as women explore and engage with the work market, albeit usually at the level of menial labour (in the case-study households), they remain largely responsible for care and housework.

“No, I do not have time to visit family and friends. I can only do that when my husband is around and only for one day because he can’t look well after my garden.” (Young mother working outside the home whose husband works away)

“Ever since we started farming women are busy, no time for gossiping.” (Elder woman living with retired husband)

In general, findings from this study confirm that women have limited time available to expand agricultural productivity at home, never mind for leisure, with the exception of going to church and cultural events. In some ways, their current involvement in gardening activities keep them busy and are perceived as positive, as it keeps them away from getting involved in “waste of time” activities.

Although the above roles and responsibilities are generational, the research clearly shows that these roles are dynamic and are being redefined as democratisation, globalisation and urbanisation expose other realities and offer new opportunities and demands for men and woman. This is borne out by other research, where the legacy of apartheid and labour migration have had a major influence on household dynamics, exacerbating the transformation of marital relations under the circumstance of long-term separation, including: a sustained decline in marriage rates; and the dependency of women and older generations on the wage-earning power of young men, grants and pensions (Mongomery et al., 2006; Rice, 2014). It has also been found that the dynamic re-definition of roles is accelerated by the increased integration of rural areas into capitalist economies, and the decline of agricultural activity in the former homelands at large.

Even though rural South African women who perform “men’s work” are generally accepted, this transition unfortunately does not yet appear to have occurred for men who take on “women’s work”. Gendered and generational dynamics found in roles and responsibilities are indeed evolving into interchangeable divisions of labour which are different to those which are traditionally defined. This is evident in the growing number of women supporting men, whether with income, labour contributions or both (Chant, 2007). Sadly, even when men are unable to be the sole or chief economic support for their households, their participation in reproductive work does not necessarily increase and they continue to withhold earnings, having the most control and decision-making power over spending (Chant, 2007:334-5). Despite the dynamism and fluidity of gender relations, in the Eastern Cape these do not show that women and men resist the fundamental gender order that subordinates women to men (Jewkes & Morrell, 2010).

“Yes, the livestock is no longer looked after by men only – women do it too and we cut poles for building kraals. Things are changing, women go wherever they want, men can’t stop them. Old people attend ABET classes.” (Single mother of two children living with her mother)

“Yes, there are changes because women now can do the jobs that were normally done by men. For instance there are two projects in our community and women are working there doing the same jobs as men.” (Makoti living with mother-in-law)

The research study indicates that gender roles are continuously interchanged between men and women, particularly those relating to herding cattle, fetching water, ploughing, and taking up employment opportunities. The changes result, for instance, from the different circumstances affecting people’s everyday lives (e.g. migration, difficult access to water sources, etc.) to the de-stigmatisation of gender roles in the household. However, there is still stereotyping that prevails, sometimes in seriousness and other times seemingly in jest but reflecting a perceived truth, that men are still viewed by women as ‘irresponsible’ and ‘unreliable’ (e.g. men go drinking, they have girlfriends, etc.) while women take responsibility for the household and well-being of the family.

3.4.8 Vulnerability to violence: A manifestation of freedom deprivation

“A clear manifestation of the lack of agency is domestic violence. Violence is the opposite of freedom—an extreme form of coercion that by definition negates agency. Women are at far greater risk of violence by an intimate partner or someone they know than from violence by other people” (World Bank, 2012).

The findings on violence within the household indicate that women in the study sites still “obey” their male counterpart and elders, and that it is common to adopt submissive behavior as a form of showing respect. Violence (physical and verbal) at varying levels was widespread within the participating homesteads, and usually associated with alcohol consumption. In addition to spousal violence, masculine identity and dominance was also made manifest in the form of “abduction marriage” or forced marriage known as *ukuthwala*. Forced *ukuthwala* marriage is illegal under South African law, as it is deemed a gross violation of rights to gender equality and bodily integrity as enshrined in the Constitution, yet is not uncommon in many parts of the Eastern Cape province and can take place either with or without the knowledge and consent of a young woman’s parents, who sometimes secretly agree to the plans for abduction (Rice, 2014). Here, it is important to take into account the complex social field in which these marriages take place, where many rural people situate the practice within the context of cultural tradition or “traditional” practices often maintained through gerontocratic authority. It is evident from the interviews that *ukuthwala* practices still exist in the Lutengele area. The prevalence and relative acceptance of the practice is evidence that women do conform to tradition without contesting it, but this being said, there were also reported cases narrated by the research participants of women who managed to escape from being abducted.

Social studies in South Africa have been dominated by discourses on domestic violence affecting gender empowerment in different forms (Mongomery et al, 2006), including erosion of their bargaining capacity to achieve their well-being (Rao, 1997). It should be acknowledged that investigating or analysing relationships in the realm of livelihoods capabilities and intra-household dynamics is challenging, especially regarding domestic violence, as relationships are complex and culture-specific (Doss, 2013:72).

Anthropologists and historians have long observed tensions within hierarchies of age and gender in Southern Africa and in correlation to how colonial administrators mobilised African patriarchy to control women and youth (Rice, 2014). According to Simpson (as cited in Jewkes & Abrahams, 2002), one of the consequences of decades of the State-sponsored violence of apartheid and colonialism is that physical violence has become, for many people, a first-line strategy to resolving conflict. This form of oppression has in turn manifested itself in gender power inequalities that feature strongly in the dominant social constructions of masculinity in South Africa, linked to strategies of control (Jewkes & Abrahams, 2002) and closely connected to male notions of “ownership” of partners (Wood & Jewkes, 1998). Violence against women is thus perceived as “a necessary work of social stabilisation” to keep women compliant with social patriarchal norms (Moffett, 2006:138). Moffett’s work on gender and violence in South Africa notes that “acts of violence are therefore seen as necessary, not only to keep the unstable subclass of women in their ordained places, but to confirm and remind them of their membership in a specific community” (Moffett, 2006:138).

Other vulnerable environments or situations are often avoided by women for fear of being victimised. In rural areas, women are at risk of violence each day during the process of collecting resources for daily living (Jewkes & Abrahams, 2002). As victims of violence, women experience physical and psychological health problems (Morrison et al. as cited in Tacoli, 2012), with great consequences to the well-being of the woman and her family.

Interestingly, it was reported that men find themselves vulnerable in one important way: as targets of sorcery as a form of female retaliation. There are also testimonies of women using *muti* to control their husbands or boyfriends. This might be done as a way of oppressing the patriarchal, controlling influence affecting them. This dynamic is reported in the literature, where *muti* (or traditional medicine) is applied as a way to control and ensure men’s obedience, sexual fidelity and financial generosity and to revenge partners for ill-treating women” (Wood & Jewkes, 1998:26).

Having said this, it is important to note that feminine and masculine identities change over time, at different paces and levels of significance. A lens of gender identity provides a frame through which one can begin to understand why men and women behave the way they do, and their broader struggles, aspirations, desires and needs that motivate their behavior (Jewkes & Morrell, 2010).

3.4.9 Understanding female-headed households: Challenges and benefits

The literature highlights some of the disadvantages found in female-headed households, which include:

- *Less access to resources:* Households headed by females are often considered “the poorest of the poor” (Jewkes & Morrell, 2010) particularly where they are unable to mobilise resources except through dependence on a man (Elson as cited in Chant, 2007). Their situation is compounded by inheritance practices, the habit of registering assets such as land and housing to male heads (despite the often crucial contribution of women to self-built and self-financed housing), and women’s limited access to credit (Tacoli, 2012).
- *Lower uptake of technologies:* In female-headed households women are less likely to adopt improved varieties of technologies, agricultural equipment, etc. (Doss, 2013).
- *Subject to traditional rights:* Households with single women, or who are divorced will be expected to differ from those in which there are marriages, as well as to have different access to resources (Doss, 2013).
- *Reproductive overload:* Disadvantages are aggravated when women raise children alone.
- *Unreliable financial support:* Transfer payments or remittances from external parties such as the State or absent fathers rarely make an appreciable difference to household incomes or assets (Chant, 2007).
- *Vulnerability to financial debt:* Financial contributions from men may be so irregular that women may be forced into borrowing money in order to get by (Chant, 2007).
- *Age:* Elderly females face additional disadvantages due to lack of employment and inadequate pensions, especially where they live alone or as the only adult (Chant, 2007).
- *Poor stigma:* Female-headed households suffer from gender discrimination in society at large.

Despite these disadvantages, the study revealed that female-headed households provide an enabling space for both single and widowed women. Here they have the most control over their household and livelihood decisions, more so than women in households headed by male counterparts. However, in the event of selling major assets such as cattle or property, consultation takes place with the male head of the kinship (e.g. a brother in-law).

Female-headed households thus cannot be assumed to be inferior to male-headed households for the following reasons:

- *“Command” and “allocation” on distribution of income:* In female-headed households, “...earnings seem to have a greater chance of being translated into disposable income for household use because female heads are better able to exert power and exercise their preferences” (Chant, 2007:112). “Debates on female household headship and poverty have also brought issues of *power* and *empowerment* to the fore in so far as they have stressed how women’s capacity to command and allocate resources can be as, if not more, important than the actual resource base in their households and that the relationship between women’s access to material resources and female empowerment is by no means straightforward” (Chant, 2007:34).

- *Effect on well-being of the family:* Women decision-makers in the household tend to have a positive effect on nutritional intake, health care, education and overall well-being.

"I make all decisions but inform brother-in-law if I sell assets just for respect." (Single women with two children)

"We own livestock as women because we are widows but if you have a husband it is owned by your husband. Women only look after chickens, ducks and pigs; men cattle, goats and sheep. I do but I inform my brother-in-law when I decide to sell livestock as a sign of respect. He can't tell me not to sell." (Widow looking after a grandchild and two foster children)

In essence, intra-household gender analysts, according to Chant (2007:338), need to pay attention to the following:

- i) female-headed households may not necessarily lack male members;
- ii) free of a senior male "patriarch", households can become "enabling spaces" in which there is scope to distribute household tasks and resources more equitably; and
- iii) women in male-headed households may have to support not only their children but their spouses as well, where men are "chief spenders" rather than "breadwinners".

These are all relevant and reflect the context of the study.

3.5 Conclusions and Implications for Empowerment

In the study areas and case study households, culture and tradition still dominate over more contemporary views of marriage. The intra-household domain is a (variously) contested space, and while it was noted that there are numerous marriages and partnerships where collaboration around agriculture occurs (e.g. migrant husbands remitting money to buy seed) it is predominantly men who make the major decisions. Even in female-headed households, external senior and male family members still exert influence or dominate control.

Triple burden: Women feel the burden of 'free' or unpaid domestic work, whereas resident men seem to have more time of their own, and spend more time on recreational activities than women. Domestic labour in all participant households continues to be an almost exclusively female domain. Women engage in the triple burden of reproductive work, productive work and community roles. The study confirms that women have limited time available to expand their agricultural productivity at home. Time-saving interventions in agriculture or in any aspect of daily life would thus have an empowering effect by making time available for other, more enjoyable or productive activities.

Secondary aspirations: Women tend to see themselves and their aspirations realised through the well-being of their children, with their interest lying in providing support for their children so that they have access to education, thus providing them with better opportunities later on in life. Feminist and gender-awareness communications embedded in agricultural information transfer and education processes, which target attitudinal change in relation to gender roles in agriculture and the homestead, hold value in helping women develop independent aspirations beyond the boundaries of cultural and social norms.

Generational responsibilities: The research shows that roles are dynamic and are being redefined as democratisation, globalisation and urbanisation expose other worldly realities, place new demands on both men and women, and offer them new opportunities. Migrant labour, de-agrarianisation and cultural evolutions that follow modernisation impact on roles that include herding cattle, fetching water, and ploughing, as well as taking up employment opportunities. And while rural South African women who perform “men’s work” are generally accepted, this transition does not appear to have occurred for men who take on “women’s work” – potentially the subject of future intervention designs targeting attitudinal change.

Marriage and submission: The practice of *lobola* is widely supported by young women as well as their mothers and female elders. Despite the status that *lobola* creates for young women, a different and negative connotation of this tradition includes subordination to men. Although *lobola* is widely culturally acceptable to women, for a large majority this arrangement also means a *contract of ownership*, involving submission to and dominance by the husband. Married women thus have to engage with agricultural decision-making in this inherently disempowering context.

Assets and empowerment: Assets which are under women’s control due to her domestic roles and responsibilities, such as water-tanks, tools, fencing and sheds, have the positive effect of increasing women’s bargaining power within the homestead. Time and effort spent collecting water from nearby sources such as springs and rivers has in some cases been significantly reduced by investments in water storage, with the reported effect of a reduced burden on the women. Infrastructure investments within the boundary of the umzi, particularly where these coincide with women’s uncontested roles (within that homestead), are associated with an empowering effect in women’s lives, which in turn might have subsequent knock-on influences in other spheres and bargained decision-making, bringing further improvements in well-being. This catalytic effect is therefore a development opportunity.

Family violence: The findings on violence within the household indicate that women in the study sites still “obey” their male counterpart and elders, and that it is common to adopt submissive behavior as a form of showing respect. Experiences of verbal and/or physical violence within the participating homesteads are high, and usually associated with alcohol consumption. The social challenges and context are also illuminated by the continued practice of *ukuthwala* or “abduction marriage,” which is illegal under South African law and deemed a gross violation of rights to gender equality and bodily integrity. Yet *ukuthwala* was still practised at Lutengele in particular during the time of this study (2012/13) and sexual violence was not unusual at Sirhosheni . While vocal

opposition from women respondents is strong, there is still relative acceptance of *ukuthwala* and the inevitability of violence in reality – evidence that women still conform to oppressive traditions, and violent behavior to a degree. The situation at Mbekweni, which is more urbanised, has a different character and while the historical cultural trajectory is similar, the cultural and related intra-household empowerment transitions have progressed somewhat differently, or perhaps just faster.

Voice and decision-making power: In general men, not women, make the major decisions in their households. However, it is noted that household decisions are made at two levels, strategic (e.g. major agricultural investments), and family operational decisions (e.g. selling cash crops). At a strategic level, all household members are involved but the male counterpart, regardless of whether he is resident or migrant, makes final decisions. In the case of a widow, a male family member is consulted (e.g. a son or father-in-law). However, at an operational level, some decisions are more fluid and dynamic, depending on the nature of the matter. Here, women's marital status and age play a considerable role, with middle-age, elder married women and widows having a decision-making advantage over young single women, makotis and even divorcees.

Advantages of women-headed households: Somewhat unexpectedly the study reveals that female-headed households provide an enabling space for women, both single and widows. Here they have the most control over their household and livelihood decisions, more so than women in households headed by male counterparts. However, there are also distinct disadvantages to female-headed households, including reduced access to resources, a lower uptake of technologies, a reproductive overload, and increased financial vulnerability as a single person heading a family – all of which is compounded by the stigma of being a single woman.

Closing statement

The findings of the study on social relations resonate well with Chant (2007) who notes that whether women are farmers, entrepreneurs, or workers, they are often caught in a productivity trap. They have to work harder than men on an uneven playing field with unequal access to productive inputs. There is a need for development programs that promote equality in the division of labour. However, gender roles and responsibilities are so rooted in culture that such changes may take a long time to occur.

The opportunity for intervention strategies is to use the identified challenges to inform targeted responses, either as explicit responses, or as indirect responses which are embedded into suitable project components or sub-strategies. It is clear that women's access to the resources which are necessary for increased agricultural production, increases with increased decision-making power within the homestead. Also, investments in a woman's asset base are in itself empowering, increasing her decision-making power, and leading to follow-on mobilisation of other resources needed for production in a catalytic effect. Interventions could take the form of homestead and social investments that increase women's time availability and (agricultural) asset base and thus increase their power in intra-household decision-making.

Resistance to changes in gender relations is inevitably strong, given long historical trajectories of entrenched values and norms. As a result the ongoing intra-household empowerment of women is intrinsically linked to wider cultural change and the acceptance of shifting role-changes for both women and men. Programme planners intending to facilitate women's agency to increase food production need to include empowering asset investments along with role-awareness campaigns while anticipating only medium- to long-term outcomes (stretching beyond the project timeline) as far as cultural and role changes are concerned.

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Chapter 4 Water Resources and Productive Use

J Denison, A Perry & C Murata

4.1 Shared Resources and Multiple Uses

This chapter presents existing water use activities undertaken by women, men and children in homestead food gardens, croplands and grazing lands in the three research sites. The intentions of the research team were: i) to gain insight into the natural and stored water resources that surround the research site villages and are physically accessible to people; ii) to document their practices in relation to the water resources and available infrastructure; and iii) to quantify the use of these resources, with an emphasis on crop production, in the different physical and functional spaces of homesteads and fields.

The chapter commences with a review of literature pertaining to water use and water assessment methods in a rural context, given the different spatial domains that impact on food production and livelihoods, namely the physical assets within the homestead (the *umzi*) and those linked with more distant fields (*intsimi*). This includes a description of the three frameworks that were adopted for the overall study (i.e. livelihoods, gender and institutional frameworks), specifically from a water perspective. The assessment embraces the Multiple Use Services paradigm, building on the fact that the same water sources and storage facilities are often used for home use, irrigation, and livestock watering, and that agricultural and domestic water use issues and solutions are similarly interlinked. The water-related work was also informed by the findings on gendered roles and responsibilities, which are detailed in Chapter 3.

The water assessment was conducted at a *community scale* first, and took into consideration the surrounding natural and infrastructure resources, including rivers, springs, dams, and water supply systems. A detailed quantitative assessment was then conducted at *homestead scale*, where water use for various purposes was quantified in both the wet and dry seasons for the 30 selected case study households. This assessment was used to arrive at average daily and monthly consumption figures during the wet season (data collection in February 2013) and the dry season (data collection in July 2013).

The chapter concludes with an analysis and discussion of access to agricultural water for crop and animal production in the domains of the homestead and the more distant fields. The findings from the water research were used as input for focus group discussions so that a deeper understanding of water challenges in relation to agricultural aspirations could be obtained (described in Chapter 7).

4.2 Literature Review of Water Assessment Frameworks

A review of relevant frameworks and literature pertaining to water use in the homestead was carried out. Theoretical issues related to gendered water access, water quality and water use are defined, leading to the methods and instruments used for the study.

Agricultural production is recognised as an important component of rural homestead livelihoods in South Africa (Backeberg & Sanewe, 2013). Development of the agricultural sector is bound in part by the availability of land and water resources, as well as by the relationship between resource managers and potential users. The lack of water specifically, referred to as "water poverty," is a key concept in rural development studies (Hemson et al., 2008). It is accepted that a multivariate relationship exists between water and poverty, and theories exploring development issues help navigate these complexities. The three analytical frameworks adopted for the project and described in Chapter 2 provide structured approaches for examining water from the perspectives of livelihood, gender and institutions, and these have informed the water-related research instruments chosen and the development of the analysis presented in this chapter.

Water management, a sub-sector of natural resource development, is inherently steeped in human values, from the recognition of human rights and equitable provision of water to concerns about the maintenance of organism biodiversity and environmental sustainability. Decisions around water are thus largely negotiated in recognition of the needs of people and the needs of the environment. Once the exclusive niche of engineers and hydrologists, water management now recognises and draws knowledge from a multi-disciplinary range of economists, historians, sociologists, anthropologists, ecologists and geographers, amongst others (Grafton & Hussey, 2011). In bringing together such an array of perspectives to examine water requirements for people and the environment, the complex interlinkages of water use to all living organisms' livelihoods are at least acknowledged, if not easily revealed.

Within the human sector of water demand alone, there is great variability in consumptive and productive patterns based on a person's economic status, line of occupation and location in a particular climatological region. Domestic tasks requiring water, such as drinking, cooking, cleaning and hygiene maintenance, either coexist with or are competed for against more productive uses, such as agriculture or manufacturing. As the demands for water increase worldwide, it is necessary for practitioners and decision-makers to understand the key issues and concerns of water management, including the wide range of users, ecosystem health, and livelihood ethics (Grafton & Hussey, 2011).

The frameworks incorporated into the overarching research project include themes of sustainable livelihoods, gender dynamics, and institutional policies, each of which has direct applicability to water resource management. The aim of the following sections is to explore these connections and understand the many factors that need to be considered in water resource assessments.

4.2.1 Sustainable water management

The 1990s were a defining decade for the global concept of sustainable development. The idea that sustainability could be achieved in water resource management focused around the economic efficiency and productive effectiveness of projects. This movement was encouraged by a shift in global thinking towards economic structural adjustments. Experiences of corruption and unachieved goals were blamed on the structure and confined management of state-led welfare systems (Cleaver & Nyatsambo, 2011). Water policymakers worked to channel perspectives of water as an economic good into a new system of thinking that decentralised power across the spectrum of water management levels.

Global summits and conferences created space for the development of influential decisions and mandates towards integrated and multi-disciplinary frameworks for water resource management. The widespread effects of summit statements such as the Dublin Statement on Water and Sustainable Development (World Meteorological Organisation, 1992) and the Rio Declaration on Environment and Development (UN, 1992) – both of which were endorsed by the World Water Forum (WWC, 1997) – re-shaped water research efforts. Broadening the scope of influencing factors that affect water demands and management, researchers considered issues of perceived gender roles, political dynamics, market pressures, and economic vitality, as much as the physical water systems themselves.

4.2.2 Water and the Sustainable Livelihoods Framework

One of the most widely-used conceptual frameworks that recognises the multiplicity of facets contributing to human livelihood development is the Sustainable Livelihoods Framework (SLF), which visually displays the interaction of these facets and the resulting livelihood outcomes (DFID, 2000a; Timmermans, 2004; Angelsen & Friss Lund, 2011). The SLF focuses on the functionality of rural livelihoods, and how people's adoption of certain livelihood strategies is negotiated between economic, political, ecological, institutional and social dynamics (Cundill et al., 2011). The SLF's broadness is useful for organising various factors that could potentially influence each other in the formation of diverse livelihood identities; however, a cited limitation of the framework is that its generality makes it somewhat inappropriate as a foundation for developing theories at a more detailed level (Angelsen & Friss Lund, 2011). The SLF is thus seen as more of a gathering place for general multi-disciplinary perspectives and contextual information of a rural landscape, whereas specific aspects of rural livelihoods, such as water-use, are better-addressed using other frameworks.

Water can be considered part of the SLF's "natural" elements needed for sustaining a livelihood. Alongside human, financial, social and physical elements, water is an essential asset and service to communities. Limited access to, or lack of control over, a natural resource such as water may have acute repercussions on people's abilities to maintain their livelihood strategies, as well as drawn-out disempowerment over time.

4.2.3 Water and gender analysis

“The key to gender sensitivity in water resource management is a constant awareness of the ways in which gendered societal roles produce opportunities for some and constraints for others.”
Cleaver & Nyatsambo, 2011

Longstanding cultural expectations of gender roles and responsibilities directly influence many of the processes related to water resource management. This gendered delegation of responsibilities, or the sexual division of labour, means that activities related to livelihood strategies, and the governance of limited resources, are allocated based on members’ identities as male or female community members. This applies to many tasks, particularly water-related ones, including the collection of water and the use of water for productive and domestic uses.

For many rural households in the Eastern Cape in 2015, piped water is not available due to a lack of infrastructure, distances from available municipal infrastructure support, or insufficient natural conditions for drawing a regular water supply. To get the water needed for a variety of tasks, water has to be transported from natural water resources such as rivers and springs to the homestead area. The physical burden of collection largely falls on women and children, who are primarily responsible for collecting water to meet the water needs of the homestead. In addition to the physical intensity, water collection is a heavy time commitment. The time required to provide the daily water supply for a homestead can conflict with or compromise other areas of life for females, such as educational opportunities or job options (van Koppen et al., 2009).

A portion of collected water is used for domestic purposes and this amount varies based on numerous factors related to the homestead size, special events and weather conditions. Activities related to supporting people within the homestead – cooking, drinking, cleaning, washing and maintaining the health of a family – require water. Some gender specialists call these tasks “reproductive work” because they are associated with supporting child-bearing and rearing as well as social activities that contribute to the homestead’s continued growth throughout various life stages. Though this type of work cannot easily be recorded in economic terms, it is crucial to homestead livelihoods. Given that women and young girls are primarily responsible for this work, the time taken limits, or in severe situations can completely eliminate, opportunities to work beyond the homestead (Cleaver & Nyatsambo, 2011).

Water also plays an important part in several productive activities that contribute to rural livelihoods. Goods and services created and used by the homestead immediately or sold through a market sector can require water as well – crop production, livestock management, cultural celebration preparations, speciality food or beverage items, and building activities, for example. Thus to understand the broader picture of water resource management for crop production, it is crucial to bring women to the forefront of these discussions.

4.2.4 Water and institutional structures

The management of finite natural resources like water is often organised into a multi-tiered structure that incorporates national, provincial, municipal and stakeholder contributions into a unified model. Political, economic and cultural influences intertwine in supporting this model. In assessing the multiple priorities of water management, one must recognise and engage with the pressures that state, market and community institutions place on the decision-making process. Within the differently-sized scales of operation and influence of these institutions, it is possible to work towards a balance of responsibility for water across many sectors with working and productive needs.

The state as an institution is largely responsible for the creation of legal obligations related to water provision for livelihood and productive needs. South Africa's Department of Water and Sanitation (DWS) is the overarching office that oversees the formulation and implementation of policies governing water use and management. Water's inclusion in the South African Constitution as an accessible right (RSA, 1996:27.1b) is defined extensively in the South African Water Services Act 108 (RSA, 1997), which outlines the national governing body's role in providing accessibility to water, appropriate sanitation standards, water service development plans, enforceable regulations related to water use, monitoring and evaluation services, financial support for water services institutions, and the handling of any other significant matters related to water management in the country. Fulfilling these mandates for the promotion of the public good requires the coordination of national, provincial and municipal levels of government to speak for the nation as a whole.

The market, as a formidable institution speaking to the productive uses of water for economic gain, also vies for rights and access to water. Market rules are dependent on the regulations set by the government, as they set the expectations of exchange in a competitive system working towards maximised profit. Water, as an often irreplaceable input resource necessary for product output, is not always calculated into final production costs, and skipping over the costs needed to maintain regular water supplies denies the importance of the resource. This can prove to be problematic at an industrial scale as well as at an individual scale. As production costs are continually driven lower in the attempt to keep prices competitive in the market, the institutional structure compromises the ability of producers to adequately secure maintenance improvements on water instruments and sources (Livingstone, 1993).

In addition to market stresses, water management can be strained because of the priorities and expectations arising from small-scale community dynamics. A community brings cultural expectations and gender roles into play alongside the government and market processes as the government attempts to create a system of management for appropriate water provision. The different groups that compose a community, including traditional leaders, civic organisations, non-governmental bodies, work groups and other informal associations, provide platforms for individuals to raise concerns and demands around water needs, with varying degrees of success. Preference for particular kinds of production or adherence to traditional voices of leadership can effectively exclude the desires of minority groups or those with less culturally accepted clout, which often is the case for

women. The institution of the community, which should ideally represent the needs of all individuals comprising it, can actually hinder the equitable division of water for all community needs.

In summary, the institutional frameworks operating in state, market and community systems have a large impact on the way water is prioritised and allocated. Each type of institution has responsibilities for providing to its stakeholders, with a working acknowledgment that water is a limited available resource. The desires of these institutions must be balanced amongst, and sometimes at a cost to, each other, with an ultimate goal of keeping water available for use.

4.2.5 Multiple Use Services Framework

As seen in this overview of broad-scaled frameworks in relation to water management, it is apparent that there are many factors and stakeholders influencing water-related decisions. While each framework offers a unique angle, it is necessary to find a way to bring these perspectives together and systematically examine water concerns and management in detail. A framework that uses water as the focal point from which to view gender-related and institutional aspects of livelihood development is the Multiple-Use Water Services (MUS) framework. Developed collaboratively by several research institutes across a spectrum of global water situations, MUS approaches water resources with a unique array of perspectives that link water usage with cultural dynamics and productive priorities, aligned to offer a more complete picture of actual water management situations (Bingham, 2007). With the ability to assess water situations in an area with greater depth and clarity, potential strategies for interventions and improvements can have a greater impact on people and water resource sustainability at large.

The International Water Management Institute (IWMI) and several research centres including the International Reference Centre for Water Sanitation and Hygiene (IRCWASH) and International Development Enterprises have partnered together to construct the MUS approach, and collectively piloted studies in eight countries, South Africa being one of them. These partnerships have extended to grassroots movements, national NGOs, local government, and governmental sub-sector agencies in each of the participating countries, which led to the framework being refined by action research and on-the-ground experiences. The current learning alliance includes over 150 institutions that have taken an interest in or experimented with MUS innovations (van Koppen et al., 2009).

The thrust of the MUS approach accommodates the truism that people's livelihoods drive their water use, and livelihoods are in turn influenced by both the environmental and infrastructural availability of water. In order to improve the effectiveness of water-based development strategies, decision-makers must assess three things: 1) the sources of water that are already available; 2) how these sources are used; and 3) the profitable uses that are available to promote in the community (Penning de Vries & Ruaysoongnern, 2010). These questions can be answered using two MUS models of inquiry, which are homestead-scale and community-scale investigations.

Community-scale MUS notes the resources and infrastructure of a community's water supply in relation to various sub-sector productive operations. Homestead-scale MUS puts more emphasis on the household unit's use of water for domestic and productive purposes – to maintain hygiene, improve health, ease domestic burdens, establish food security, and supplement incomes (van Koppen et al., 2009). These types of livelihood benefits of multiple water uses could greatly contribute to the Millennium Development Goals (MDGs) and the reduction of poverty. MUS strategists have hypothesized the ways in which the homestead-scale MUS approach aligns with the MDGs and how water could be a key underlying factor in the achievement of all eight MDGs, as shown in the table below.

Table 4.1: The links between the MDGs and homestead MUS objectives (van Koppen et al., 2009:31)

Millennium Development Goal	Homestead-scale MUS contributes by:
1. Eradicate extreme poverty and hunger	Improving food production and incomes at and around homesteads
2. Achieve universal primary education	Alleviating the burden on children in fetching water or herding cattle and by ensuring good sanitation at school
3. Promote gender equality and empower women	Reducing women's excessive domestic chores and improving access to water for productive purposes for both women and men
4. Reduce child mortality	Enhancing health and income for child care
5. Improve maternal health	Reducing women's domestic chores and improving access to water for productive purposes
6. Combat HIV/AIDS, malaria, and other diseases	Reducing burdens of water fetching, avoiding dehydration, accommodating higher hygiene requirements, allowing nearby food production and income generation by the sick and their dependents
7. Ensure environmental sustainability	Reducing the proportion of people without access to safe drinking water by using and re-using multiple water sources for multiple uses for higher efficiency, and by prioritising water for domestic and basic productive uses for greater equity
8. Develop a global partnership for development	Recognising water for multiple purposes as pivotal for poverty eradication

Van Koppen et al. (2009:31) elaborate on the connections between water and the increased quality of life for peri-urban and rural communities:

"The benefits of multiple water uses reinforce each other over the generations in a virtuous circle that helps people to climb out of poverty. Healthier and better nourished people are more productive. Higher incomes allow higher spending on health care and for reinvesting in water technologies. Alleviating unpaid domestic chores by women frees up time for income-generating activities. Reducing the time that girls spend fetching water and boys spend on cattle herding to distant water points breaks the intergenerational poverty cycles to absenteeism from school, lack of skills and early marriage. Improved well-being, in turn, enhances user satisfaction with public services, so improving both their ability and willingness to contribute financially or otherwise to the systems."

The contribution of water for livelihood improvement and stability is undeniably essential to long-lasting development investments. To understand the specific role of water in diverse livelihoods, implementers of the MUS approach have used several tools to identify people's multiple demands of water and to evaluate water use and access. There is recognition that water usage is multi-faceted and dependent on several factors. In combining scientific and human-oriented tools of water measurement, researchers can practically merge the environmental availability of water with the human purposes for water usage.

The distinctive nature of MUS lies in its active recognition of how multiple sources of water are used to meet a plethora of water-related needs for homesteads, including crop production, domestic and other productive uses. Rather than creating water infrastructure services that are designated for single-use entities, developers of MUS promote that multiple-use understanding should be used to enhance the design of such structures. Engaging with local community water users, along with conducting environmental assessments of water infrastructure development, helps developers to invest in context-appropriate water strategies that can be used across the community.

Herein lies the motivation for the research approach, which sets out to create water measurement methods matched with complimentary innovative tools and participatory fieldwork processes, in order to give a holistic picture of water use and access in a rural South African context.

4.2.6 Factors to consider in water assessments

Assessing people's multiple water needs is the starting point for developing or improving water infrastructure for domestic and productive purposes. The focus on people's current uses and needs for water is referred to as "water service provision" by the MUS framework developers, and takes into account the quantity, quality, accessibility and reliability of water services.

Issues of water quantity

Water is a contributing factor to livelihood activities, but a limiting factor when availability is low. In residential settings, whether urban or rural, water is used for a plethora of daily domestic and productive activities. Domestic uses include cooking, drinking, washing laundry, cleaning, bathing and sanitation, while productive uses cover a broad spectrum of activities such as small-scale gardening, livestock management, tree-growing, fuel wood and fodder production, pottery, and brick-making, along with other water-dependent enterprises (Gleick, 2003; van Koppen et al, 2009). Data about urban water users and their uses of water are more readily available than data of the same nature in a rural context. Additionally, most studies focus on productive uses only in an attempt to quantify water use in relation to product output, while domestic uses are rarely catalogued at all, let alone identified (Rosen & Vincent, 1999; Gleick, 2003). The studies that have examined water use at a homestead or household level, as noted in the literature review, have employed limited methods. While it is desirable to report information on specific quantities of water used, the tracking process itself is difficult and gross estimations are often accepted, though these give little attention to productivity cycles or seasonal fluctuations.

Issues of water quality

The greatest concern connected to water quality is user health. Many studies examine the repercussions of compromised water quality and the different types of contaminants that create a poor water quality environment. Government regulations revolve around quality conditions – in South Africa alone, there are several white papers and continual updates to policies regarding the appropriate water cleanliness for domestic, livestock, irrigation, industrial and recreational uses. Additionally, water quality is recognised and regulated for the environment with regard to freshwater and marine aquatic ecosystems (DWA, 1996). Regulations are set for un/acceptable concentrations of bacteria, heavy metals, organic compounds and nutrients present in water sources. Problems noted in water quality can expose system-wide issues, such as point-source pollution, water flow hindrances or storage container contamination. However, ever since the collaborative work by White et al. (1972) and subsequent studies, many researchers have concluded that the overall quantity of water available for use has more of an impact on human health than its quality. Rosen and Vincent (1999:20) explain: "Because faecal-oral diseases have multiple transmission routes – hands, food, and dishes, as well as drinking water – they are more likely to be water-washed than waterborne. If a household has only a small quantity of water to use, it is likely that all aspects of hygiene – from bathing to laundry to washing of hands, food, and dishes – will suffer." Thus, water quality and improvements aiming to increase water quality, while important, do not always translate into better health for a population.

Issues of water accessibility

Water use is contingent on physical access and the capability of users to collect water from available resource points. Accessibility is directly related to quantity, and studies spurred on by the Drawers of Water report (White et al., 1972) have continually shown that the proximity of the water source to the homestead is crucial to increases in quantity. Travelling distances for water carriers have been mapped and measured by many researchers, and the results have shown that per capita usage increases significantly only when the water source is placed directly inside a household or

homestead area; otherwise, the quantities used do not change much when fetched from sources that are 30-1000 meters from the household (Rosen & Vincent, 1999: 23).

For that reason, a community's water infrastructure is of utmost importance in influencing livelihood strategies. "Through infrastructure, water resources are converted into water services" (Adank et al., 2011). Water-related infrastructure is not only about the water resources, but also about water storage capacity, which is also a substantial determinant of potential water use. Barriers to accessibility could be financial, as far as limitations to investing in storage containers like rainwater tanks. With little storage capacity available, users have to expend more physical effort and time to collect water, which could discourage livelihood-appropriate water use.

Issues of water reliability

Finally, reliability of water resources highlights the importance of sustainable availability that supports the varied water demands of a population. "Can the water be reliably accessed at the right time?" ask Adank et al. (2011). For some uses, such as supplementary irrigation, extra water only has to be available for a seasonal period of time. As noted with the accessibility factor, the infrastructure related to the water resources and storage capacities greatly affect both the perceived and actual reliability of water availability. Water services, as highlighted by the MUS framework, should primarily meet people's multiple water needs (van Koppen et al., 2009). Users should have regular access and be able to rely on the available water sources for domestic and productive needs.

4.2.7 Summary of key points informing the water assessment

The characteristics of water service provision for domestic and agricultural use contribute to the overall water security of a community. Water collection activities often demand physical intensity and have heavy time implications, the physical burden falling largely on women and children, particularly in relation to the water needs of the homestead (domestic and agricultural). Water collection and use must therefore be analysed from a gendered perspective, be contextualised within people's livelihoods strategies, and framed within a multiple-use paradigm. It must also be cognisant of the various formal and informal institutions that bear upon practices. Key considerations for assessment thus include:

Rural data: The studies that have examined water use at a homestead or household level have typically employed limited methods and focused on domestic needs (i.e. needs within the homestead) and not agricultural uses and needs. Understanding the rural context and quantifying agricultural uses within the homestead is needed.

Multiple use paradigm: Water usage is multi-faceted, used for domestic, agricultural and other productive purposes. Scientific and human-oriented tools of water measurement can be used in these various domains to holistically understand water-use patterns and quantities.

Collection time: The time required to provide the daily water supply for a homestead can conflict with or compromise other areas of life, mainly impacting on women and children. The time spent collecting water is therefore an important assessment criterion.

Proximity of source to point of use: Proximity of the water source to the homestead or croplands is crucial to increases in quantity used. Quantities used do not change much when fetched from sources that are 30-1000 meters from the household.

Quantity is the priority: Many researchers have concluded that the overall quantity of water available for use has the most impact on human health. Water quality and improvements aiming to increase water quality, while important, do not always translate into better health for a population. An assessment of water quantity is thus a priority.

Resource use requires infrastructure: Infrastructure related to the water resources themselves needs to be assessed, as well as storage capacity, which is a substantial determinant of potential water use.

Household and community scales: It is necessary to examine how water is entering a community at an environmental scale (including water harvesting and conservation, and irrigation at field scale), as well as how water is used in the homesteads, homestead gardens and fields, and incorporated back into the environment.

4.3 Methods and Instruments used in the Water Assessment

This section summarises literature on water use evaluation in rural agricultural settings, and highlights key aspects that are included in the methodological approach. Special attention is given to multiple-use water studies and the interdisciplinary tools used to facilitate water assessments in relation to people-based and environmental-based pressures. Thereafter, the instruments that were developed and piloted are presented.

Following the MUS approach and using related tools, the community's water situation assessment was approached from two angles: a broad environmental resource-level assessment and a homestead-scale assessment. The environmental investigation looked at the afore-mentioned characteristics of water access and provision from a resource level. In piecing together the availability of water from a broad perspective, the study then honed in to examine water usage for crop production, both at homestead level and at field level.

Among the homesteads, the amounts and uses of water reveal people's priorities and strategies for the water context in which they participate as residents. The two sections of assessment are inextricably linked, and it was predicted that the availability of water at a resource level would affect usage at the homestead level in many ways.

4.3.1 A participatory approach using multiple data collection techniques

Water development thinking in the last 10 to 15 years has been part of a larger movement that has characterised the new millennium: that of interdisciplinary, integrated thought to effect meaningful development. The United Nation's Millennium Development Goals (MDGs) were set in 2000 and identified specific global targets that would improve livelihoods of impoverished societies. The

MDG's called on policymakers and researchers to take definitive steps in implementing intensive participatory research that truly enacted the multi-disciplinary perspectives conceived in the 1990s. This recognition of complexity forced water resource managers and researchers to move into an unprecedented era of innovation and collaboration with an array of disciplines in order to analyse water use and management. More emphasis was placed on understanding multivariate relationships between water and poverty, and exploratory theories and frameworks – such as MUS integrated with sustainable livelihoods – emerged to accommodate the combination of contributing factors.

Participation of water users themselves in research, using self-monitoring as a research method, was increasingly seen as a worthwhile venture for tracking patterns of household water use (Bramfit et.al, 1997). Similarly, complexity of use as identified in the MUS framework was addressed by employing a suite of field methods to examine water concerns, and integrating information obtained from direct observation, interviewing, self-reporting by households, discussion groups and statistical mapping. In this way, researchers were able to see the major patterns and influences of water usage and could highlight water use trends linked to household socio-economic status, agricultural priorities for water use, spatial distances between resources and users, and perceptions of resource quality (Gazzinelli et al., 1998; Palmer, 1997; Roa Garcia & Brown, 2009). Similarly, Hadjer et al., (2005) highlighted the importance of interdisciplinary engagement as a way to find solutions that maximise benefits appropriate for the community and environment, and demonstrated, through detailed questionnaire survey participation, that primary influences included changes in seasonality, accessibility differences, livelihood scenarios and household dependents. Other work by Katsi et al., (2007) used participatory rural appraisal tools such as discussions, direct observation periods and personal interviews to drive the analysis of the multiple-source water use scenarios. The demand for water to achieve domestic needs as well as productive activities was found to be highly varied based on the segmentation, real or perceived, of water service availability, associated regulations, and water quality.

It is clear from the literature that engaging with local community water users, alongside independent assessments of water infrastructure, is necessary to achieve a meaningful understanding of water use and issues that can lead to the development of context-appropriate water strategies which can be used across the community. Draft IMWI guidelines for planning, developing and providing Multiple Use Water Services present an array of suggested tools for achieving MUS objectives (Adank et.al, 2011). The ability of these research approaches to properly respond to agricultural water imperatives has also been well-addressed (Penning de Vries et.al, 2010).

The burden faced by women is particularly important, and often difficult to uncover in the research process as women's voices are often culturally muted in external-researcher engagement. Further, while women have employed many innovative strategies to affect their immediate water supply challenges, their agency to influence higher system-level decisions around access and infrastructure is limited or non-existent. It was shown that a rich picture of the gendered water situation could be obtained using information from community members during researcher observation periods, questionnaire surveys, semi-structured interviews and intensive focus group discussions. Data from

these methods reveal trends related to unfulfilled but desired needs, including improvements in water quality, quantity, accessibility and reliability (Ademun & Mandere, 2009; Upadhyay, 2005).

The primary goal of the water dimension of this research project was to create a clear picture of access to and volumetric use of water in crop and animal production activities across the Eastern Cape's rural landscape, from a gendered perspective. However, MUS shows that separation of agricultural and domestic use is neither useful or practical in understanding water practices and challenges. The instruments that were developed, piloted and refined have built on the substantiated and detailed body of field approaches and analysis in the literature, and acknowledge that a variety of livelihood strategies are deployed, based on different water sources in these areas including springs, roof-water harvesting, municipal taps, boreholes, riverine sources, etc.). They also recognise that community members are engaged in different kinds and intensities of productive activities in home-gardens and in fields.

The instruments are modelled on the IMWI MUS guideline (Adank et al., 2011), which itself draws from eight other guidelines that have contributed to the development of the MUS framework and span an array of water situations across the world. The development of a best-practice field methodology resulted in four different data collection methods that are integrated using participative methods with water users and farmers to gain insight into their complex user realities, leading to proposed strategies for intervention at the end of the action-research process. The four approaches used in the water-related study of the project are:

- i) Situational Water Resources Assessment (SWRA) (community level)
- ii) Homestead Water-use Assessment (HWA) (sample households)
- iii) Field cropping Water Resources Assessment (irrigation scheme only at Mbekweni)
- iv) Interactive workshops on strategies for water development (sample households and community members – reported in Chapter 7)

4.3.2 Water use categories and boundaries for measurement activities

Before expanding on the four above-mentioned approaches to determine water use in homesteads and fields, it is necessary to define the boundaries within which the various measurements took place. People use water and grow crops differently in different spatial areas well-described in isiXhosa with specific words, and which have significance to the research participants and therefore the research process. These spatial demarcations were identified during the contextual socio-economic survey and are described in detail in Chapter 3 and briefly summarised here, given their importance in this study. The identification of two different growing spaces within the boundary of the *umzi* (homestead) reinforces the rationale for using the MUS framework, and measurements were taken separately for these different spaces.

As a reminder, the *umzi* is the homestead itself, including buildings, livestock facilities and crop production areas. This is the boundary of measurement for household activity, and includes different water-uses and crop production sub-units as follows:

- the portion of the homestead which is settled with huts, houses and kraals and where water is used for drinking, cooking, clothes and body washing, etc. (the domain of domestic water use);
- the *isitiya*, which is a relatively small garden (a few hundred square meters) and is characteristically intensively cultivated with green leafy and other kitchen vegetables (the domain of agricultural water use); and
- the *igadhi*, which typically occupies the largest part of the *umzi* behind the cluster of houses/huts, is usually fenced (albeit with varying effectiveness), and is where rainfed maize, beans and squash are most usually grown (also the domain of agricultural water use).

In addition there are usually small livestock which require watering within the *umzi*.

Beyond the *umzi*, it is typical that families have an identified field, or *intsimi* in IsiXhosa, which is located some distance from the homestead and is either fallow, summer-cropped using rainfed methods, or occasionally irrigated.

Accurate water measurements were taken in the varied spatial domains within the *umzi*, and in fields, approximations of water-use were made.

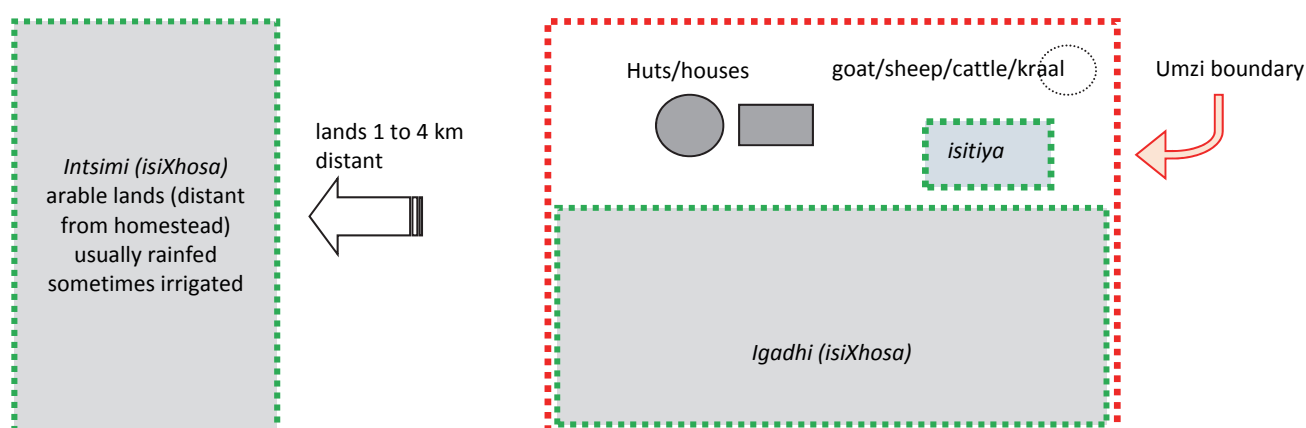


Figure 4.1: Schematic of the umzi boundary and MUS spatial water use elements

4.4 Description of Water Data Collection Methods

4.4.1 Method 1: Situational Water Resource Assessment (SWRA)

The situational water resource assessment included assessments of water resources, water infrastructure, documentation of actual water use practices, and barriers that hinder access to water services. The resource-level assessment examined the water resources and infrastructure capacity of the study area, focusing on the range of sources, water use practices and environmental (hydrological and runoff) factors influencing water availability, using the multiple use paradigm.

Features walk of the site

The purpose of the features walk was to obtain both general and specific information about the water resources and services of the community, the infrastructure that supported water provision and collection, and the multiple uses of water. The data collection method was based on direct observations recorded by experienced water-resource researchers on the team, guided by representatives from the community who explained the uses of water and offered clarification as needed. As recommended by Adank et al. (2011), observers took note of water resources as well as the people using them. GPS points were taken at strategic water points, as well as other relevant places in the village (pathways to water, springs, cattle watering points, washing points) to initiate other discussion and inform analysis. Informal interviews with people encountered during the walk were highly beneficial, as well as visits to homesteads using water for crop production.

Output: An overview of the geographic features; observations concerning the controlling factors of water resource management by institutional arrangements; and key investments in agricultural productivity related to water management (i.e. livestock types, irrigation systems, etc.). This is included in the SWRA.

Water situation map

Following the site walk, the researchers used the observations of water resources and GPS coordinates to create a GIS-based map of the community, with contributions and feedback from the community's water users and other participating support groups. Geographic coordinates were loaded into Google Earth imagery and further mapped using GIS software. The satellite imagery has the advantage of being easily recognised by community members and allows the research team to view a community's water situation from a spatial perspective, noting how natural features of the land contribute to the layout of homesteads in relation to gardens, fields, and the available water resources. Tools within Google Earth and the GIS software were used to manipulate data to measure distances between water sources or look for spatially influenced patterns of attribute-type features of homesteads. Factors that are often listed as influential in water usage, such as travel distances to available water sources, physical land features and infrastructural support (e.g. roads and water treatment plants) were viewed as a whole. This instrument is a digital adaptation of a more basic tool recommended in the MUS Guidelines (Adank et al., 2011), where collaboratively hand-drawn maps are used.

Output: A map specific to each study area that includes notations of participating homesteads and relevant attribute data, and a map of water sources available and relevant infrastructure for each community's water situation (also included in the SWRA).

Environmental Water Quantity Estimations

After identifying the community's water sources, the research team estimated water availability by estimation of flows in rivers, springs and by reviewing documentation of locally applicable reports and literature on dams and yields. Rainfall, runoff and other hydrological data was taken from the WRC-developed WRSM 2005 package (Middleton & Bailey, 2008), presented in summary form.

Output: Estimated environmental water resource for each research site (included in the SWRA write-up).

4.4.2 Method 2: Homestead Water-Use Assessment

The homestead-level assessment aims to accurately measure water used in the specified categories within the boundary of the Umzi, and the homestead unit (*umzi*) and is key to inform community-based water resource development (van Koppen et al., 2009).

At the Lutengele research site the *umzi* boundary, which was determined in the project thematic study on agricultural resources and skills (reported separately), is considerably larger than those at the other two sites, extending up to 1.8 ha in some cases. At Lutengele the preparatory work for the water survey showed that there is little or no differentiation made between the *igadhi* (rainfed garden within the *umzi*) and *intsimi* (separate distant fields), and these are typically combined and occur as a much larger *igadhi* within a larger *umzi* boundary. This is the result of a combination of historical factors: the spacious village layout, which was not subjected to villagisation through resettlement, and the very steep topography generally which leaves a dearth of the flatter locations typically used as sites of arable rainfed fields (and although these do exist for some families, they are rarely used for crop production).

Recording methods

Despite the accepted recognition of the importance of homestead water use data, there is no consensus on how to record this type of data for complex water distribution systems that use multiple and often unmetered sources (Wutich, 2009:50). MUS-based assessments conducted across the world have primarily used once-off water consumption surveys to summarise quantity-based figures. These approaches will produce satisfactory tables, but the figures are gross estimates hampered by potential underreporting of participants, memory recall lapses, and lack of usage variation dynamics.

To enhance reporting on water use, it was realised during the pilot stage that it would be necessary to employ a number of strategies in relation to water use in the *umzi* and the varied spaces noted earlier.

Use of illustrated recording sheets

Recording sheets were developed based on categories emanating from the literature review, the observations of how land within the homestead is used differently for cropping and small livestock watering (made during the survey preparation and livelihoods survey processes). The water survey sheet is a pictorial data collection tool that enabled the collection of detailed information about water uses at the homestead. Using the data on actual water use, researchers can begin to establish facts about homestead, crop and animal water use (Penning de Vries & Ruaysoongnern, 2010).

While a questionnaire can provide a substantial amount of information about homestead water use, a potential downside is its heavy dependence on memory-based recall; this approach was thus

considered unreliable and was not used. To get a clearer picture of the patterns of daily water usage on the homestead, the use of a self-recorded research diary was adopted to capture water data closer to real-time usage. As defined by Alaszewski (2006), a diary is a collection of documentations written by an individual that has the following four characteristics: i) regularity - it follows a sequence of dated entries for a period of time that is influenced by specific events or time intervals during a day; ii) personal - the content is entered by an identifiable individual who then designates access to others; iii) contemporaneous - to avoid recall mistakes, diary content is ideally recorded within a short time of the events or activities occurring; and iv) a record - whether in written form or audio recording, a diary's entries give an account of an individual's experience, which may include events, activities, interactions, impressions and feelings. While researchers take a role of neutral scientists who focus on the design of the diary, participants become the primary collectors and recorders of their reality. Upon receiving the documentation, researchers can then investigate the systematic measurements and analyse the material to see if there are any patterns that emerge (Alaszewski, 2006).

For survey-based research, diaries can attempt to minimise recall or memory bias. Many surveys and once-off interviews or questionnaires ask memory questions that require a substantial amount of calculating on behalf of the participant. In doing so there is a high risk of participants synthesising and/or estimating events inaccurately, which is referred to as "telescoping," when "individuals allocate to a period an accident [or event] which [actually] occurred outside the period" (Alaszewski, 2006; Angelsen & Friss Lund, 2011). Using a diary as a research tool facilitates access to patterns of life that are generally taken for granted by the survey subjects, and are therefore not necessarily easy to summarise through other research methods such as a once-off questionnaire.

Water collection and usage is heavily ingrained into the schedules of homestead livelihood activities. With multiple sources supporting homestead water supplies, strategies for water usage are influenced by the priorities of the homestead as well as the amount of regular access. The water diary teases out some of these priorities and water use patterns, and gives participants the opportunity to directly record the amount of water they use for different tasks. Because the study is focused primarily on agricultural practices in and around the homestead, participating homesteads were asked to record information about their total water use in homes, gardens and for livestock in the boundary of the *umzi*. To make the diary an equally accessible document for homestead water collectors ranging in age and literacy capabilities, the water diary was designed with illustrations for capturing the data as opposed to a word-heavy diary. The survey sheet is shown in Figure 4.2.

1 home use		3 garden		water used (litres)
	ukupheka		isitiya	
	ukuphunga		ighadi yombona	
	ukuhlamba izitya		inkampani (ukuncedana)	
	ukuhlamba	4 irrigated fields		
	ukuhlamba iimpahla			
umhlambi wemfuyo 2 livestock				

Figure 4.2: Data collection sheet for the Household Water-Use Survey

Data collection process details

- Dry season and wet season water use recordings.** The water use data was recorded by 30 participating households over a period of seven days (i.e. 10 households x 3 research sites) to obtain a detailed assessment across the week. Two sets of weekly data were collected at each site: one set in mid-February 2013 to reflect the wet season usage and one set in mid-July 2013 to record the dry season usage. Data was averaged over the 7 days to provide average-daily values for both dry and wet seasons, and extrapolated over the month to give a monthly water use for dry and wet seasons. In this way a representative water usage pattern was established to allow seasonal comparison and a more general annual analysis.
- Measuring equipment and training of participants.** The research participants measured their own water use with a set of standard coloured buckets (5L 10L, and 20L volumes) provided by the team. Actual volumes for each day were recorded on the illustrated recording sheets.
- Daily homestead visits and water use discussions.** Trained local research assistants or project team members conducted visits to each homestead mostly daily, but at least every second day during the week of data collection to discuss and check data entries and draw insight from observations of practices.

4.4.3 Method 3: Field-crop water use assessment

The field water use assessment applies to fields which are separate from the *umzi* and thus not included in the household measurement. This category includes for irrigation and supplementary irrigation. Runoff farming and water-harvesting and conservation practices were noted. The assessment of agricultural water use was based on estimates of area cropped under irrigation, made during site observations in both seasons, noting that irrigation water use was minimal and found only at Mbekweni, where irrigation is practiced at field scale, albeit minimally in terms of the resources available. Irrigation within the *umzi* (i.e. in the *isitiya* and *igadhi*) was measured accurately as part of the household water use assessment.

4.4.4 Method 4: Focus group discussions and development of the Resource Infrastructure Demand Access table

Resource Infrastructure Demand Access (RIDA) table approach

To organise and enrich the data collected using methods 1 to 3 above, an analytical approach listed as one of the tools within the overarching MUS framework, called RIDA (referring to water resources, infrastructure, demand and access), was developed during the interactive community focus group discussions. Given that the primary issues of interest in this research project were focussed on crop production, which goes well beyond the topic of water alone, discussions included issues pertaining to aspirations, land access, agricultural skills and capabilities, along with water issues. The detailed interactive discussion process is documented in Chapter 7.

The RIDA tool, a table that presents a range of water-related data concisely and clearly (Adank et al., 2011), was helpful in positioning the water aspects of crop production within a MUS framework. It is used for MUS assessments because it facilitates the participative listing of multiple resources, users, demands and other characteristics related to water service availability. Both primary and secondary data are of value to this type of assessment, and a key part of the research strategy is determining what information can be collected from existing secondary sources versus that which requires primary data. When all the aspects of the RIDA have been collected, one can begin to critically assess available sources and the needs of current uses, and envision potential future uses (Adank et al, 2011). The research instruments utilised to construct village-level RIDA assessments specific to rural Eastern Cape contexts included the four methods described above. The RIDA table is the consolidated analysis that allows research participants (homestead growers and field-based farmers) to focus on the following questions that are posed during focus group discussions (Adank et al., 2011):

- Which (potential and current) uses are insufficiently met?
- What is the overall infrastructure status to meet the identified water uses and needs?
- Is there scope or need to develop additional infrastructure?
- What is the status of existing water resources?
- What are possible untapped resources?
- What other agricultural water methods could respond to the water needs?
- What are the potential productive water uses given the socio-economic context and what other accompanying measures might be needed to enhance the benefits?

In asking these questions in conjunction with the use of information collected using the research instruments, the RIDA analysis maps out the resource-level data in a schematic and descriptive format which clarifies primary water concerns, management gaps, and potential opportunities for interventions.

Preparing for the focus group discussions

During the various surveys, interesting patterns might emerge in the answers of respondents. To clarify data interpretation, the focus group discussions (FGDs) give researchers a chance to ask follow-up questions from the survey questions, as well as inquire about unanticipated factors that may have arisen during the interviews. As a research tool, a FGD is typically carried out with a small sub-group of the community, consisting of 10-15 people. Adank et al. (2011) outline the basic procedures of an FGD in a series of steps, as noted below:

i) Pre-identification of the focus group participants.

The participants in the focus group discussions were the household participants (n=30) who were previously selected, and other interested individuals with insight and knowledge.

ii) Selection of a facilitator that encourages group participation.

The primary purpose of the FGD is to encourage people to speak freely about their personal experiences and understanding of the focus topic, so the facilitator role is crucial for creating an open atmosphere for the meeting. The facilitator guides the FGD through the format of the meeting, including an introduction to explain the objectives of the discussion. After the introduction, the facilitator begins by asking guiding questions, being sensitive to the group dynamics and allowing people to give full answers. Xhosa-speaking facilitators led discussion in the interactive sessions.

iii) Guiding questions for understanding the context of water use.

Water use takes place in different contexts at different times of the year, sometimes for home-use, celebrations, building, animal watering, car washing and gardening, amongst other things. Guiding questions provide a structured way of interrogating the context of use (Adank et al., 2011). These included questions on current use of water for livelihoods, limitations for multiple water use, interest and demand for water for livelihoods, and expectations.

iv) Capturing of responses of participants and feedback to the group.

As the facilitator proceeds through the questions of the discussion, another member of the research team records answers to questions, thoughts that are expressed, and other interesting topics of discussion. These are shared with the group from time to time so that everyone in attendance is able to see what is being documented and can offer more information as needed.

4.5 Situational Water Resources Assessment for Mbekweni

4.5.1 Context and overview

Site visits were conducted throughout the project period for various ongoing research purposes, including when the detailed household water measurements were taking place. A longitudinal transect walk up the sub-catchment was conducted in February 2013 and a transverse transect walk in mid-July 2013. During these transect walks and in ongoing conversations linked to parallel themes, discussions were held with community members to identify and obtain background information on the resources. Desktop work was also conducted, including securing information from the Department of Water Affairs on dam yields, and interviews were held with the newly established Water User Association in their local *area of operation* (a DWA term demarcating a WUA boundary) which includes 13 villages in the area. Interviews were also conducted with the current municipal operator of the borehole water supply system to Mbekweni.

Water resources in Mbekweni are grouped into four categories:

Domestic water. Two boreholes operated by the Lukhanji Local Municipality provide water to communal standpipes in the village.

Household rainwater tanks. These are widely used as augmenting and backup supply, though storage per household is relatively small (explained and quantified in Section 5).

Irrigation scheme water. Most fields outside the village are supplied with irrigation water by a gravity pipeline from the Bushmanskrantz Dam some 18 km up the valley. The irrigation 'scheme' is unusual in that it is perhaps more of a mixed-use, bulk water supply scheme than a conventional irrigation scheme. The pipeline from the Bushmanskrantz Dam traverses five village clusters over the 18 km length which were originally designed to be irrigated and also supplies water to a number of small water treatment works for the villages. The idea of a 'scheme' must be understood as these separate and somewhat distant parcels of land, belonging to unconnected villages, which share a bulk, mixed-use, gravity supply pipeline.

Stock dams: There are a number of small stock dams (at Oxtan and Haytor Manor adjacent to Mbekweni) which serve as leidams for that portion of the irrigation system, but are also accessible for stock watering in the communal grazing context.

4.5.2 Rainfall and runoff data

The Mbekweni village extent falls in Quaternary No. S32F and S32G. Rainfall data was obtained from the data sets of WR2005 (Middleton & Bailey, 2008) which comprises 86 years of monthly average rainfall from 1920 to 2005, as follows:

- Average annual rainfall is 534 mm p.a. (shown as monthly data in Figure 4.3)
- Average annual evaporation is 1600 mm p.a.
- Approximate Catchment Response (Mean annual runoff / Mean annual precipitation) = 6.5%

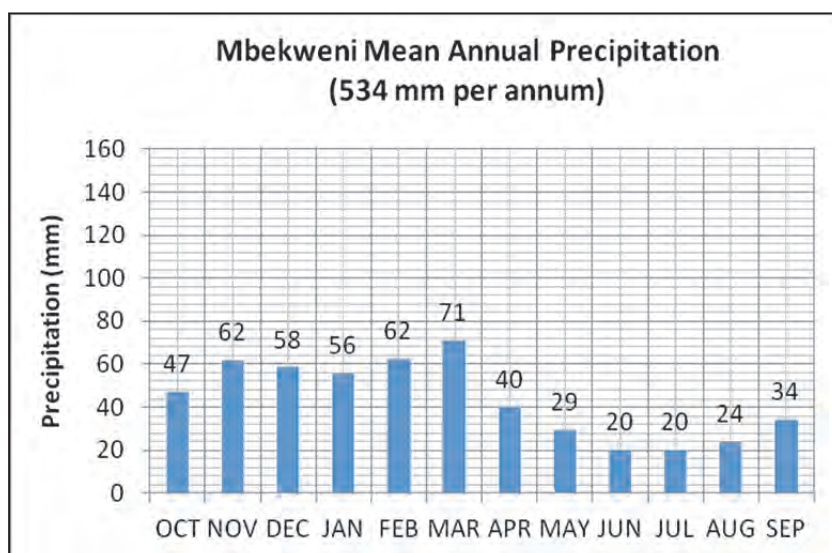


Figure 4.3: Average Monthly Rainfall at Mbekweni

Rainfall is unimodal with average wet-season monthly rainfall of 63 mm/month (summer growing period peaking Feb-March) and average dry-season monthly rainfall of 26 mm/month with a minimum in June-July. The summer rainfall is sub-marginal for maize-cropping and the winter rainfall is insufficient for any crop production, so irrigation or intensive soil-water conservation practices are necessary for successful crop or pasture farming.

4.5.3 Historical potable water sources

Mbekweni village was formed in the late 1970's during the establishment of the Ciskei homeland. The community was resettled onto serviced plots, 800 to 1000 meters square in size. Water was provided to communal taps from the Bushmanskrantz Dam, locally referred to as the NoTiki Dam, via a small water treatment works (WTW) located across the main access road south of the village.

The WTW was operated by a DWAF employee for decades until he passed away in 2007. No-one was appointed to the position thereafter and the WTW fell into disuse, was subsequently vandalised and is now inoperable. Raw water from NoTiki Dam is still connected to the treatment works and is also the supply for the irrigation water in the fields. Further, there is a connection between the raw water pipe and the treated system which, in times of water stress in the village through failure of the borehole pumps, is used by the operator to supply raw water to the communal taps. This is an emergency measure, but has interesting implications as the volumetric potential for village supply is very high, though with quality issues from a domestic use perspective as the water is untreated. A general layout is shown in Figure 4.4.

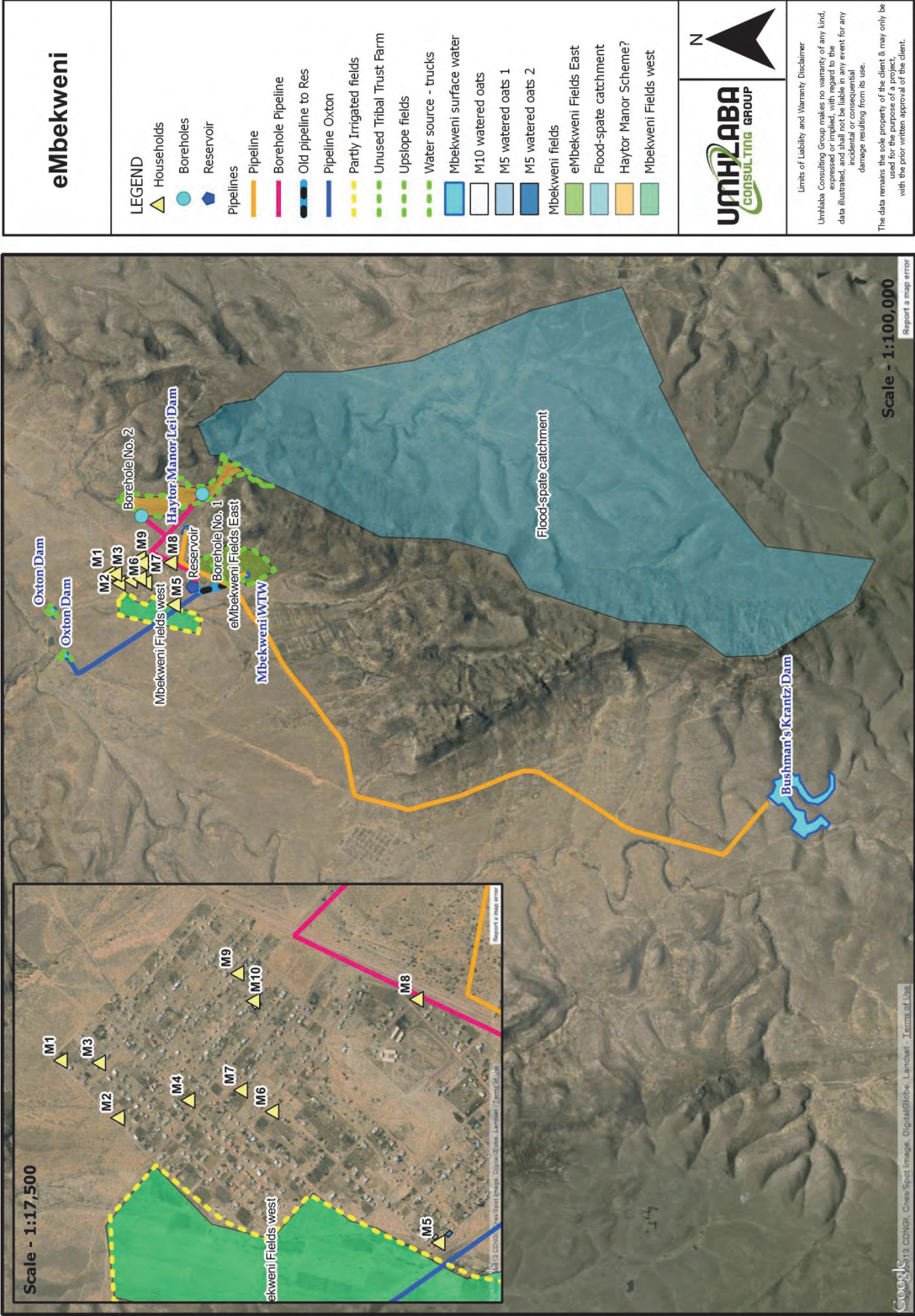


Figure 4.4: Water resources and infrastructure at Mbekweni

4.5.4 Present day domestic water supply to the village

The two boreholes that supply domestic water to the communal taps in Mbekweni are located on an old commercial farm that was incorporated into the Ciskei in 1978. This farm, Haytor Manor, is immediately adjacent to Mbekweni village on the opposite side of the main access road, and while used during the homeland era under a government-run project, has not been used for many years. The original boreholes are operated by the Lukhanji Local Municipality which is the official Water Services Provider as designated by the Chris Hani District Municipality, the designated Water Services Authority. Basic details of these boreholes are as follows:

Borehole No. 1

Diesel-driven mono pump enclosed by a lockable pumphouse.

Pumping cycle: 8 hours pumping and 16 hours recovery. The pumping cycle can be changed to 12 hours pumping and 12 hours recovery. However, this is unlikely to happen due to working hours being 8 hours.

Borehole No. 2

Electrically-driven submersible pump enclosed by a lockable pumphouse (brick structure).

Pumping cycle: 8 hours pumping and 4 hours recovery. The pump is set on an automatic timer.

Concrete reservoir and elevated 5000 litre plastic tank

The concrete reservoir is the original reservoir built when the project was implemented. An elevated 5000 litre plastic tank is situated above the reservoir. Pumped water enters the elevated tank and overflows into the reservoir. Chlorine tablets are placed in the reservoir to disinfect the water, but the water in the elevated tank is not disinfected. The elevated tank is used to supply households in close proximity to the reservoir, which is on relatively flat land. It is easy to see that these households must be affected by fluctuating levels of water in the reservoir (the 5000 litre tank provides sufficient supply for a maximum of 2 days, while the reservoir reportedly has water for approximately one week). In addition, the demand for water is very high, especially in winter, due to the widespread, unlawful watering that takes place.

There is still a pipeline which links the NoTiki Dam scheme to the reservoir. This can be used if the boreholes cannot supply water, but the community says the NoTiki Dam water doesn't taste good, which is hardly surprising as the water is untreated and has a heavy silt load.

Domestic water reticulation system

The reticulation in the village is old, probably implemented in the 1960's or 70's. The 15 mm diameter standpipes are indicative of this. There are 67 standpipes in total, but only 43 are in operation. The remaining 24 have been sealed off to prevent wastage. The sealed off standpipes are in areas where residents have permanently fixed hosepipes to the bulk supply main to supply their gardens and yards, actively discouraged but apparently unofficially tolerated by the water services operator from the Municipality.

Comments noted by the operator of the village water supply system:

Gardens are irrigated at night using sprinklers, and during the day using flood irrigation, despite the use of hosepipes being prohibited by CHDM. The Operator tries to control this, but with no success, and promotes watering by hand which is allowed. Some householders have connected directly into the separate untreated bulk irrigation water supply pipeline from Bushmanskrantz Dam which runs around the periphery of the village, and they use the water to irrigate their gardens with hosepipes. These people had a practically unlimited water supply until it was closed by the DWS in the last quarter of 2004, explained further below.

4.5.5 Irrigation water to arable lands outside of the village

An 18 km water pipeline (250 mm Ø) provides an unregulated supply of raw water to the Mbekweni village area, both to arable lands where Mbekweni villagers have individual rights of use and access, and to the old commercial farm of Haytor Manor adjacent to the village. The latter was a white-owned farm which was incorporated into the Ciskei Homeland in 1981, and after democratisation in 1994 was 'returned' to the Chief to administer as Tribal Trust land (i.e. with no individual rights allocated by the Chief since).

The pipeline extends from the dam to supply a number of villages. The entire NoTiki Dam scheme is managed and operated by DWS and falls under the same management team as Waterdown Dam and Kat River Dam. At the time of the water-assessment fieldwork in 2013, the DWS water bailiff was interviewed and confirmed that the pipeline valve remained open at all times unless it had to be closed for repair work. However, in late 2014 following a national departmental policy positions paper in relation to a national water policy review, the pipeline was closed. The policy positions paper renewed emphasis on the economic use of water, and stated that all users must pay, regardless of their historically disadvantaged status. This irony, in the context of a drive for Water Allocation Reform and greater productive use by historically disadvantaged South Africans, is the subject of detailed discussion in Chapter 5.

Confirmed yields from Bushmankrantz Dam and the downstream Oxkraal Dam are shown in Table 4.2. Bushmankrantz is upstream of the village and supplies water by gravity, while Oxkraal Dam is downstream and, though closer than Bushmanskrantz, is not used by Mbekweni villagers. The confirmed yield of the Bushmanskrantz is 4.9 Million m³ per annum (DWA, 2012), which is dedicated to the local irrigation scheme only, excepting in severe drought when the dam would be used to supplement domestic supply. The report however lists only 259ha supplied by Bushmankrantz Dam (drawing 1.5 Million m³ per annum), but the stated confirmed yield of 4.9 Million m³ per annum is equivalent to some 610 ha of irrigable land if full irrigation of pastures was practiced – an anomaly not central to, nor resolved in this study. An estimate of the total land area connected to the Bushmanskrantz Dam, including 4 villages upstream and across the valley from Mbekweni, was estimated at 630 ha, indicating a reasonable water balance between the confirmed yield and the estimated irrigation area. In any case, Bushmankrantz Dam has a recently evaluated confirmed yield dedicated for local irrigation which is roughly equivalent to the total irrigable area commanded by the dam (610ha). Mbekweni irrigable area in communal tenure fields (110 ha), and the adjacent Haytor Manor farm (65 ha) total approximately 175ha.

Table 4.2: Water resource details from dams hydraulically connected to Mbekweni

Dam name	River	Quaternary catchment	Net full supply capacity (million m ³)	Historical firm yield (million m ³ /annum)	Dam owner	Purpose
Bushman-krantz	Oskraal	S32F	4.93	4.9	DWA	Smallholder irrigation
Oxkraal	Oskraal	S32G	15.67	3.4	DWA	Large-scale Irrigation

Source: DWA, 2012.

Gravity irrigation water supply to fields with individual rights

At Mbekweni, the arable lands with individual rights are located adjacent to the village on the west and south-east (Figure 4.4). Some co-operation around water is required between individuals within the area, as the irrigation system is organised so that each 90 mm diameter rising hydrant is shared by four individuals who need to irrigate one after the other in rotation.

Before the DWS closed off the supply to Mbekweni fields from the Bushmanskrantz Dam, sufficient water for full irrigation was available and no water charges were raised by the DWS. The pipeline is pressurised by gravity to hydrants in the field, so no pumping was required for sprinkler operation. Yet, despite the absence of water tariffs and the availability of gravity-pressure water in the fields, up to late 2014, utilisation of the available water resource was observed to be fractional, estimated at 15 % on average over the year. This estimate was based on two transect walks, and observation of dry-season (winter) use of approximately 10 % of the available irrigation area (mainly oats, grown to feed lambing ewes), and supplementary irrigation of maize in the wet season of approximately 20%. As the water supply is now closed, irrigation no longer takes place.

Haytor Manor farm history and water resource

Haytor Manor is an old commercial farm on a separate land portion that was previously part of a Ciskei government-run project during the homeland era (1981-1994). A leidang used to receive water from the Bushmanskrantz Dam and was used as balancing storage to irrigate 65 ha on the farm. While no records were obtained, local narratives indicated that some time after incorporation into the Ciskei in 1981, the original commercial farm was operated by the Ciskei agricultural parastatal Ulimocor, but was subsequently ransacked during the “Oupa Gqozo Uprising” in 1992 at the height of mass mobilisation against apartheid-supported structures (including the homeland governments, of which the Ciskei was one). The land was intermittently used since then by cooperative initiatives which were supported by government, but reportedly finally collapsed with the withdrawal of municipal funding around 2005. Importantly, there are no individual rights to the land at Haytor Manor, which is held under Tribal Trust by the Chief on behalf of the community, making individual access impossible without some kind of land administration or land tenure intervention.

Haytor Manor is located at the bottom of a 3800 ha catchment which has no substantial water storage structures and only one small dam. The runoff from the catchment upstream of the arable lands was estimated based on WR2005 values for the quaternary catchment, of 6.5% of the mean annual runoff (MAR) per annum. The runoff chart is shown below (i.e. flows exiting the catchment, just upstream of the first arable lands on the farm).

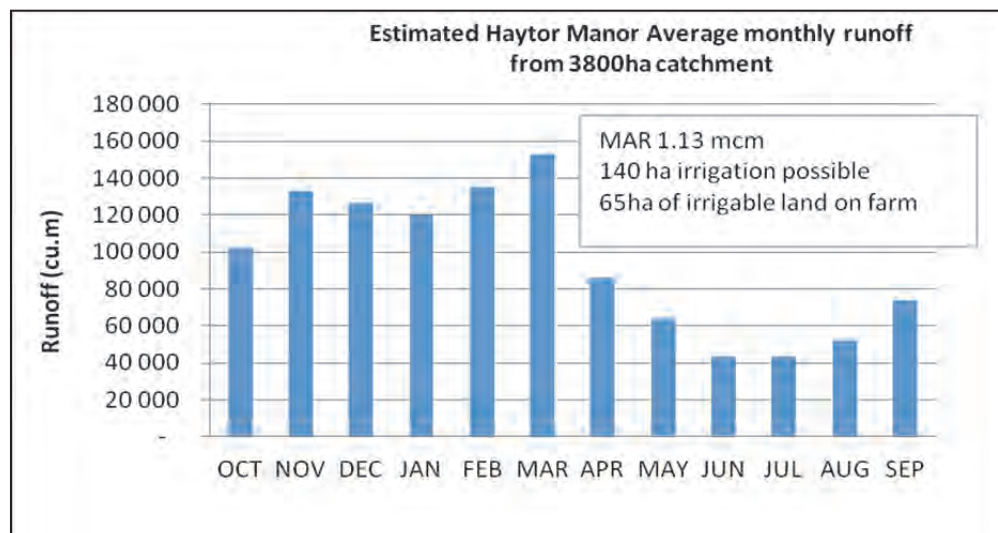


Figure 4.5: Average monthly runoff from the catchment upstream of Haytor Manor Farm.

The mean annual runoff (MAR) is 1.13 million cubic metres per annum. This translates to sufficient irrigation water for 140 ha of lucerne (as an indicator crop). The MAR is significant in two ways.

Firstly, this presents high potential for floodwater harvesting using the 'saaidam' method (Denison et al. 2011) for the farm – a relatively low-cost basin-irrigation system which makes opportunistic use of occasional flood runoff, and seems well-suited to the local crop preference (pasture for sheep) and the flat topography of the fields, although soils and depths would need to be verified.

Secondly, any water diverted into Haytor Manor fields from the catchment for irrigation would reduce the inflow to Oxkraal Dam, which is immediately downstream and which is allocated entirely to white commercial irrigators further downstream of the dam. This fact clearly has implications with regard to existing water allocations, and importantly from a political and policy perspective, potential to give meaningful effect to water allocation reform (see Chapter 5 for more detail on this aspect of the study).

4.5.6 Mbekweni situational water resource summary

The community level situational water resources assessment at Mbekweni shows substantial water resource availability, which, apart from the groundwater resource used for the domestic supply to the village communal taps, is largely underutilised.

The groundwater resource, as presently developed, is fully utilised for domestic supply and given both current draw-down levels, and the cost of pumping, this would be excluded from any future agricultural water-use strategies at Mbekweni. There is a reality that this water is presently used in gardens in the village, but the cost of this pumped groundwater is high and other options for garden watering such as rainwater tanks and bulk water connections (albeit for untreated water) from Bushmanskrantz justify interrogation in going forward.

Irrigation water is available for all of the village's arable lands in terms of the *resource* from Bushmanskrantz Dam, but use is limited by implementation of DWS policy regarding water payments (as of late 2014), and by ageing pipelines. The Mbekweni lands that are reportedly connected to the bulk system are estimated at 110 ha in size, including both portions east and south-west of the village. The irrigation water use is minimal, estimated only at 15% on average across both seasons.

Runoff from the 3 800 ha catchment above Haytor Manor is not regulated or stored, but a scoping level hydrology evaluation shows this to be more than sufficient to irrigate (which would require the construction of storage dams on the farm), or provide floodwater harvesting inflow for the 65 ha of land on the farm that was irrigated before 1981 when the farm was commercially operated. This resource is currently totally unutilised, but has implications for water allocation reform given that downstream of Ockraal Dam only white commercial farmers have agricultural allocations. The implications are, as with all water allocation reform interventions, that existing allocations for the downstream white commercial farmers would require some curtailment, but an intervention would be highly positive as a measure to give effect to water allocation reform policy aiming to increase water access to historically disadvantaged individuals.

4.6 Situational Water Resources Assessment at Lutengele

4.6.1 Context and overview

The villages at Lutengele are contextually quite different to the Mbekweni and Sirhosheni sites and it is useful to sketch out the context so that the description of resources makes more sense. Lutengele is located some 20 km upstream from the mouth of the Umzimvubu River, in the heart of the cultural domain of the Pondo people. The village is adjacent to, but up on the hills above the river itself, with a 200-250 meter uphill walk (Figure 4.6). The Umzimvubu River is the last major undeveloped river in



Figure 4.6: Umzimvubu River looking downstream from Lutengele villages

South Africa and only a small fraction of the available water resource is utilised across the whole basin. There is an abundance of water in the locality (the village is approximately 2 km from the

river, in plain view), but water is scarce and of high value in the village itself given the substantial elevation difference. The Lutengele socio-economic survey showed somewhat higher poverty and lower levels of household resources than at the other sites (Chapter 3).

The settlements in the Lutengele cluster are laid out along the ridges and were never subjected to villagisation. The homesteads (*umzi's*) are spread out and the fields (*amasimi*) are effectively combined with the *igadhi*, and form an integral part of the *umzi*. This is important as field-water use is completely integrated with homestead water use, highlighting the reality of MUS in practice as a norm. Historically Pondoland maintained a relative degree of psychological independence from colonisation and subsequent apartheid domination because of the inaccessibility of the terrain and the historical absence of roads in the steep valleys. The recent inter-clan conflict in the bloody 'Majola Wars' in the 1990's, which extended over six years and were the result of local tensions in the political transition years, impacted on Lutengele. The wars extended widely around the Majola area and were accompanied by cattle raiding and bride-stealing, including across the Umzimvubu River into Lutengele village. Local narratives indicated that one sub-village of Lutengele adjacent to the Mzimvubu flood plain was ransacked in the mid-1990s, and was evacuated and has never been resettled. The remnants of huts are testament to this violent period, and high-value agricultural lands downstream with river-terrace soils next the Mzimvubu River lie unused and are densely infested with Acacia. The present lack of use of the high-value resources is partly due to reported ongoing security concerns, particularly for women venturing far from the village to tend fields, but it was also suggested in interviews that it may be tied to superstitions and unresolved social impacts of the Majola war.

There are numerous factors that influence practices in Lutengele beyond the above, but it was observed from the outset that the people have a markedly greater sense of self-determinism, and the level of agricultural activity in the Lutengele *umzi's* was significantly higher than at the other two sites. The quantitative water survey and the final discussion of the water analysis in this report will expand on these themes.

Situational water assessment process

Site visits were conducted throughout the project since commencement in 2012, and the water survey also built on the long-term relationship of village groups with the Wildlife and Environmental Society of South Africa (WESSA), which has been working on environmental and conservation issues, including food production and family health, for a decade in the wider area. As in the case of Mbekweni, measurements of household water use were made in February 2013 and July 2013 to cover use in both the wet and dry seasons.

4.6.2 Rainfall and runoff data

Rainfall data was obtained from WR2005 for the quaternary catchment T36B, shown in Figure 4.7. Lutengele lies in a relatively higher rainfall zone of South Africa adjacent to the east coast, with a characteristic sub-tropical climate. Relevant data for Lutengele is shown below.

- Rainfall = 1029 mm p.a. (85 years, monthly data set)
- Evaporation = 1150 mm

- Catchment Response (MAR/MAP) = 20%

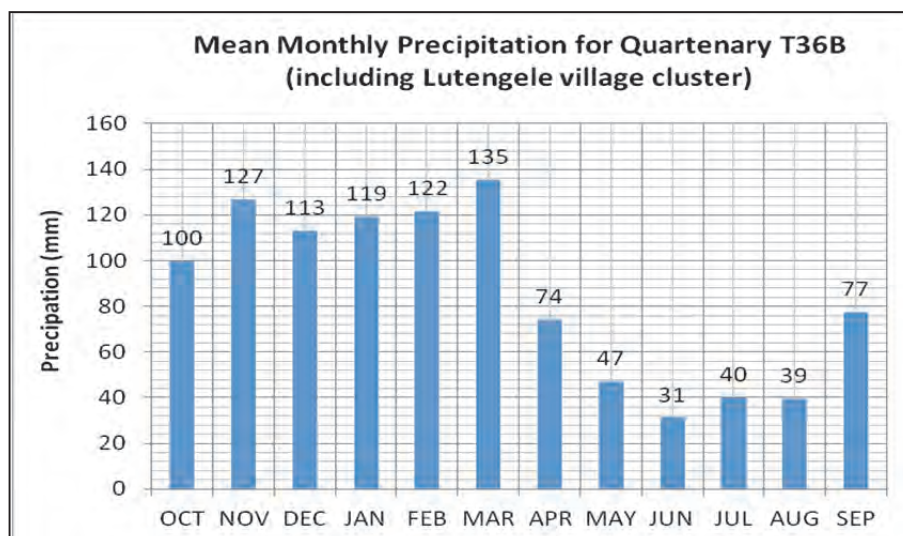


Figure 4.7: Average monthly rainfall data for Quaternary T36B (Lutengele)

The rainfall pattern is uni-modal with a wet season peak in the summer (November to March) averaging 123 mm/month, and low rainfall in the four winter months (May to August) averaging 39 mm/month. Rainfed crop production in summer is thus possible and widely practiced, but winter cropping requires supplementary irrigation for the months of the dry season.

4.6.3 Domestic water sources

There is no piped water supply at Lutengele, and all households rely on a combination of communal and rainwater harvesting sources for their domestic and crop-production water (see Figure 4.9). Domestic water sources include:

- springs and streams, which vary in quality and quantity over the year;
- the Mzimvubu river, some 1.5-2 km walking distance away, with an average climb of 250 m (loaded with a 20 litre bucket, this takes approximately 45 minutes uphill, and ninety minutes for a round trip); and
- rainwater tanks, drums and buckets, which are a high priority and widely used by all households.

The sub-villages of Lutengele use the various streams and springs which are closest to their homesteads. These were visited and are described below. In general, the spring and stream water quality is reported by locals to be good, and there is sufficient water all year round in the vicinity for hand-carried demand. Some of the springs have very low flow in the dry season and people who rely on these have to then walk significant



Figure 4.8: Khukhapi stream – dry season flow

distances to the Umzimvubu, or to Khukhapi stream (Figure 4.8) or other springs.

There is also a perennial sulphur spring approximately 1 L/second just next to the Umzimvubu River and the water from this spring is widely used for medicinal purposes for people and stock. The sulphur spring water is valued highly, and collected in vehicles or with donkeys. A map of the village layout and water sources is shown in Figure 4.10.

Sources and flows

Umzimvubu River – this river could provide a practically unlimited supply for local use in excess of all demand, even if all irrigable land in the village locality was irrigated. However, given that people farm almost entirely at their homesteads, which are situated on the hilltops, this is too distant and difficult to access. There is one small communal project on 10 ha of land which is funded by the Department of Social Development but somewhat typically is beset with local political, institutional and profitability problems and is dysfunctional.

Khukhapi stream is a valuable resource serving both freshwater collection and a place for clothes washing (dry season flow = 5 L/s).

Springs provide high quality water. Flows are varied, with some being quite substantial (Tyityana flow = 0.5 L/s). Emkakatsitisi spring is protected but has been broken open to allow scooping given its almost negligible flow (it takes approximately 15 minutes to fill a one-litre container).

Ntshayi spring within the village is also small, while Manyekeni Spring is stronger and people collect water there with vehicles as it is more accessible. Vehicles are hired usually for building, celebrations or funerals, at the extremely high cost of R 300 per load, which comprises 15 x 20 litre containers (i.e. R 1 per litre = R 1000/kL).

Nozinja spring is further away than Ntshayi and youngsters will charge R 10 for 5 litres of water carried to closer localities in the village (amounting to R 2 per litre = R 2000/kL). One informant noted that he buys bottled water when he can, which is actually cheaper than this collected water, though at more distant shops.

Rainwater harvesting tanks: Most homesteads have rainwater tanks collecting roof-water runoff, and all manner of containers are used to collect rainwater. A number of families were recipients of 20,000 litres of rainwater harvesting tanks from a DWA project (Figure 4.9). As an illustrative case, one of these families reported that 2 tanks were connected to roofs and 2 were in the garden collecting overland flow. They related that they have never run out of potable water since the installation of the tanks, though tanks had often run low. This family has now expanded their garden to across the road.



Figure 4.9: Typical water collection in Lutengele (above, tanks; below, donkeys)

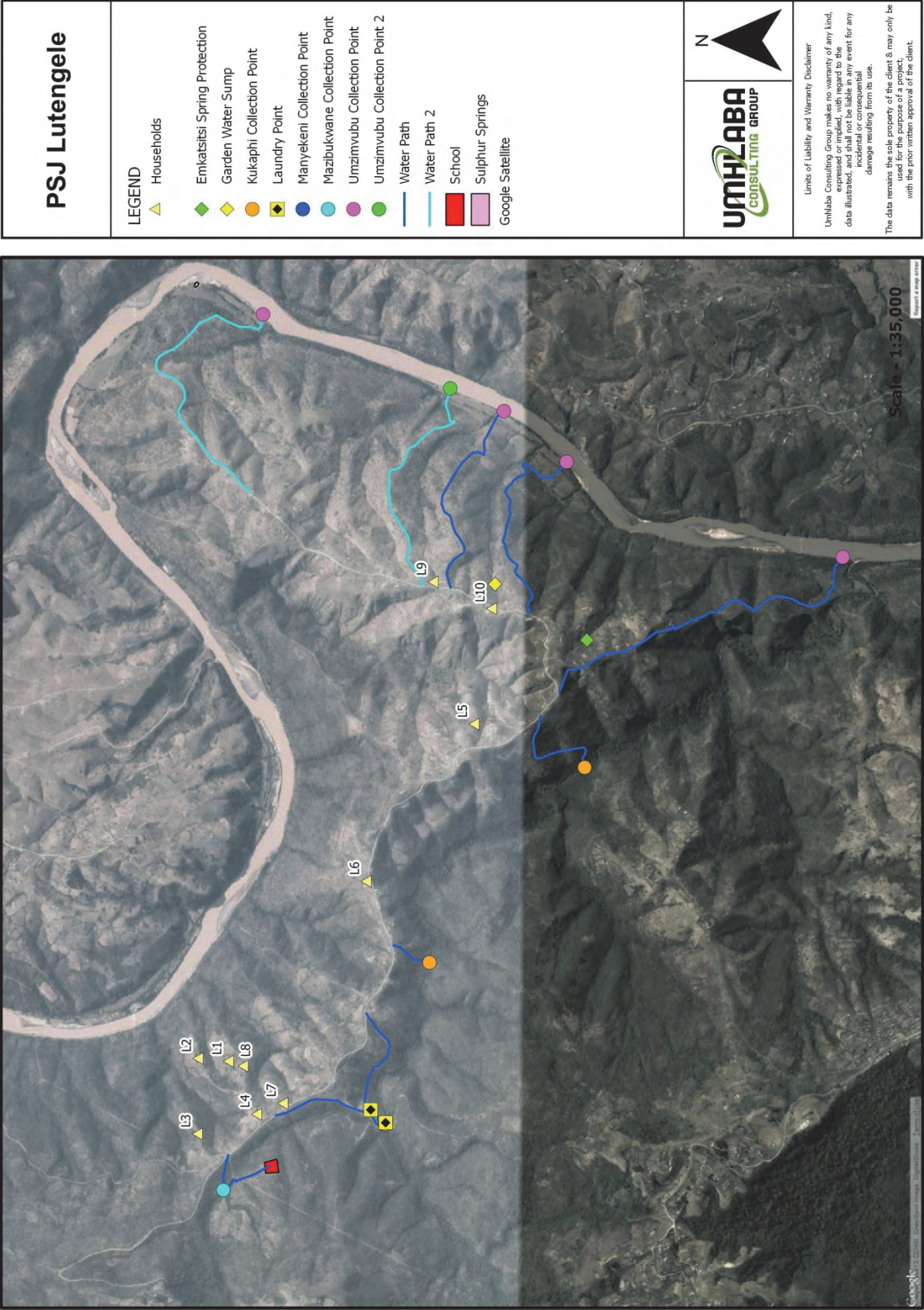


Figure 4.10: Lutengele village cluster water sources, collection points and pathways

4.6.4 Summary of water resource assessment at Lutengele

Lutengele irony: Lutengele people live in a relatively high rainfall area of South Africa (1029 mm), and are located 1 to 2 km from the Umzimvubu which is South Africa's largest undeveloped major river, but live in a general state of water deprivation. They allocate significant labour and productive time to water collection, though this is combined with social interaction and undertaken with calm resolve, even by the elderly.

Water harvesting tanks a priority asset: Most households prioritise rainwater tanks and many households, even those who were not part of the DWA water-harvesting project, have invested in tanks and have many small (20 litre) containers that are used in the wet season. Some households are even water-secure (for home use) with their existing storage capacity (see quantitative detail in Section 5).

Drudgery and collection times: Except during the peak of the wet season, each household will typically make two trips to the communal water source, allocating between 1.5 hrs and 3 hours per day in the dry season to water collection when the closer, smaller springs dry up and distant sources are used.

Water quality and quantity: There is an inverse relationship between water quantity and quality. The spring water is of a reportedly high quality relative to river water. This was confirmed, albeit somewhat subjectively, by the team who routinely drank the spring water while working in the field who noted a preference to their more usual chlorinated urban water supply. No bacteriological tests were taken at the springs but it would be entirely reasonable to conclude that the quality is better than surrounding surface options. Volumes, however, are low. The Umzimvubu supply is the opposite, with huge relative volumes but with a high silt load and likely high pathogen load, given that it is a water body open to animal pollution sources and human veld-defecation (with some 25% of the village population using the bush as an open latrine - reported in Chapter 3 – and likely the wider situation in similar surrounding villages).

Water for productive use: This is largely limited to rainwater harvesting, although some households use collected spring and stream water in the dry season, albeit in very small quantities, given the high costs of getting the water to the gardens. Details on volumetric use are presented in Section 5.

Charges for water: The cost of water bought from local vendors is extreme. Those who have to obtain water for celebrations, building, or because of old age, pay between R 1000 and R 2000/kL compared with typical urban tariffs in South Africa, which vary by total monthly volume used but currently lie in the range of R 5-R 14/kL. This is a disparity of two orders of magnitude, or roughly 100 to 200 times more expensive, and is a situation faced by some of the most materially poor people in the country.

4.7 Situational Water Resources Assessment at Sirhosheni

4.7.1 Context and overview

Sirhosheni is a traditional village located between Butterworth and Willowvale in the former Transkei. The village is expansive and has not been subjected to resettlement. The soils are predominantly deep doleritic soils surrounding the village in large blocks, each allocated to a household. Within the *umzi*, there are maize gardens (*igadhi*) and vegetable gardens (*isitiya*), and summer rainfed cropping in the *igadhi* is widespread, although irrigated gardening in the dry season is nearly absent. On the periphery of the village there are many old lands which were reportedly ploughed in the past and to an extent more recently (see Chapter 6). During the homeland era, the Transkei Agricultural Corporation (TRACOR) reportedly had a very successful maize production programme, where it located maize centres in the high-value maize areas. Sirhosheni was one of these locations with its easy access, deep red soils and gentle slopes.



Figure 4.11: Collecting spring water in Sirhosheni

4.7.2 Rainfall and runoff data

The village is located on the first escarpment at an elevation of around 650 m above sea level, and 35 km from the coast. Rainfall data was obtained from WR2005 for the quaternary catchment T90D and key data for the study purposes are shown below:

- Rainfall = 808 mm p.a. (85 years, monthly data set)
- Evaporation = 1300 mm
- Catchment Runoff Response (MAR/MAP) = 11%

The summer months (November to March) average 97 mm/month and can support rainfed cropping, typically maize (often with beans and pumpkins), while in winter (May to August) it is much drier, with only some 30 mm/month, requiring irrigation for crop production.

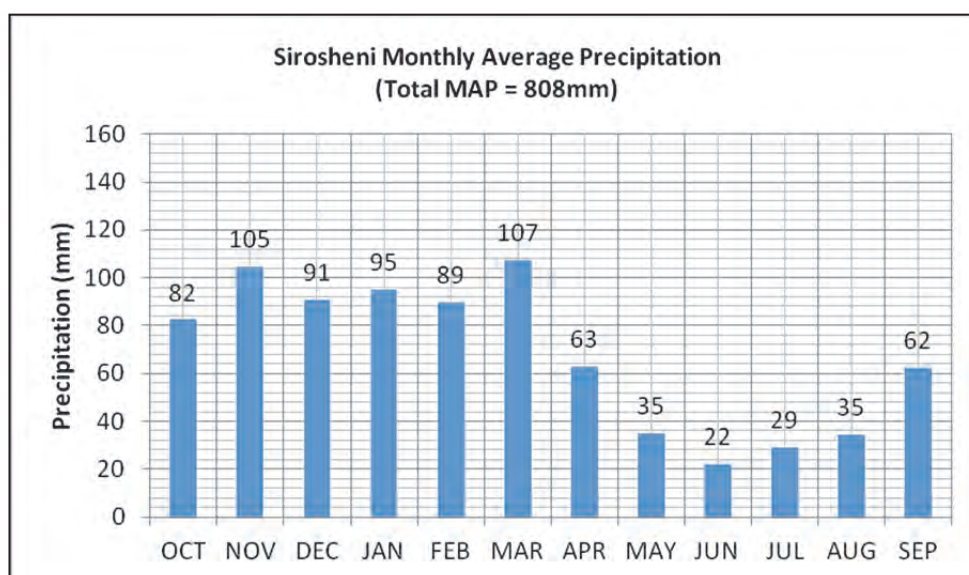


Figure 4.12: Mean monthly precipitation at Sirhosheni research site

4.7.3 Water sources

The area is very rich in groundwater and there are many springs/seeps which can be found on the slopes in and around the village, including one artesian well which has been capped.

Springs: Currently the springs are the main source being used by the villagers, but this might stop soon as an RDP water scheme is currently being implemented. Most, if not all of the water collection points were visited, and co-ordinates taken.



Figure 4.13: Sled for irrigation water collection at Sirhosheni

Even in the middle of winter, it was evident that the spring sources are able to meet the basic needs of villagers and livestock at their current low levels of consumption, noting that minimal irrigation is practiced. There is little evidence of winter home food gardening, although at least one of selected households (HH no. S-10) was very motivated and was growing vegetables intensively. Water is collected by oxen for the watering of these plants, using a sled.

Sirhosheni has the fewest and the simplest water resources in terms of quantity, compared with the Umzimvubu River (and multiple streams) at Lutengele, or Bushmanskrantz Dam at Mbekweni. The only river that villagers have access to is located far below the village site. Yet people are secure in their drinking supply due to the many springs that flow out of the dolerite sub-structure of the area.

Streams: A number of streams surround the village and are named as follows:

The *Imfams*, which runs from the east to the south of the village. This stream is said to be perennial and has never dried up. When some of the small springs dry up, people fetch water from the Imfams, which flows into the Qora stream flowing along the southern aspect of the village. The stream-flow was estimated at about 1 L/s.

The *Cafutweni River*, which runs from the north to the west into eMgwe, which in turn flows into the Qora.

The *Entlanjeni*, which is where water is collected using oxen drawing sledges. Researchers saw two sledges in the village, but there could be more.

The *Mankonkxa*, where water can be collected by vehicle for brick-making and for use at special occasions. The water does not seem to be very clean, but was being collected for brick-making. There were boys and young men washing clothes at this spot also.

The *Tshoma*, where water comes out of a bank and flows into the stream. Washing is done just below the place that water is collected.

There is only one stream with a secure winter flow of any significance, approximately 1 litre/second. This is between 1 and 2 km in distance away from households along the village ridge. A small social development food security project (Komkhulu Project) of approximately 1 ha with 26 members was initiated in 2010, and has limped along with financial and technical difficulties. Most of the members are women. Unfortunately the weir, which was built in 2010, is no longer effective as the water has undercut the wall. It is clear that the structure was not built properly and the scheme was implemented with little knowledge of participative irrigation development or of technical and marketing realities. In addition, the pump was also not in working order and women have been carrying water and hand-watering the crops. The distance to carry the water is approximately 120 metres. Crops which have been grown in the past are cabbage, potato, beans, maize, carrots and butternut. A small revitalisation attempt is being made on the project, but irrigation is likely to remain problematic because there is limited storage at the (inadequate weir) and the structure and catchpit need to be rebuilt, amongst other challenges.

Regional domestic water supply project: During 2013 and 2014 Sirhosheni was part of a regional water supply scheme to provide water services at an RDP level of supply (25 L/per person/day). Standpipes were completed and handed over in late 2014 but were not yet delivering water at that time. Agricultural use of this (treated) water is not permitted by the Water Services Provider (Amathole District Municipality), as is typically the case for treated domestic water supplies.

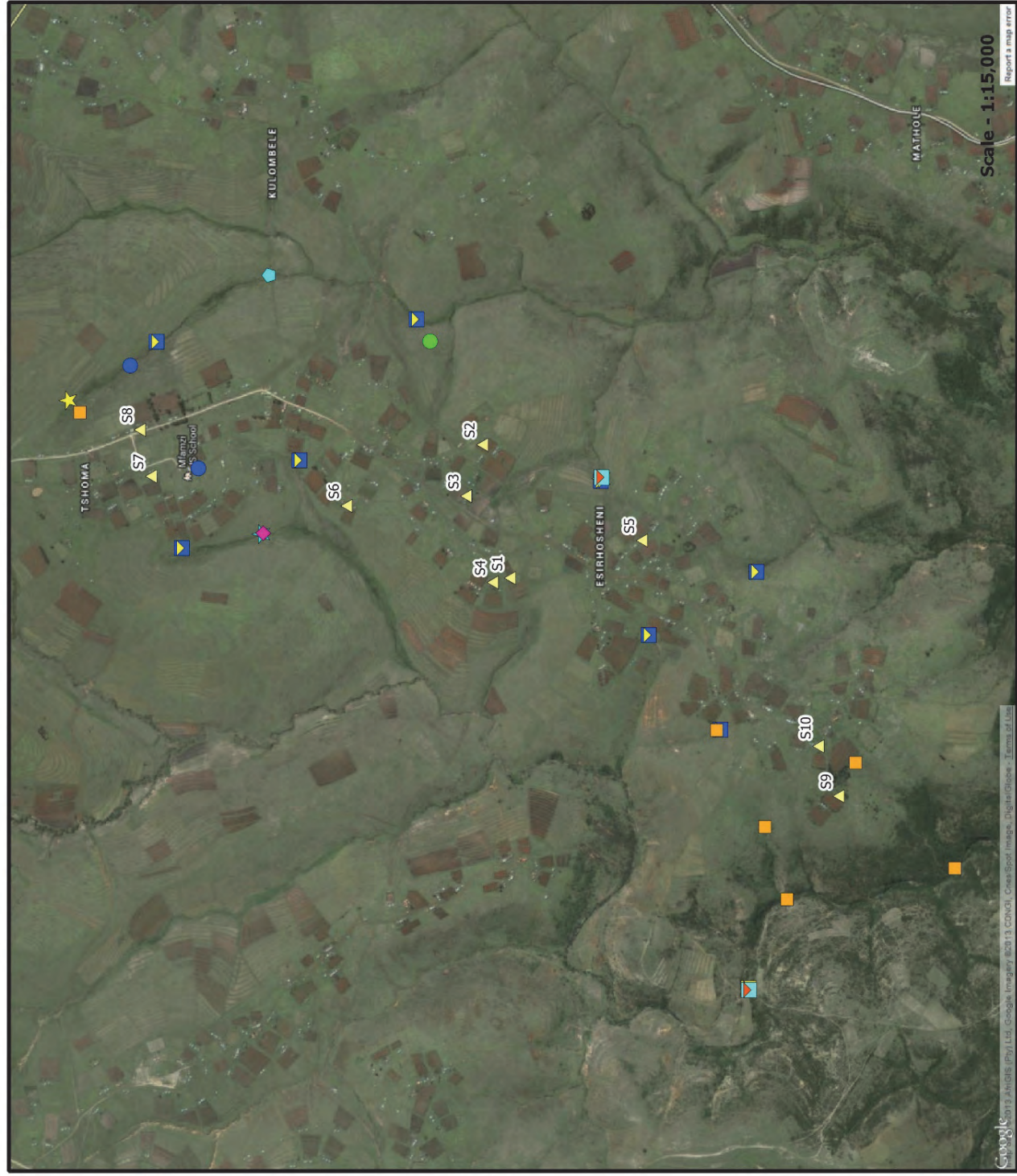


Figure 4.14: Sirhosheni Village Water Sources

4.7.4 Summary of water resource assessment at Sirhosheni

The villagers at Sirhosheni are located in a medium rainfall area with 808 mm mean annual rainfall, and have access to water mainly via numerous springs which are in close proximity to the village. Home food gardening is taking place, but field cropping activity is low. The home gardens are actively used in summer (rainfed) and with only a few exceptions, not at all in winter (the dry season). There is also very limited irrigation taking place on the food security project, which barely operates, but some women continue to attempt hand-watered cultivation there. One main issue is the distance of this plot from the homesteads, but technical and institutional issues also persist.

Sirhosheni has the smallest volumetric local water resource compared to Lutengele (with the adjacent Umzimvubu River and multiple springs and streams) and Mbekweni (which is supplied by Bushmanskrantz Dam and has substantial upslope catchments with potential for floodwater harvesting).

The only perennial river that villagers have access to at Sirhosheni is located far from the village site and is not readily accessed or used. Yet despite the relatively low resources, people are secure in their domestic water supply, due to the many reliable springs that flow out of the dolerite sub-structure of the area and which are located close to their homes on the ridges of the rolling terrain. Water available for agricultural production, other than rainfall, is limited.

Sirhosheni was, late in 2014, connected to of a regional water supply scheme and RDP standpipes were constructed through the village, which will change water use patterns in the future, though agricultural use of this (treated) water is strictly prohibited by the Water Services Provider (Amathole District Municipality).

4.8 Detailed Homestead Water Use Assessment

The homestead water use assessment set out to accurately measure how much water people are using and for what purposes within the boundary of the umzi, including domestic, garden and livestock use. The methodology and instruments used were explained in detail in section 4.3, and the results (i.e. the factual water data) are presented here. The analysis was done across all three sites, which are differentiated in the graphs and tables. This facilitates comparative assessment and gives insight into the dynamics at play. These final water use findings were an important set of information used for interdisciplinary discussions with community members, reported on in Chapter 7.

4.8.1 Data matrices and summary data base

Data for each of the 30 households, collected from the household water survey, was first entered into tables. One week of typical recordings for the summer season is shown in Table 4.3.

Table 4.3: Typical data water use in a homestead in one week in the wet season (Feb 2013).

Homestead No. 7 Lutengele	Type of use	6Feb	7Feb	8Feb	9Feb	10Feb	11Feb	12Feb	total L/week	ave L/day	extrap cu.m /month
<i>cooking</i>	<i>ukupheka</i>	20	50	20	25	25	30	25			
<i>drinking</i>	<i>ukuphlunga</i>	10	10	10	10	10	10	10			
<i>dishes</i>	<i>izitya</i>	10	10	10	10	10	10	10			
<i>washing</i>	<i>ukuhlamba</i>	25	50	25	50	30	25	30			
<i>clothes</i>	<i>iimpahla</i>	20	200	200	100	200	200	200			
TOTAL Home use		85	320	265	195	275	275	275	1690	241	7.3
TOTAL Livestock		40	150	150	0	0	150	0	490	70	2.1
	<i>isitya</i>	80	100	25	250	50	150	50			
	<i>igadhi</i>	0	400	0	0	0	600	400			
TOTAL Garden use		80	500	25	250	50	750	450	2105	301	9.1
TOTAL UMZI		205	970	440	445	325	1175	725	4285	612	18.6

There are thus 30 tables for the three villages for each of two seasons (wet and dry), totalling 60 such tables in the data set. These were then summarised into a single summary matrix, along with other data necessary to inform the analysis. These additional data sets include garden size, number of people in the homestead, on-site water storage, and sex of household head. This allowed the analysis of water use to be linked to the wider context and activities of the homestead.

4.8.2 Water use in the umzi

The average household consumption was calculated from the 7-day average of measurements taken by participating households in both seasons, and are shown in Table 4.4 and Figure 4.15.

Table 4.4: Average daily consumption measurements for multiple uses in the umzi in the wet and dry seasons (litres)

	Village	House (L/HH/day)	Animal (L/HH/day)	Garden (L/HH/day)	TOTAL L/HH/day	L/cap/day	Equiv L/HH per month
Wet Season	Lutengele	110	36	59	205	40	6234
	Sirhosheni	79	5	9	93	20	2828
	Mbekweni	53	9	131	193	47	5869
Dry Season	Lutengele	150	42	74	266	55	8089
	Sirhosheni	72	6	26	105	22	3193
	Mbekweni	34	15	335	384	93	11677
AVERAGE across 3 villages		83	19	106	208	46	6315

Note that all of the above water-use activities are within the boundary of the umzi (i.e. within the homestead):

- House = water used for domestic purposes (drinking, cooking, body-washing, clothes-washing etc.)
- Animal = water used for livestock watering, typically small livestock (chickens, pigs, goats and sheep)
- Garden = water used for irrigation or supplementary watering of crops (food and pasture)

Average household use (n=30): Average water use across the three villages and over both seasons totalled 208 L/household per day, which when extrapolated to a month (using a factor of 30.416 days/month), is equivalent to 6315 L/household per month. This is 5% more than the Government target of 6000 L/household per month for Free Basic Water.

Average per capita consumption (n=30): This was calculated for each household by taking the average daily amount divided by the actual number of household members resident at each case study homestead. These 30 values were then averaged to equal 46 L/person per day, which is 184% of the target RDP minimum level of supply.

High local disparity in access and use (n=30): While the findings above suggest adequate access to water for all when compared with Government targets (Free Basic Water and RDP level of supply), the summary data belies the fact that: i) the averages mask a high disparity of access and use across the households, where a few households have very high consumption and most households survive on a fraction of the target levels of supply, and ii) a significant portion of the high water consumption is derived from unlawful connections to both bulk-water and domestic water supply on a fraction of the target levels of supply, and ii) a significant portion of the high water consumption is derived from unlawful connections to both bulk-water and domestic water supply lines. The per capita water use for each household (averaged over wet and dry seasons) shows the relative disparity at village level, with only four households recording per capita use of over 60 L/person per day, and a median value of 18 L/person per day, which is substantially lower than the average of 46 L/person per day. Individual water use within the case study households is shown graphically in Figure 4.15, where the wide range and disparity is evident

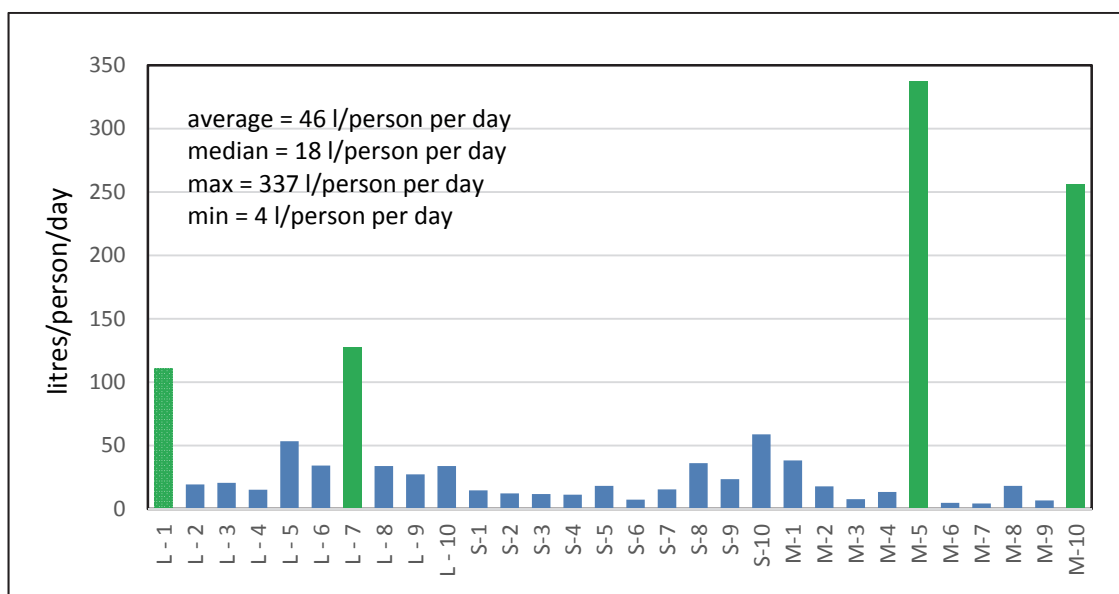


Figure 4.15: Per capita water use with high disparity at the three research sites (n=30)

The disparity can be partly explained by two very high users at Mbekweni, households M5 and M10 (Figure 4.15) who have direct (and unlawful) connections to bulk water pipelines at Mbekweni; and similarly, L1 and L7 at Lutengele, who have substantial rainwater harvesting storage. The high consumption in the two Mbekweni homesteads arises because they freely irrigated their gardens in both summer (for food crops) and winter (to irrigate oats). The hours they irrigated extended to six or seven hours a day and they would typically do this twice or three times a week – incurring no water charges for their use. Flow rates were measured in the field to confirm the measurements, and it was observed that oats are typically planted on a sizeable portion of the yard – and in the case of M-10, a neighbour’s yard as well – explaining the high values. Household M-10 had connected to the irrigation line from Bushmanskrantz, while the M-5 connected to the domestic source from the boreholes. Winter at Mbekweni is post-lambing time, and milking ewes are put onto the oats with their lambs. The two high values at Mbekweni are not considered outliers as such, even though they are very different from the rest of the data set. The reason is that the number of house connections (unlawful hose connections) observed could quite easily be 20% or more across the village, so these 2 higher readings out of 10 are considered to be a reasonable indication of the Mbekweni situation, even though this heavily skews the average at the site.

At the low end of the scale, those households with extremely low per capita consumption (M7, M9 and S6, which recorded 4, 7 and 7 L/person per day) are the three largest households of the thirty (with 12, 11 and 10 people respectively), which shows an association between density of homestead occupation and severe water deprivation. These households are also headed by old people, whom it was found adopt the coping strategy of using water at the source, away from the homestead (rivers, small dams and springs) for some purposes such as body and clothes washing, despite the inconvenience and discomfort of distance or cold (which use was not recorded in the study). While

these uses would impact on water quality, they would have little quantitative impact generally as the water is returned to the local water system.

The overall relatively high averages meet Government targets across the 30 case study households, but do not accurately reflect the norm in terms of household water use and must be treated with appropriate caution when drawing conclusions about the adequacy of water supply in relation to Government targets in general. On this point, the selection of case study households was from agriculturally active households (55% many practising irrigation within the homestead across 3 villages); thus the case data would likely represent MUS use for this group, but overstate the consumption of surrounding households not engaging in cropping in the homestead (45% on average across 3 villages).

The data shows that even for the higher-using group with their personal investments in tanks and the ingenuity to connect to available raw-water pipelines (irrigation or domestic bulk water), 71% of the individuals surveyed are using less than 25 L/person/day, and 38% are using less than 12 L/person/day. This represents a situation of serious water deprivation for most people, across the three villages, with only a few who are relatively water-rich and have much greater volumetric access due to their homestead water infrastructure (tanks or direct connections to untreated bulk supply lines).

Findings by type of use within the homestead

On average, 3224 L/household per month (51%) is used for crop production, 578 L/household per month (9%) is used for animal watering and 2513 L/household per month (40%) is used for domestic purposes (Figure 4.16). Productive use (crop and animal use) thus totals 3802 L/household per month on average (equal to 60% of all water consumed in the homestead per month). The average sectoral use shows the reality of MUS in practice. It is an important finding that productive water use is dominant and consumes such a large portion of the total water used within the umzi (60%) across the three sites.

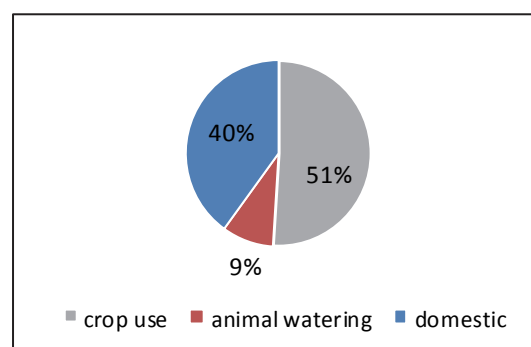


Figure 4.16: Water use for multiple purposes within the homestead boundary (n=30)

Variations across the three research sites by season and type of use

While substantial variations were found across the three sites, the dominance of the need for water for food particularly in Lutengele and Mbekweni was marked, with very little water use in the gardens in Sirhosheni. A breakdown for each site for both seasons (wet and dry) is shown in Figure 4.17.

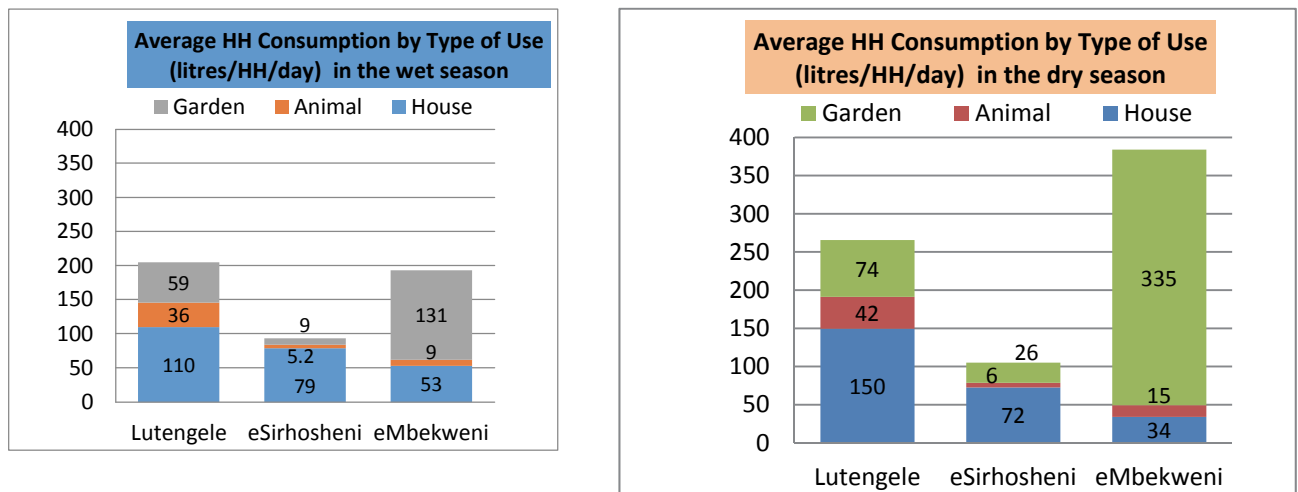


Figure 4.17: Average Household Consumption by type of use in the wet and dry seasons

In the wet season week, the overall household consumption at Lutengele was similar to Mbekweni, with an average use of 205 and 193 L/HH/day respectively, both being more than double the amount at Sirhosheni. This seems most likely due to the relatively limited spring water resources at Sirhosheni, the higher rainfall at Lutengele, and the bulk water supply availability at Mbekweni. In the wet season, there was quite some variation in the purpose of use between Lutengele and Mbekweni, with 54% of Lutengele use being for domestic purposes, and the balance of 46% split between livestock and garden use, while at Mbekweni, 68% of use was for gardening (though this figure is skewed due to the very high users discussed above). In the dry season at both Lutengele and Mbekweni there is a marked increase in total consumption and a spike in garden use at Mbekweni due to the lower winter rainfall and the two heavy users in particular. Sirhosheni recorded much the same use as in the wet season, reflecting the relatively low productive water use in the homesteads compared with the other sites.

For future strategies, the substantial difference in water use between those who are connected to the bulk supply and those who are not raises the question of whether the provision of untreated water supply infrastructure to homesteads will translate to increased productive water use for agriculture in the umzi. This question, when addressed in the focus group discussions (reported in detail in Chapter 7) resulted in a resounding affirmative answer – that when considering food production within the boundary of the umzi, water is indeed the single critical limiting factor to increased food production, with other challenges being present but not critically so. As expanded on in Chapter 7, this was not the case for infrastructure investment to provide water to fields, both in terms of respondents' understanding of the challenges in relation to the farming system, but also demonstrated in findings of field production at Mbekweni, where bulk water available in the fields did not translate to productive use due to a number of other critical factors at play.

The findings suggest that the nature of agricultural production in the umzi is significantly different from agricultural activity in the fields, where multiple factors are critically limiting. In the umzi, it

seems that water alone is critical and other challenges can be overcome with local ingenuity and resources. This is discussed further in Chapter 7.

Seasonal variations reflected as per capita consumption

Figure 4.18 shows household consumption divided by the number of people living in the household, i.e. litres/person per day. There is a markedly higher daily average water-use at Lutengele (40-55 litre/person per day) than at Sirhosheni (20-22 litres/person per day). Mbekweni's per capita consumption is higher on average (47-93 litres/person per day) but closely similar to Lutengele if the households at Mbekweni with bulk-supply hosepipes (households M-5 and M-10) are excluded (given that the spike in the dry season at Mbekweni is the result of the oats irrigation in the *igadhi* from the unlawful hosepipe irrigators noted above).

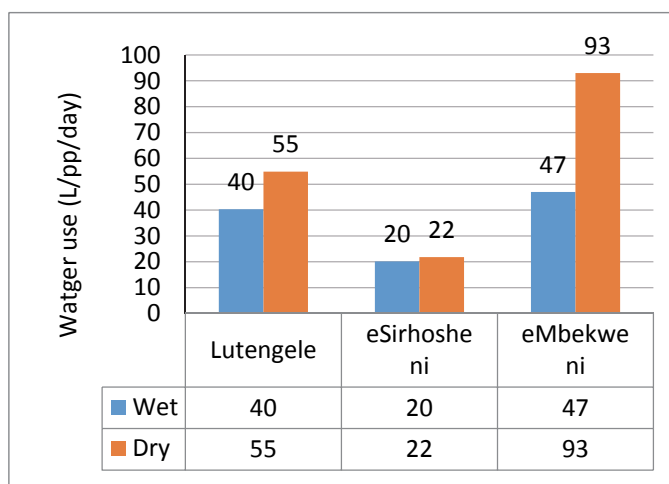


Figure 4.18: Average per capita water use (L/pp/day) in the wet and dry seasons

4.8.3 Proxy index of water drudgery

The Water Carrying Drudgery Index (WaCD) was arrived at quasi-scientifically to give a basis for comparison of the effort of carrying water at the different sites. The WaCD Index thus derived at allows *distance* and *elevation* to be combined in a unitised measure. In simple terms, the higher the WaCD index, the more effort it takes to fetch water. A series of ten tests with two volunteers was conducted, with the water-carriers recording their effort to carry twenty litres of water, both on the horizontal and up a steep pathway with an elevation of 100 metres. It was concluded that to walk 100 metres up a steep hill is equivalent to walking horizontally for an additional 400 metres when carrying a twenty litre water container.

Water-carrying drudgery index: $WaCD = [D + 4H]/WaCD_{EZ}$

D = horizontal distance walked (in metres).

H = vertical elevation difference climbed (in metres).

$WaCD_{EZ}$ = standard of easy water access (twenty metre walk to a yard tap, with a one metre elevation difference).

Using this simple equation the WaCD index at the three sites was calculated, shown in Table 4.5.

Table 4.5: Water Carrying Drudgery Index

	Average distance walked	Average Elevation difference	Equiv distance (m)	WaCD Index
Lutengele	1500	175	2200	92
Sirhosheni	300	20	380	16
Mbekweni	125	5	145	6
WaCD_{EZ}	20	1	24	1

Using the WaCD index as a proxy representation of effort shows that it takes 92 times more effort to get water at Lutengele than for a household with a yard tap (WaCD_{EZ}). Between the sites, the effort needed at Lutengele is 15 times greater than at Mbekweni, and 6 times more than at Sirhosheni. This disparity in water collection drudgery is also reflected by the high charge at Lutengele for water that is delivered by children, donkeys or vehicles, amounting to between R 1000 and R 2000 per kilolitre, a phenomenally high cost that has to be paid by some of the most materially poor people in the country.

Despite this high level of drudgery, water use in the homesteads at Lutengele is much higher than at Sirhosheni. Part of the explanation for this is linked to the fact that the resource itself, found in numerous small springs at Sirhosheni, is volumetrically small albeit easy to get to; and also that people at Lutengele are significantly more agriculturally active in their homestead gardens and fields, have a strong motivation to grow food, and seem to prioritise water collection, harvesting and storage in order to do so. People need the water as it has great productive value, so they make the capital investment to store it and the effort to collect it from natural sources despite the effort and costs involved.

4.8.4 Water use and household storage

Storage is useful and needed to opportunistically capture flows to save for later use (i.e. rainwater collection from a roof, or hose-pipe connections to tapstands at night). Figure 4.19 shows household storage at the three sites, but excludes the two homesteads which had permanent connections to bulk water pipelines at Mbekweni providing continuous supply. Storage in these cases had no relationship with use due to the continuity of supply in the pipelines. Lutengele, with its relatively greater water challenges and highest WaCD index had the highest average amount of water storage in its homesteads (9965 litres/HH). Sirhosheni, which is largely reliant on perennial springs, had a significantly lower average amount of 4747 litres/HH, and Mbekweni had the lowest average, with 1803 litres/HH of water storage.

The lower storage at Mbekweni can be explained by the fact that there is a borehole supplying piped water to the village and hose connections to the borehole supply (needed to feed storage tanks) are discouraged. Roof-water is still an obvious potential water source, but not one that has drawn widespread investment from people. At Lutengele, rainwater harvesting has been promoted actively

by WESSA and DWA and there has been government support in supplying tanks to homesteads (see Chapter 5). The data set includes 5 of the 10 households at Lutengele who were part of the DWS water harvesting and tank construction programme. This alone, however, does not explain the higher storage amounts as the programme had limited scope across the village, and most households can be observed as having invested their own funds into significantly-sized household water storage facilities. This is not surprising given the relatively high levels of effort needed to collect water from alternate distant sources in the hilly terrain.

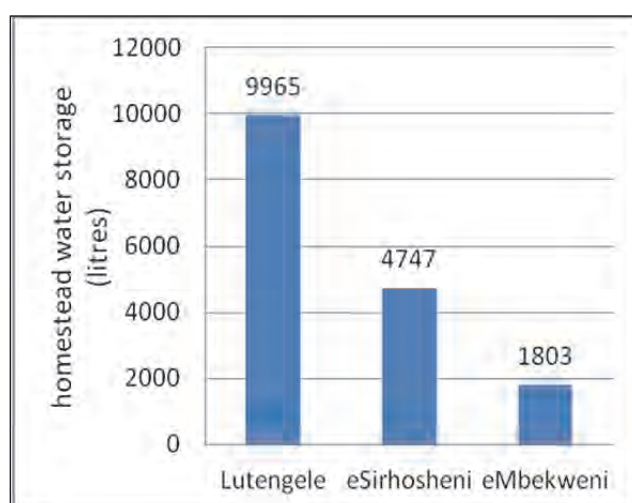


Figure 4.19: Average household water storage at the research sites (n=28)

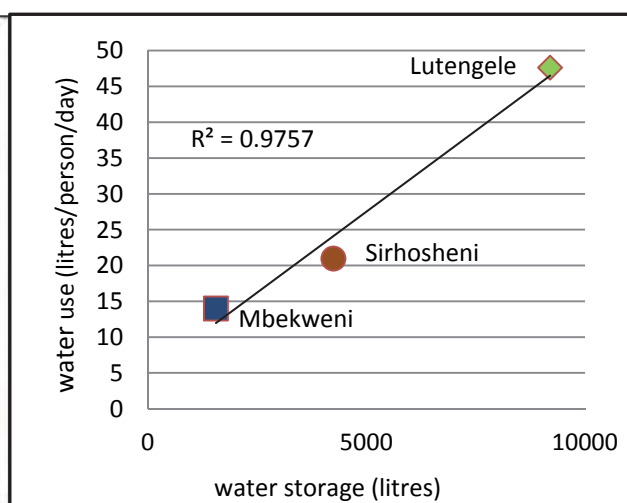


Figure 4.20: Average per capita use and household water storage at the research sites (n=28)

Figure 4.20 depicts the average per-person consumption plotted against water storage facilities at each village ($n = 10 \times 3$ sites). The correlation between average storage and average per capita use appears very strong ($R^2 = 0.98$) noting that the two Mbekweni households with permanent piped connections and high consumption (out of 30 households across the 3 villages) were excluded, as these two data points skew correlation to storage because in these households storage is not a factor in quantity of use. The correlation between storage tanks and water use makes inherent sense. In short, an investment in storage (or hose connections for that matter) in the homestead will lead to increased water use in the homestead, though this hardly requires research to demonstrate, as it is rather self-evident. What is important here in the context of food production is that the high water users (with their associated higher storage) all used a large proportion of the water they have available for food production, showing a strong association between increased water infrastructure provision and increased use of water for crop production within the boundary of the umzi.

4.9 Conclusions of the Water Resource and Use Assessment

The main conclusions of the water resource situational assessment and the detailed household water use assessment are presented on the next page.

Water deprivation is widely experienced and local disparity is high.

Average daily water use across 30 households over both wet and dry seasons equates to a seemingly healthy 46 litres/person per day. This is higher than expected, as it is nearly double the RDP target level of supply (25 litres/person per day). However, the daily average is heavily skewed by two hosepipe irrigators and two highly effective water-harvesters that also have storage tanks. These individuals use orders of magnitude more water than the others (upper quartile = 127 litres/person per day; max = 337 litres/person per day).

A better indication of the typical situation is provided by the median water use, which is 18 litres/person per day (n=30), with the median household use equal to 2786 litres/month (including domestic, livestock and crop watering). This is less than half of the required Free Basic Water provision of 6000 litres/month per household, so when compared with the government objective of a minimum supply, people in general use considerably less than their legal right makes provision for. Seventy-one percent of the *individuals* surveyed (n=180 persons) in the 30 case study households are using less than 25 litres each per day and 38% of *individuals* (n=180 persons) are using less than 12 litres each per day, including garden watering use. This represents a situation of serious water deprivation for most people across the three villages, not least that only 40% of this average water used, was for domestic use, the remainder for garden watering (51%) and small livestock watering (9%).

Productive water use dominates household water consumption patterns.

On average across the 30 case study households, 3224 L/household per month (51%) is used for crop production, 578 L/household per month (9%) is used for animal watering and 2513 L/household per month (40%) is used for domestic purposes. Thus overall average productive water use (for crops and animals) totals 3802 L/household per month, which equates to 60% of total use within the homestead (n=30). The average sectoral use shows the reality of MUS use in practice, though not with water systems originally designed for MUS, but with systems modified by locals (albeit unlawfully in cases) to supply their varied needs.

People with water infrastructure use more water.

It is an important finding that across the three sites, productive water use is dominant and consumes a large portion (60%) of the total water used within the umzi, and that the bulk of this productive use is directly linked to those with augmented water infrastructure. A MUS approach to water supply infrastructure investment, particularly the provision of raw water to homesteads (as modified locally in Mbekweni) and rainwater harvesting through roof and surface water runoff collection (as is the case at Lutengele), is strongly associated with increased crop and animal production benefits. This association suggests that a supply-driven approach would result in greater productive use of water in the homestead. Caution is warranted, however, in assuming that the provision of water alone will translate to successful food production, as this appears to be the case within the domain of the homestead, but not the fields (see Chapter 7 for more on the analysis of constraints).

Water resources are markedly underutilised.

At both Lutengele and Mbekweni there are major water bodies and rivers which are practically unused (in volumetric terms) by local residents. At Lutengele the Umzimvubu River runs less than two kilometres from the village, and is used almost exclusively for washing and home use, although in extreme times it is also used for watering seedlings. At Mbekweni the Bushmanskrantz Dam supplied bulk water to the field edges using gravity pressure, but the pipeline was closed by the DWS in late 2014. Prior to closure, however, utilisation was still very low, estimated at 15% of the water available for the irrigation of their fields. Total use of available runoff within the wider resource boundaries of the villages was estimated at less than 3% across the three villages.

People need water in their umzi's as the priority.

The high water demand at Mbekweni and Lutengele shows that increased water supply to homesteads is a main priority. While fields along the Umzimvubu with deep oak-leaf soils, and fields at Mbekweni with gravity water supply available at no cost, lie largely unused, people at Lutengele, where the WaCD index shows that it takes 92 times more effort to obtain water than hauling it from a yard tap, go to great effort to haul water from distant sources up steep hills to their homesteads. This shows that there are other issues limiting irrigation development in the more distant fields. These are discussed in numerous other publications and papers (Denison & Manona, 2007; van Averbekke et.al. 2011) but the evidence from the water study suggests that simply providing more agricultural water for use in the space of the Umzi (within the homestead) will result in increased crop-production, which is not the case for field irrigation interventions as many other critical limiting factors prevail. This dynamic is discussed in more detail in Chapter 7.

The cost of water collection is extreme for some people.

At Lutengele the relatively small resource nearby the village is often supplemented by purchasing water from water-carriers who use donkeys or bakkies to haul it from the Umzimvubu River. The village is high above the river (some 200-250 metres in elevation) and one to two kilometres away, through hilly, often muddy and slippery terrain. The cost of the water, which is typically purchased for building and celebratory events, but also on occasion to ensure seedling survival in food gardens, is extremely high and ranges from R 1000/kilolitre to R 2000/kilolitre, although it is purchased in small quantities of 10-300 litres. This is 100 to 200 times the cost of treated municipal water in South Africa, which reflects the difficulty of obtaining water in this area. Ironically, this cost is incurred by some of the most materially poor people in the country.

Water is not the main constraint in fields.

The issue of multiple limiting factors in agriculture is well-established in agricultural systems literature, and was clearly demonstrated at Mbekweni. Here gravity irrigation supply was available in the arable lands at no direct cost to farmers (up to mid-2014, when this was changed by the DWS) but irrigation use was estimated at only 15% of the irrigable land serviced by irrigation infrastructure. This low usage was reported to be due to a number of issues including fencing, financing, profitability, and ploughing services, amongst other things (see more on this in Chapter 7). Agricultural constraints within the homestead garden, however, appear significantly easier to overcome, given its smaller scale, immediate proximity to the homestead, and time and family

labour advantages, which lends support to the idea that water investments alone (within the umzi) will result in increased food production, although this is not the case for more distant fields. The fact that at Mbekweni water is available in fields which remain unused shows that there are other major constraints to agricultural production – a finding which concurs with the literature (discussed in detail in Chapter 7).

Water limitations in the homestead can be overcome with modest investments in rainwater tanks.

The relatively high level of food production at Lutengele is surprising, given its high WaCD index and the extremely high price of water there. People at Lutengele have mitigated these challenges through both state-sponsored and personal investments in water storage at their homesteads. It is this which is strongly associated with higher crop production activity within the umzi at Lutengele.

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Chapter 5 The Impact of Water Allocation Reform at the Two Villages in the Eastern Cape

J Denison

A review of water-related policies and instruments of the Government's ongoing water reform process is first presented, followed by a report on findings on the impact of Water Allocation Reform (WAR) initiatives at the research sites. At Lutengele in 2008, DWAF funded a water harvesting and food production initiative as part of a regional pilot in 104 households, with substantial investment in homestead water storage and food production training. At Mbekweni in 2012, with a changed name, the DWA funded and enthusiastically led a WUA strategic planning process among smallholder farmers, aiming for substantially increased productive water use within their quaternary catchments. There was no WAR initiative located at Sirosheni. The two WAR-related interventions are described, and their potential for expansion and increased impact is discussed.

5.1 Review of Water Allocation Reform Policy and Related Literature

The second edition of the National Water Resources Strategy (NWRS-2) identifies that with the sustainability of fresh water resources having reached a critical point, South Africa is facing serious water challenges. Primary concerns include security of supply, environmental degradation, and resource pollution (DWA, 2013a). Related to this, the associated management of water is facing a crisis – a situation defined as having a negative impact on economic, political, societal or environmental goals – and this in a context where agricultural water use is the largest category of use, accounting for 60%¹ of the national available surface and groundwater resource (DWA, 2013a). The NWRS-2 further notes that agriculture has huge potential for socio-economic impact in rural communities, which is a perspective shared and articulated in greater detail in the National Development Plan, where smallholder irrigated farming on schemes and on independent farms, with varied business orientations, is the central tenet of the country's rural development strategy up to the year 2030 (NPC, 2011).

This vision of agrarian reform underpinned by smallholder irrigation is optimistic, given the well-documented reality that smallholder schemes in South Africa perform well below their potential (van Auerbeke et al., 2011) and are a small fraction of the commercial sector (100 000 ha of 1.4 million ha) (van der Stoep, 2011), with limited expansion taking place. The reasons for underperformance of the smallholder irrigation sector are the result of a raft of challenges, including water-insecurity, weak market linkages, a lack of agricultural financing, inadequate production knowledge, and severe institutional deficiencies in land and water organisational domains (NPC, 2011; Sender, 2015; Cousins, 2013, Hollingworth & Matsetela, 2012). The burden of these prevalent factors is accentuated by the intentions of the National Water Policy Review Positions Paper (DWA, 2013b) which echoes the NWRS-2 in relation to the imperative to obtain economic returns on water, given increasing water stress, but most importantly, to clearly prioritise social and redress considerations over economic imperatives in relation to authorisations. All users, including

¹ Van der Stoep (2011) assesses agricultural water use similarly but slightly higher at 62%.

smallholder farmers, should be paying for water (principle of 'the user pays'), adding further financial stress to an already struggling smallholder sector. Together, this presents a development conundrum, where initiatives for redress and reform, which are linked mainly to agricultural water-use (as this is the primary domain and opportunity for increased water uptake by historically disadvantaged individuals) have higher risk and de-facto lower economic returns, given the factual performance of smallholder irrigation nationally.

The need to balance the tension between the social and economic benefits of water is long-established and is highlighted in the White Paper of 1997 (RSA, 1997) and the National Water Act (RSA, 1998). The Department of Water and Sanitation (DWS) has mitigated the financial impact on HDI smallholder irrigators historically, and continues such subsidised support through the Resource Poor Farmers Subsidy (DWAF, 2004b; DWA, 2013a), targeting HDIs who are prioritised in the Water Allocation Reform (WAR) strategy (DWAF, 2008). WAR aims to address the disparity of access to and benefits from water, which is discussed in Section 5.1.2 below, followed by an explanation of the WAR strategy itself and a summary of two key documents which outline the government's future intentions regarding smallholder water users.

5.1.1 Disparity of water access in South Africa

Discrimination in access to land is one of the most visible symbols of historical policies that concentrated wealth and resources in the hands of white South Africans, but discrimination is even more pronounced in relation to water (Woodhouse, 2012). The GINI index is a measure of inequality, based on the concept of 'relative mean difference'. A GINI of 0 means that everyone has access to the same volume of water. A GINI of fractionally less than 1 means that a few people have nearly all the water and everyone else has almost nothing. The GINI, applied to water disparity in South Africa, looks at the distribution of registered water use for commercial agriculture and for rural water use, or alternately, looks at all other users (agriculture, industry and urban-domestic), and rural water use, with adjustments being made for non-recording users. Using the latter (more disparate) measure, Cullis and van Koppen (2007) calculated the GINI index in the Olifants Basin as 0.96, which is amongst the highest in the world; they also derived the coefficient for the social inequality of the benefits of water as being equal to 0.64. The latter is close to the more general GINI coefficient for expenditure per capita (excluding taxes) of 0.67 and 0.64 in 2006 and 2011 respectively (STATS SA, 2014). To understand the meaning of the index, a GINI coefficient of 0.96 means that 99.5% of rural households account for only 5% of water use in rural areas (Cullis & van Koppen, 2007). Schreiner, van Koppen and Tapela (2010) refer to subsequent unpublished work done by Cullis and van Koppen (2008), who extended the detailed Olifants GINI assessment for all water users (registered and not-registered) to other provinces and arrived at a GINI of 0.93 for South Africa, reflecting extreme disparity across the country.

Funke and Jacobs (2011) quantified disparity using a different indicator of water licensing. They note that in 2011, only 15% of water-use licenses were allocated to historically disadvantaged individuals, in relation to the DWAF target of 40% by 2013/14. The interim WAR targets, discussed further below, were not achieved, and this has led to the revised National Water Policy Review (DWA,

2013b), discussed later. Cullis and van Koppen (2007) highlight that one of the asymmetries that perpetuate the registration status quo is that proficient, larger-scale users are more able to fulfil criteria and submit license applications. In addition, they have legal capability and leverage, which places pressure on approval processes; all of this, it is concluded, undermines the redistributive intentions of WAR. These points of critique surface later in relation to the field findings as highly topical issues, reflected in crop-water security at the research sites.

5.1.2 The Water Allocation Reform Strategy

The WAR strategy of 2008 (DWAF, 2008:4) sets out that: “The overall impact of this reform should be water allocation that promotes equitable social and economic development in the WMA with a special focus on women and Blacks.” The two pillars of water reform are Registrations and Licensing, and these were “...intimately bound up with the idea of Compulsory Licensing” and the related technical tasks of assessing water availability and existing lawful water use (Movik, 2012:52). The National Water Act (NWA) (RSA, 1998) provides the foundation for WAR, and requires that government:

- takes pro-active steps to meet the water needs of historically disadvantaged individuals (HDIs), i.e. ‘blacks’ and women;
- ensures participation of the poor and historically disadvantaged individuals;
- works with other agencies to help build capacity to use water productively; and
- promotes the sustainable, beneficial and efficient use of water resources.

The initial WAR position paper was made public in January 2005, and went through a process of public comment that is criticised by some for not actively involving stakeholders in identifying issues, but rather seeking views on issues already defined (Movik, 2012). Movik’s critique of the initial draft policy describes two perspectives which remain at the forefront of contemporary debate, and relate to the different types of irrigation farmers who would be assisted by government through WAR-related investments. One type reflects the modernist perspective, where economic growth is prioritised and is driven by strategic water investments, invoking to some degree the successes of past grand agricultural and industrial schemes, and is a strategy which was aligned with the Government’s Growth, Employment and Redistribution Strategy (GEAR). The other is the agriculturalist/livelihoods perspective, which focuses on integrated planning within an Integrated Water Resources Management (IWRM) paradigm, decentralised to local level by the inclusion of farmers in WUAs, and with specific attention given to resource-poor farmers (Movik, 2012).

In the present WAR policy of 2008, reform activities are prioritized to first take place in water-stressed catchments, and are given effect through three main processes:

- i) The **routine licensing process**, where the inclusion of BEE objectives in response to Section 17 of the NWA is required to support and justify new licenses.
- ii) **Compulsory licensing**, which specifically creates the opportunity for new, previously-disadvantaged users to apply for and obtain access to needed allocations through: the reallocation of water from existing users; the implementation of efficiency measures; and catchment improvement (e.g. alien removal) to increase yields.

- iii) The **support of resource-poor farmers**, mainly through the provision of a range of subsidies for bulk water infrastructure, operational costs, and rainwater harvesting storage systems.

While driving these parallel agendas, the WAR process, in keeping with the NWA, must strive to balance the promotion of beneficial water-use in the public interest (economic and environmental) with the needs of the individual and the commitment to equity.

Targets were set in the 2008 WAR Strategy to ensure that resources are channelled to HDIs, with a portion allocated to women, for the achievement of strategic transformation goals. The long-term target is that by 2024, 60% of allocable water is allocated to HD individuals, of which half are women. The WAR targets are shown in Table 5.1 below.

Table 5.1: WAR Targets (2008)

Year	Target HDI as a % of allocable water	% of target to be allocated to women
2014	30%	30%
2019	45%	40%
2024	60%	50%

Source: DWA Water Allocation Reform Strategy (DWA, 2008)

Overall progress towards these targets is widely acknowledged by observers (van Koppen & Schreiner, 2014; Hollingworth & Matsetela, 2012; Funke & Jacobs, 2011) and by the Department of Water Affairs and Sanitation itself (DWA, 2013b) to have been completely unsatisfactory. Yet considerable efforts have been made in various piloting initiatives which have shown substantial promise but were never implemented at scale, such as the WAR Empowerment Strategy and the initiatives identified at two of the three research sites reported on in this chapter.

5.1.3 WAR Empowerment Strategy – mobilising smallholders to take up water

The WAR Empowerment Strategy is part of the WAR Toolkit developed under an initiative funded by the Department for International Development (DFID) (DWAF, 2007). The strategy aims to promote productive water uptake by smallholders, and also addresses gender equality priorities. The WAR Empowerment Strategy defines a sequence of planning and participatory methods to raise awareness of impending compulsory licensing, where HDIs can secure allocations and integrated efforts through a local watershed approach. This includes the identification of sub-catchment priorities within an IWRM framework, shown schematically in Figure 5.1. The adoption of a watershed approach is well-aligned with the National Water Resources Strategy motivation for effective planning and implementation, and takes local and wider upstream-downstream water relationships into consideration. In the Empowerment Strategy, water resources were assessed at a quaternary scale, some 30 000 ha to 50 000 ha in size (e.g. 30 km x 15 km = 45 000 ha), along with land and agricultural enterprise opportunities, soil-erosion hotspots, and pasture use. Future possibilities were explored participatively (supported by technical input on enterprise possibilities)

and concept interventions were defined collaboratively – with prioritised groups and involving DWA and advisory consultants.

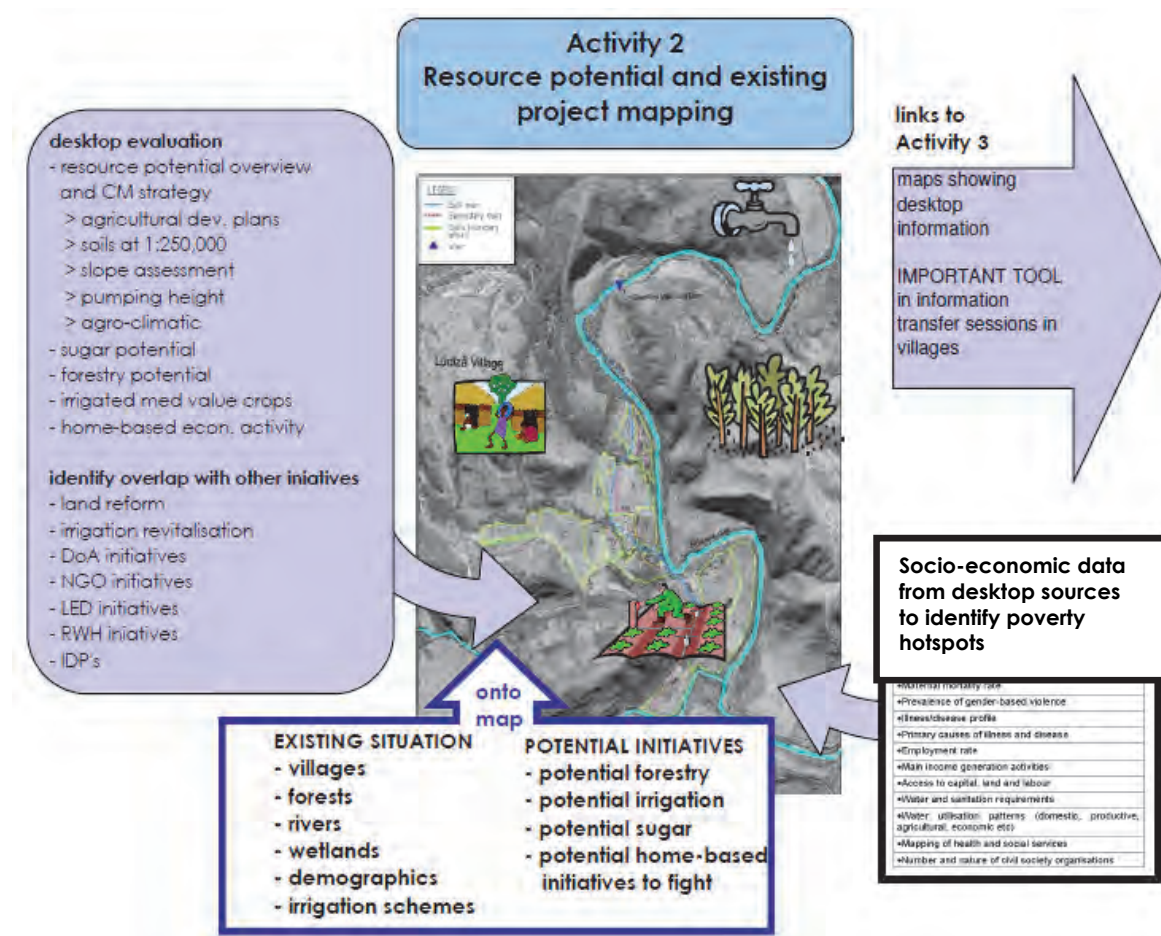


Figure 5.1: WAR Empowerment Strategy Watershed-based Planning Approach

The empowerment strategy describes five likely smallholder enterprises that require significant volumes of water and can contribute to water-uptake for the production of food, forestry, and agro-industrial crops. The strategy quantifies approximate benefits, and outlines how these enterprises can be implemented to achieve development targets. A summary of the enterprises is shown in Table 5.2 and a series of schematics of the approach is included in Appendix 2.

The WAR Empowerment Strategy approach of defining and exploring the realities of likely water-using enterprises (implications and benefits) to smallholder land-holders was tested and demonstrated in the Umhlathuze catchment in KwaZulu-Natal. Interviews were held with implementing agents (Scherzer, 2008), who reported substantial interest on the part of home-food gardeners but limited interest in the other typologies.

Table 5.2: List of likely productive water-use enterprises

Productive water-use initiative	Characterisation of target group	Likely number of poor	Likely number of women	Likely number of children	Risk profile
Rainwater harvesting and home food production	Poverty	■■■■■■■■■■	■■■■■■■■■■	■■■■■■■■■■	low
Sugar outgrowers	Poverty / entrepreneurial	■■■	■■■	■	moderate
Forestry outgrowers	Poverty / entrepreneurial	■■■	■■■	■	moderate
Smallholder irrigation	entrepreneurial	■	■	■	high
Business and partnerships	entrepreneurial	■	■	■	high

■■■■■■■■■■ = many ■■■ = moderate ■ = few

Source: WAR Empowerment Strategy (DWAf, 2007)

While resource availability was confirmed for the two entrepreneurial categories (smallholder business irrigation and partnerships) with a DWA-confirmed water allocation equal to 1000 ha of irrigation water, the hindrances to the irrigated agricultural enterprise were viewed by local smallholders as overwhelming and limiting. Anecdotal information obtained through direct involvement in the Umhlathuze programme reflected a persistent and factually correct view on the part of the DWA that their mandate was to engage in the provision of bulk water supply up the field edge only – leaving smallholder farmers without support for other critical farming activities requiring water uptake which were not part of the implementation process. Water system implementation and in-field agricultural activity is the sole domain of the Department of Agriculture, but coordination between the two departments was absent from the WAR process.

Scherzer (2008) noted that, in his view, the process needed to place greater emphasis on identifying and supporting entrepreneurs, engaging in mass meetings only when financial resources for implementation at scale were immediately available. Mass planning, and the resultant high expectations which arose, proved disappointing, as the exercise emphasised water allocations but offered no follow-on financial support to develop water-using enterprises. The piloting in Umhlathuze reportedly resulted in demonstrated cases of successful water-harvesting and increased food production within homestead gardens, but this was found to be highly dependent on well-trained and capable facilitation teams, and strong technical backup. It was found that there was resource potential for forestry and irrigation but with limited uptake due to low returns and production complexities. The programme was never rolled out beyond piloting in the Umhlathuze, despite the highly policy-responsive smallholder focus and the positive results that were demonstrated. The piloting also showed that effective cross-sectoral integration (particularly between water and agriculture) at project concept formulation and implementation stages appears to be an important gap in the WAR Empowerment Strategy.

5.1.4 DWA Resource-Poor Farmers Subsidy

The Policy on Financial Assistance to Resource Poor Irrigation Farmers (DWAF, 2004b) enables the Minister to provide financial assistance to “any person for the purposes of the Act,” (DWAF, 2004b:5), thus including support for redress and the promotion of resource-poor farmers (RPFs). This can be in the form of grants and subsidies for the capital costs of the construction of bulk irrigation infrastructure, as well as for rainwater harvesting tanks and other rainwater harvesting works. The objective of financial support for resource-poor farmers is to ensure a reliable and equitable supply of water for sustainable economic and social development, including the eradication of poverty. While the term “resource-poor farmer” is defined in the RPF subsidy policy as: “farmers who are citizens of South Africa and who are members of the historically disadvantaged population groups” (DWAF, 2004b:7), the term is most usually applied to black farmers at the smaller end of the farming scale (perhaps <20 ha), characterised by weak linkages to input and output markets (as detailed in Chapter 1).

The DWAF subsidies for resource-poor farmers cover six categories:

1. Grants for the capital costs of bulk water distribution infrastructure, including canals, weirs, pipelines, pump stations, storage dams and related water-metering.
2. Grants or subsidies for the operation and maintenance of water works, water-resources management, and depreciation charges (where applicable). This subsidy is phased out over six years by an annual 20% decrease in the grant.
3. Grants for the acquisition of water entitlement for irrigation, which includes the purchasing of water rights for resource-poor farmers (RPF) from willing sellers.
4. Grants for socio-economic viability studies and investigations, project planning and proposals, technical feasibility studies, and hydrological studies.
5. Grants for training WUA management committee members in water use, conservation and management, financial management, business planning and irrigation scheme sustainability.
6. Grants on rainwater tanks and related rainwater harvesting works for food security through family food production and other household productivity (DWAF, 2004b).

The RPF subsidy allocations have usually been relatively small compared with the applications submitted. Irrigation investments have dominated, with administrative limitations resulting in the award to fewer large-scale projects as opposed to many small ones (DWA, 2011). Contrary to this general reality, in 2008-2009 the DWA embarked on a bold initiative, funding forty million rand into WAR activities, used mainly for Item 6 (grants on rainwater harvesting tanks) which benefited 500 households in a successful RWH and food production program. The Lutengele research site was one of the locations which benefited, and is described later in this chapter. In 2009-2010, the allocation was twenty-two million rand, and this was used mainly on two major irrigation projects, benefiting 438 project beneficiaries. In 2010-2011, the allocation was reduced to ten million rand and, contrary to policy, which focuses on agricultural water, was allocated to water services through the distribution of 5,000-litre roof-water tanks linked to township development in water-scarce areas. This diversion from policy was reversed the following year. The 2011 DWA review of the Masibambane III Programme (2007-2010) noted that while substantial gains were made in mid-term

of MSB III in developing responses to agricultural water support, the recent trend is a move away from supporting resource poor farmers (DWA, 2011). The conclusions of that report, presented in a Ministerial Note, highlight priorities:

- There is strategic overlap between water allocation reform, employment creation and poverty alleviation, and the resource poor farmer (RPF) subsidy. The potential synergy in these priority arenas needs to be exploited.
- The ambitious priorities for water allocation reform (WAR), home food security and related agrarian reform are considerably out of sync with the DWA funding and personnel that are being allocated towards getting water to the rural poor for productive use. (DWA, 2011)

At the time of writing of this report, the RPF subsidy is awaiting formal change to a new financial facility as stated in the latest National Water Resources Strategy (DWA, 2013a), but details are not yet public. Present policy and strategies, however, clearly emphasise women, and specifically set out to support resource-poor farmers.

5.1.5 The National Water Resources Strategy Edition 2 and the Water Policy Review Positions Paper of 2013

The Approved Water Policy Review Positions Paper (DWA, 2013b) sets the stage for a redirection of water allocation reform in the face of persistent water inequality trends. The Positions Paper sets out to: reflect on transitions and transformations; refine water policy in South Africa; and set new and updated courses of action. The paper notes that since the development of White Papers pertaining to the water and sanitation sector between 1994 and 2003, a number of challenges and unintended interpretations have been identified and require attention.

The Policy Review Positions Paper has two dominant concepts which aim to influence policy change in the current and ongoing water policy review process. First is a working approach that embraces developmental water management, i.e. linking water management closely to the developmental and transformational goals of government. The second concept emphasised is the ‘water value chain’. “The water value chain in South Africa extends from the water resource to consumptive and productive use, and back to the water resource. This water value chain requires definition and must include the social, ecological and economic value of the water resource” (DWA, 2013b:4).

The backdrop of the Policy Review Positions Paper is the planned merging of the National Water Act and the Water Services Act into one seamless document governing the entire water chain, during which process the necessary legislative changes from the review can be motivated for in a Bill. Free Basic Water provision, radical transformation in demographic access to water, and water as an enabler of social-development are priorities. The policy, summarised in the paragraphs below, defines a strengthened set of working principles to incentivise productive water use and facilitate transformation and allocation reform.

Use-it or lose-it: Authorised water which is not utilised for a specified period should be reallocated to the public trust managed by the Minister. The category of Existing Lawful Use, a transitional mechanism still in use, is the subject of change to comply with paragraph 34 of the NWA.

Water trading moratorium: No form of temporary or permanent trading between authorised water users is envisaged. It will be obligatory for any holder of a water-use entitlement which is not utilised, to surrender such entitlement to the public trust.

Social and economic equity in the reallocation of water: Equity and redress, it is proposed, will be the primary consideration, with preference given to HDIs for reallocations (with final Ministerial discretion). The principle of prioritising equity in the reallocation of 'set-aside' water which has been returned to the public trust supports the fundamental water principles and Constitutional imperatives of equity and equitable water access in the country. On this item, but as will be seen is not the case for the status of WUAs, the Policy Review Positions Paper is closely aligned with the NWRS-2, and it is of great significance that priorities for water authorisations for consumptive use in the NWRS-2 have changed since the first NWRS (DWA, 2004). In terms of assessing water authorisations for consumptive use, the new priorities place social needs, social stability and political redress (Priority 3) *higher* than water which is strategically important for the economy (Priority 4) (DWA, 2013a:39). The implications are far-reaching, and when viewed in light of the case study at Mbekweni, show a perplexing contradiction between key aligned aspects of the NWRS-2 and Policy Review Positions Paper, and DWS practice on the ground in relation to allocations to resource-poor farmers.

Multiple-Use Approach in planning infrastructure: The Policy Review Positions Paper defines that infrastructure must consider all potential users, and plans must be made inclusively with users to provide for different needs, in a multiple-use paradigm.

Free Basic Water Supply to indigent households only: The Policy Review Positions Paper re-emphasises the commitment of the Bill of Rights, and enumerates levels of supply. A basic service in the Water Supply and Sanitation Policy White Paper (DWA, 1994) is 25 litres of potable water per person per day, a maximum distance of 200 metres from a dwelling and with a flow rate of not less than 10 litres a minute, or 6000 litres of potable water supplied by formal connection per month (in the case of yard or house connections). It should also be available for at least 350 days of the year, without being interrupted for more than 48 consecutive hours at any one time. The Policy Review Positions Paper calls for ongoing improvement and higher levels of supply (yard connections, house connections, etc.) demonstrating intent not to limit supply and access to present levels, but to increase these. This intention throws interesting light on the findings of substantial water deprivation at all three research sites, and particularly the practice of hose-connections which effectively, albeit ad-hoc, convert RDP level of supply to yard-tap level of supply, in line with the policy review document.

Economic regulation: The DWA, in consultation with the National Treasury where needed, will set the rules to control, monitor, enforce and/or change tariffs and charges, tariff and charge determination structures, and service standards for the water sector. The Policy Review Positions Paper also stresses the centrality of public participation in water management issues – the State, in partnership with communities and regulated regional water services providers – to achieve necessary change.

Regional Water Utilities to implement, operate and maintain: The DWA currently does not have an institution which is able to implement water resource management and provide regional bulk infrastructure. CMAs and Regional Water Utilities can fill this gap in the institutional arrangement, with the CMA being responsible for water resource management implementation at a catchment level and the Regional Water Utility fulfilling the role of building, operating, maintaining and supporting regional bulk infrastructure.

Catchment Management Agencies and Utilities to assume Irrigation Board (IB) and WUA functions: CMA formation and Water Utility functionality will be aligned, with the de-establishment of WUAs and Irrigation Boards, their present operational and maintenance roles being delegated to either the CMA or the Regional Water Utility. The Policy Review Positions Paper presents a strongly-worded case which attributes delays in achieving transformation and equity objectives to the failure of old irrigation boards to meaningfully transform to WUAs and participate in or achieve the transformation goals of the NWA. Transformed Irrigation Boards, it states, have also failed to achieve the adequate participation of other users, such as municipalities. There are currently 78 Water Users Associations that have been established (DWA, 2013b), but fifteen years after promulgation of the NWA there still 129 Irrigation Boards in the country which remain untransformed (DWA, 2013b). The policy review communicates a sense of discouragement, even anger and disillusionment, at the ongoing inability to give effect to WAR.

The proposed disestablishment of WUAs is a major change from norms in IWRM and international irrigation water management practices, as well as from those stated in the Second Edition of the National Water Resources Strategy (NWRS-2), (DWA, 2013a). The latter anticipated a WUA different to that of the policy review – one with a centrally developmental role to tackle the challenges of transformation and economic development. The NWRS-2 strategy motivates for a WUA which is an agent of water development and agrarian transformation.

“Transformation of the rural economy is profoundly dependent on the re-allocation of land and water rights, and this underpins the transformational role of WUAs. The role of WUAs should, therefore, be situated within an integrated land-water-agrarian reform as a flagship programme of government” (DWA, 2013b:199).

This binds the DWS (formerly the DWA), which is the sole entity responsibly for WUA support and development, to facilitating combined water and agricultural interventions in the support of resource-poor farmers. The strategy commits the DWS to supporting WUAs. “DWA should also ensure effective support for the establishment of WUAs for resource poor farmers, and for the allocation of water to these farmers. The transformation of irrigation boards should be accelerated through a structured programme so that they can be brought under the ambit of the NWA and the transformational requirements of the developmental state and the National Water Act” (DWA, 2013b:199).

The NWRS-2 is significant in that it reiterates the Department of Water and Sanitation’s (DWS) commitment to: collaborative multi-sectoral engagement driving intensive agriculture as a water

consumer; working with land and agriculture departments; and supporting WUAs which represent resource-poor farmers. However, the 2013 Policy Review Positions Paper states that the above is no longer a proposition, that WUAs are an obstacle to transformation, given an entrenched status quo, and must therefore be disbanded. Since the NWA of 1998, WUAs have been a key entity in the IWRM institutional setup; particularly in the management of irrigation systems and involving other water users within their 'area of operation'.

Despite the marked contradiction between the 2013 Policy Review Positions Paper and the NWRS-2 in relation to WUAs, the legal position on WUAs is not ambiguous. The NWRS-2 is a legally binding document which makes clear its expectations of a developmental WUA. The 2013 policy also states that WUAs will continue until such time as they are disbanded, so although clear in a strict sense, the contradiction in the vision is cause for confusion. In the last few years the DWA has successfully established smallholder WUAs in the Eastern Cape, Limpopo, Mpumalanga and KwaZulu-Natal, with a developmental agenda as envisaged in the NWRS-2 (Pegasys, 2012). One of the WAR case studies (Hewu Dalubuzwe at Mbekweni research site) describes such a developmental WUA aiming for increased irrigation and water-harvesting in its catchment. Although the Minister who invoked the 2013 policy review has since moved on (in late 2014), there is still no pronouncement on the government's intention to disband WUAs, leaving the WUA development process, and smallholder WUAs in particular, with unclear direction from government.

5.2 Impact of WAR on Women at the Research Sites

This next section of the report is developed from the extended research engagement at the research sites over the last three years, and observation of operational and rural development initiatives that have taken place at and around the research sites. Two of the three sites have been impacted on by various government programs. At the Lutengele village cluster, the DWS (then the DWA) used the resource-poor farmers' subsidy for storage tanks (20 000 litres) and food production training. At Mbekweni, sub-catchment water-resources development planning was implemented by the DWS (also then the DWA) under a WUA development initiative focusing on resource-poor farmers in surrounding villages. At the final site, Sirosheni, people were completely reliant on spring water until 2014, but around the time that the research was concluded an RDP regional water supply project was underway. This recent development is not related to the reform agenda as such, but is a routine water-services project, and is therefore not reported on further here. Information on the two WAR-related initiatives in this report was obtained from the DWS and consultancy reports related to the implementation of both programmes detailed below.

5.2.1 DWA-funded water harvesting and food production pilot program at Lutengele Village using the RPF subsidy

Pilot expansion phase of the RPF-funded rainwater harvesting programme

In 2008-2009, the DWA supported a rainwater harvesting (RWH) programme at household scale using funds from Item 6 of the DWA-managed Resource Poor Farmers Subsidy. The project was implemented by the Independent Development Trust (IDT). The project installed 20 000 litre tanks in 103 selected households, 44 of which are in the Lutengele area. The water tank systems were

implemented alongside an extended agricultural training effort in home-food production, with NGOs and implementing agents involved. One of the current WRC project research sites has a number of households who benefited from the RWH program, and five of these households were involved in detailed case study assessments for this WRC project. Figure 5.2 shows the surface-water collection system for gardens, and Figure 5.3 shows selected photos from the programme at Lutengele.

The DWA funding provided for water storage of 20 000 litres, which facilitates some food production during the four dry winter months. Training facilitated by implementation agents and partner NGOs driving a food production agenda also included alternative infiltration and conservation methods, such as swales, mulching, etcetera. The RWH programme was widely seen by locally involved organisations in KZN, Limpopo, Free State and the Eastern Cape to be a successful initiative with full payback of capital investment in 3-8 years, depending on garden-scale economic assumptions. In addition, substantial social benefits in terms of better nutrition, increased self-worth, and the reduction of hunger were noted. The technical rainwater harvesting methods formed a central part of the training course in home food production. The main RWH methods covered included trench beds, diversion furrows, mulching, swales, fertility pits, greywater harvesting, roofwater harvesting, and A-frame construction for contouring. Food production training, mainly for fruit and vegetables, was conducted over a series of seven workshops, which commenced with a five-day training session and concluded with two follow-up workshops. These training sessions focussed on agricultural intensification and on-farm practices.

Typical tank installations

The design shown in Figure 5.2 made maximum use of slope to avoid burying the plastic tanks, which is risky because they can either float out of saturated ground or collapse from earth pressures when empty. Buried installations also rely on non-return valves to allow shallow groundwater into the tank, which present a risk of leakage or blockage which would result in storage failure. By connecting the inlet structure to the tank some distance away (between 5 m on steep slopes up to 20 m on flatter slopes), the tanks only require a shallow excavation, thus mitigating both collapse and flotation risks.

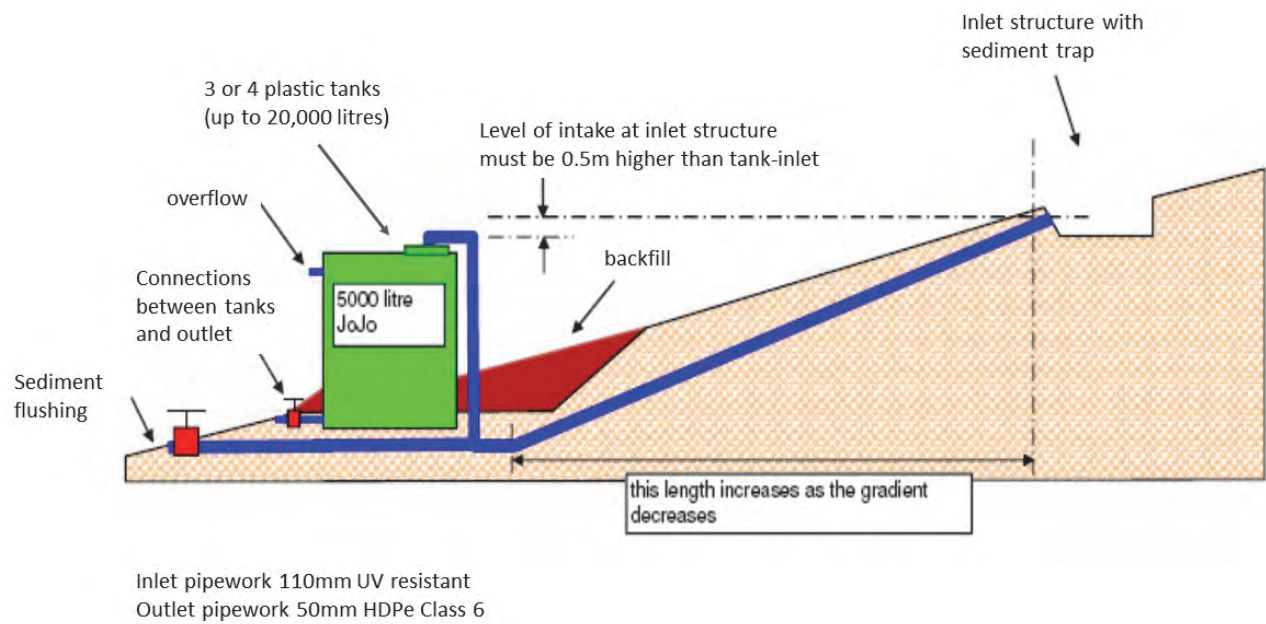


Figure 5.2: Cross-section of inlet arrangement to surface-water collection storage tank system.



Above: Photos of Lutengele surface runoff collection in home-gardens 2011. Photo (a) catchpit and tanks, (b) foodcrops and tanks, and (c) cash crops and tanks.



Above and below: Photos of Lutengele roofwater harvesting and agric-training. Photos (d) and (e) collection from traditional houses using flexible guttering, (f) Leak-proof testing, (g) diversion-swailes in gardens, (h) training in mulching and contouring, (i) trench beds and diverse crops.



Figure 5.3: Elements of the Resource Poor Farmers Subsidy rainwater harvesting and food production initiative at Lutengele Village

5.2.2 Experiences and qualitatively assessed impacts

In the DWA-funded programme, no finances were allocated to baseline surveys of key indicators to allow for a quantitative assessment of impact, despite formal submissions being made highlighting the importance of this process. In the absence of empirical evidence, in-depth interviews were used to give insight into benefits, which are typified by the following vignettes.

Miss Madolwana, photo (k), standing on the right, is now working part-time for the Apostolic Faith Mission in the area. She has four tanks, two of which collect from surface water runoff, while two more tanks collect rain from the roof gutters. She sees herself as a hard worker, and always attends meetings for her church and for WESSA, the assisting NGO. She has never been married but has one young child. The family presently consists of four members and has a little shop selling drinks, but by their own evaluation it is not very successful and family debt is an ongoing worry. The garden boasts an array of produce and is visibly highly productive, with wild insecticide (*iantsanqwana*), apple, guava, peach,



granadilla, and mango trees present, as well as spinach, beetroot, tomatoes and other vegetables. Since receiving the tanks she rarely goes to the river; the water from the tanks which collect overland flow is used only for growing food in the *isitiya*, while collected roofwater is for both household and garden use.

Miss Madolwana does not use a hose pipe; rather, she waters by hand to use water sparingly and can thereby observe the amount of water she applies to her produce. Her desire is to increase her agricultural production and if she could generate increased yields she would like to start selling surplus produce on a more permanent basis to increase her income. The narratives about the relieved burden of collecting water are widespread across other tank owners.

Mama Nogwada, photo (l). Water is collected in the rainwater tanks and when those are dry, from the nearest spring. When this water has dried up, she goes to the Umzimvubu River. This is far away and it takes 3 hours of her day to fetch 40 litres of water. When it rains, however, the water tanks provide reprieve from these arduous trips. She has to go to the river more often in the winter months, when there is no alternative and the local springs have run dry. Lately, it has been raining heavily so she hasn't collected from the river that much.



Mrs Kenya: She does not go to the river as often as she used to because it has rained and her tanks have helped her avoid the long trips to the river and the springs. She takes water from the tank by hand and has not thought to connect pipes or hoses from the spout, but insists on hand-watering (*gangashela*) to conserve what water is collected.

Mrs Mngcetywa, photo (m), received four JoJo tanks from the project that was funded by the DWA. These tanks have helped in her production, but because her garden is small, and she lacks fencing, it has still been difficult to produce an abundance of food. The water is used for general family purposes – bathing, drinking, and washing clothes – instead of for irrigation purposes. She finds that people are not getting sick as much as they did before receiving the water tanks. The benefits of the tank are obvious from the family's improved lifestyle.



Concluding comments on the DWA RPF Subsidy Implementation at Lutengele

A detailed quantitative analysis and evaluation of water-use within a homestead and the surrounding watershed is presented in Chapter 4. This showed, not surprisingly, that households with storage tanks used more water, with a significant portion used for food production. The narratives from those who benefited from the RPF subsidy pilot programme in Lutengele clearly communicated positive outcomes in terms of the reduced burden of water collection for women, increased food production in the homestead (particularly but not only the irrigated *isitiya*), and increased water for domestic use. The DWA successfully used the RPF subsidy and invested in both water infrastructure and agricultural training with an NGO partner. Although impact monitoring was not implemented by DWA or IDT to quantify benefits, some seven years later the homestead water systems are fully operational and water is being collected and used productively to grow food during both summer and winter. Garden intensity at Lutengele is particularly high (see Chapter 6), which is associated with the food-production intervention. The growers' group which share agricultural information has increased in size, and members confirm the value of the storage tanks, their improved quality of life, reduced water-carrying burden, and improved food supply, as well as some supplementary cash generation for the household.

5.3 Mbekweni Village – Hewu Dalibuzwe WUA formation and development process

South Africa's water law, which is framed around IWRM principles, calls for the devolution of certain management functions to the lowest practical level, institutionalised in WUAs. WUA legislation in South Africa foresees diversity in purpose and size, and the allowable constitutional structures are intentionally flexible and accommodating. These sometimes take the form of company-style organisations (service provision utilities) that efficiently operate and maintain large irrigation schemes, including works maintenance, billings and collections, or alternatively small groups of farmers who loosely coordinate simple systems, even as small as a single shared canal.

Most WUAs in South Africa evolved from their prior identity as Irrigation Boards or Government Water Schemes responsible for large commercial irrigation and water schemes. These underwent a transformation process following the Act. According to the DWA (2013b), progress on WUA establishment has been disappointing, with 129 boards still un-transformed. The institutional transformation pace, and the pace of re-allocation against WAR targets, where WUAs are seen to be limiting transformation, has been heavily criticised, as noted in the policy review presented earlier in this section. For Irrigation Boards and State Water Schemes, transformation to a WUA involves the development of a new constitution, registering additional members from a wider ‘area of operation’, and structuring greater inclusiveness of HDI farmers and stakeholders in representation and decision-making.

5.3.1 Smallholder WUAs: an important developmental agent

Smaller and different WUAs also exist, however, their purpose focusing more on coordinating and planning productive water-use interventions with smallholder farmers, rather than on the operations and maintenance of large irrigation schemes. The WUA of interest here is the Hewu Dalubuzwe WUA, which comprises only smallholder farmers (Figure 5.4). The WUA boundary covers roughly 50 000 ha, and includes the research site of Mbekweni



Figure 5.4: Members of Hewu Dalubuzwe WUA

Village (Figure 5.5). The WUA formation coalesced around the Shiloh Irrigation Scheme but extends twenty kilometres upstream to Bushmanskrantz Dam to include 13 villages, 3 dams, and the local municipality which supplies Whittlesea town.

It is a legal requirement that within six months of a WUA being gazetted, it must submit a business plan to the Minister setting out its objectives and the activities, finances, staff resources, etc. that will be allocated to achieve its defined goals. The DWS Institutional Oversight Directorate solicited a business planning process with 41 WUAs in 7 provinces, led by Pegasys Consulting Group (Pegasys, 2012). Some were transformed or untransformed WUAs around the large irrigation schemes (Sundays River, Great Fish and Gamtoos), while others were comprised wholly of smallholder farmers, such as Hewu Dalubuzwe WUA, Zanyokwe WUA, and eDikeni WUA (at Alice, extending up the Thyume Valley, which had no irrigation scheme at all).

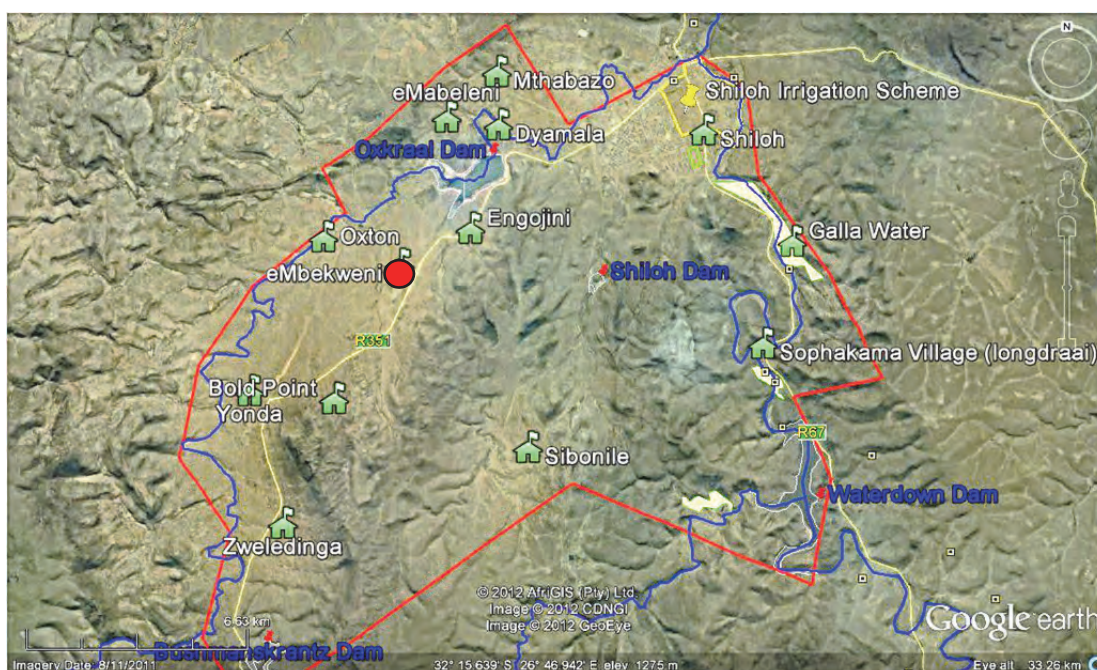


Figure 5.5: Area of Operations of the Hewu-Dalubuzwe WUA southwest of Queenstown in the Eastern Cape.

5.3.2 Summary of Strategic Business Planning process for smallholder WUAs

The WUA development process for smallholder WUAs was piloted in a series of detailed sessions held over 10 to 12 days, following the process included in Appendix 3 of this report (Pegasys, 2012). Regional DWA personnel played a dynamic and motivational role in the process, mobilising communities, municipal water service providers, farmers and consultants alike to ensure meaningful knowledge-exchange and practical outputs in the form of a viable business plan (i.e. strategic plan). The approach developed by the DWA team was participatory and resource-based, starting with participatory resource mapping and an analysis of challenges in farming and water, leading to the setting of strategic goals and priority activities to achieve them.

The hydraulic boundary of the WUA predetermines a catchment mode of engagement, which facilitates planning by providing a logical boundary for agricultural water development, soils, water and crop planning. A watershed approach is adopted to help define the WUA scope of activities, in line with international best practices in land and water management development.

The Pegasys team reported that the process of working with the smallholder WUAs at Hewu Dalibuzwe and a number of other smallholder WUAs was very different to that of working with former Irrigation Boards, such as the larger Sundays River or Gamtoos irrigation schemes. The smallholder WUAs are new and functioning minimally, or not performing any functions at all. They are characterised by under-utilised water and land resources, generate little or no water revenue, and suffer from a severe shortage of skills, finance and information. These WUAs are effectively

starting a newly-functioning organisation, from its paper form into an operational entity that acts in the water interests of its members.

Members are typically rural folk from dispersed villages and adjacent irrigation schemes. Many do not speak English and have only basic literacy, and many are not currently farming or using water productively. Their primary interest in the WUA is that they are very keen to commence agricultural production and are alert to the unused water potential in their locality. Motivation levels and commitment to the strategic business planning process are reportedly high and commendable.



Figure 5.6: Members of the Hewu Dalibuzwe WUA, many of them women, engaging in strategic planning with interest, energy and characteristic humour.

Working with these members required a full awareness-raising process on the practical and legal roles and functions of a WUA, and then systematically teasing out the resources and opportunities that were available, and what the WUA could realistically do for them to convert these resources into a meaningful benefit. This led to the outline of a strategic plan, which was then developed further and in detail. The challenge, given the members' initial limited understanding of the purpose of a WUA and the practicalities needed to turn available land and water resources into productive water-use enterprises, was to do this in a way that ensured full participation, so that all outcomes were directly informed by the members' needs,

This challenge was successfully met, and centred on resource-mapping and visioning, with intensive sessions of information-exchange around irrigation planning and development, operations and maintenance, water-harvesting opportunities, and responses for increased crop production in fields. The WAR Empowerment Strategy Toolkit's productive-use pathways (with six water-use enterprise models) was used to frame possible avenues forward, along with videos of water harvesting practices, workshops, and field visits. Numerous WUA members were, in fact, rain-fed or irrigation farmers with insight into resources, their historical use, and contested issues. The strategic plans that resulted included watershed-based planning approaches, with a project prioritisation process, pre-feasibility study and cost estimation. These provided a coherent basis for mobilising implementation funding from various sources, including the RFP subsidy, provincial agriculture departments and District Municipalities, amongst others. Their primary interest was to define

projects to lead to implementation. Legal compliance in itself was a stepping stone to gaining direct livelihoods benefits from agricultural water available but underutilised in their locality.

The alignment of the approach with key elements from the Water Policy Review Positions Paper with regard to participation, Multiple Use Systems, and the drive for Water Allocation Reform is marked. Similarly, the smallholder WUAs as they defined themselves in the process were fundamentally developmental WUAs, in line with the NWRS-2. These WUAs thus embodied critical elements of the current DWS policy vision regarding elements of development, participation, water reform, beneficial use for HDIs, and IWRM in practice.

5.3.3 Strategic direction of the Hewu Dalubuzwe WUA

While different WUAs have different strategies, the kind of strategic interventions that emerged from the smallholder WUA process are marked by their planning emphasis, compared with the operational emphasis of the larger WUAs. The stated Mission of the Hewu Dalubuzwe WUA is to maximise local benefits from the productive use of water in the Dalubuzwe WUA area of operations, through coordinated water-related planning, knowledge-sharing, and the promotion of development initiatives; and to operate and maintain the Shiloh Irrigation Scheme on a cost recovery basis.

Table 5.3: Main strategies formulated by the WUA in the 3-year business plan

STRATEGY 1	Plan new agricultural water projects. Facilitate rural development through the collaborative planning and implementation of water-use initiatives by identifying potential irrigation and water harvesting projects, and develop concept plans to facilitate the funding of new initiatives.
STRATEGY 2	Improve stock-water availability (boreholes and small dams). Identify priority villages in need of stock-water development and then develop practical solutions to provide water for stock.
STRATEGY 3	Build the organisational capacity of the WUA. Progressively develop skills, institutions and systems to administer water use within the WUA area of operation.
STRATEGY 4	Obtain and distribute information on smallholder irrigation and water harvesting methods to improve crop production. Actively pursue sources of information and training and make linkages with key support and academic institutions in the area.

The Hewu Dalubuzwe WUA's interest in Shiloh Scheme was one sub-item under Strategy 1, with most WUA members not directly involved in the scheme itself, but being particularly interested in how they could increase water access to support livelihoods. Water-harvesting for rainfed crops, rangeland and cattle water, and smallholder irrigation in limited locations, were identified as collectively-justified and priority pursuits. The strategic plan as it stands is a primarily *developmental* document, and the detail under Strategies 1, 2 and 3 very clearly shows the emphasis on identifying productive water-use enterprises. This aligns with the specific intentions of the NWRS-2 regarding developmental WUAs.

5.3.4 Opportunity denied and momentum stalled by intended policy shift

In the case of the Hewu Dalubuzwe WUA members, many shared a reality of material poverty, quantified to some extent in the socio-economic survey in Chapter 3, but also reflected by their difficulties in paying for taxi transport (some R20-R40 per person, per monthly session, which was a significant personal cost to individuals). Their primary motivator was the collective awareness that their own available water and agricultural resources were not used to good effect, and they wanted to change that. The WUA's strategic steps and priorities were defined in their 3-year Business Plan and presented to the DWA in April 2013, for submission to the Minister.

The only purpose of the planning process, as far as the WUA members were concerned, was to start a process that would lead to prioritised water-use (i.e. agricultural) projects. Their idea was to use the WUA business plan as a step to develop funding proposals that could be submitted to either municipalities or government departments. Given the watershed scale of roughly 50 000 ha, the project priorities in irrigation, water-harvesting farming, conservation, rangeland management and forestry had started to be defined in a simple but coherent spatial plan, led by local leadership, and responsive to IWRM resource-balancing realities (see elements of WUA strategy in Appendix 4).

It had thus arisen that the process of developing the (smallholder) WUA Business Plan exercised the collective will of members to define strategic water interventions for local smallholder benefit. Participation in water-resource decision-making, thereby ensuring meaningful uptake of water and giving effect to water allocation reform at a local level, are central features of the Hewu Dalubuze strategy. The WUA legislation as it stands, and the DWA-supported institution-building processes gave a positive intermediate outcome, as intended, and a legally compliant Business Plan. This was a very successful institutional establishment process driven by the regional DWS office, demonstrating broad-based IWRM in action at the most local level. However, this small initiative with substantial promise could not progress to any level of implementation or even keep the WUA functioning without additional financial and technical support, which was not forthcoming.

At national level around the same time, Water Allocation Reform as a national transformation project was seen to have failed, and WUAs, from a ministerial perspective (and in the context of the stated Irrigation Board transformation disappointments set out clearly in the 2013 policy review), were seen to be a systemic impediment to necessary reform. As a result, WUA support activity vacillated, and without funding from DWS, the WUA activities ceased to have purpose. The case at Hewu Dalubuzwe highlights an unfortunate and unintended outcome of the 2013 Policy Review that proposed the de-establishment of WUAs. The Hewu Dalubuzwe WUA was a practical, locally-accessible institutional vehicle that people invested in heavily in their striving for local food and economic benefits from smallholder irrigation and runoff farming. The momentum and interest was lost with the DWSs ongoing uncertainty about whether or not WUAs would soon cease to exist.

5.3.5 Conclusions from the Hewu Dalibuzwe WUA case study

A number of valuable lessons can be derived from the WUA case study.

People engage in planning because they want outcomes, not plans. At Hewu Dalubuzwe it was remarkable that village people from distant locations made a consistent effort to get to WUA Business Planning meetings, often with very limited personal financial resources to pay for transport, so that they could attend sessions and contribute. This was done in the hopes of follow-on implementation, not just for the paper outcome of the Strategic (business) Plan, which for them was a necessary step but not a particularly valuable outcome in itself. At the end of the planning process, people were eager to implement.

Land and water resources are available and under-utilised. There was a strong interest and desire on the part of the Hewu Dalubuzwe members (including Mbekweni village irrigators who were part of the WUA) to identify how to convert the substantial water and land resources that they have at their disposal into an economic benefit. Land availability was generally not limiting, but water and related financial factors were articulated as primary reasons for under-use of available resources.

The (smallholder) WUA is a purposeful developmental vehicle. In the face of agricultural and water development challenges, the WUA became a suitable vehicle for generating solutions. The Strategic Business Plan that was developed provided a clear road-map for the WUA members to initiate action, and as a submission to the Minister has a convincing legality to it. The NWRS-2 anticipates collaborative effort and promises a change to heavily developmental WUAs with institutional muscle and *“...(strong) linkages to broader government and private sector programmes of redress in land, agriculture and business. Compulsory licensing is required in stressed catchments to ensure that water is made available for HDIs. This (further) requires implementation plans”* (DWA, 2013a:12). In addition, the NWRS-2 identifies the new DWA Agricultural Water Use Development Finance Programme (i.e. the current Resource Poor Farmers Subsidy), which, it says, will contribute significantly to the WAR programme through its impact on subsistence and small-livelihood enterprise water uses. The WUA strategic plan and budget forms a structured platform for such funding applications, providing context on the project site and clearly prioritised interventions that people themselves have identified. Despite this congruence, the R60 000 funding that was requested in the Business Plan to keep the WUA functional in its first year of work, was not provided.

Agricultural water is important, not just ‘irrigation’. While WUA functions typically revolve around irrigation activities and the coordination of other water users within the WUA area of operation, the importance of broadening this understanding to include water-harvesting techniques was adopted and pursued in the planning process. While water harvesting is sometimes misunderstood as referring to roofwater harvesting only, the range of agricultural water practices also includes interventions which have major volumetric impact, such as ‘flood-water harvesting’ or the ‘saaidamme’ approach found at scale in the Northern Cape (Denison et al, 2011). ‘In-field’ water harvesting methods developed for maize and vegetable production in moderate rainfall areas hold much value in realising aspirations for traditional, maize-bean-pumpkin cropping. There are ideal

opportunities for such interventions in the Hewu Dalubuzwe WUA area, many of which would better serve the diverse interests and needs of the WUA members and would not require the heavy investment of irrigation costs.

WUA Policy re-direction has an unintended outcome. The WUA establishment process led to a strategic planning process for improved water uptake through a range of agricultural initiatives and locations (Appendix 3) during 2011-2012. The shift in WUA status in national policy, with the proposed de-establishment of WUAs, resulted in an unintended outcome, where HDI farmers' progress to achieve much-needed local food and economic benefits from smallholder (irrigation and water-harvesting) farming was effectively stalled due to the DWSs lack of clarity on the status and future of WUAs.

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Chapter 6 Land Administration Institutions and Implications for Women in Agriculture at the Research Sites

C Murata & J Denison

6.1 Introduction

Research interest in productive land has proliferated exponentially over the post-colonial era in Africa and elsewhere, attracting attention from development researchers and practitioners, academics and policymakers around the globe. This trend is both influenced by and a reflection of the growing recognition worldwide that rights in and access to land is critical to the wellbeing of people, particularly poor rural households living in the developing world, including Latin America, Asia and Africa (IFAD, 2008). Accordingly, at a global level protagonists have argued that land is an economic, social and political resource that is central to livelihoods, especially in agrarian communities. Socially, land is a critical factor around which people form social identities and organise their day-to-day social lives. Land is also an essential political resource that can substantially influence how power relations are defined and negotiated between individuals, within households, and even across the gender categories (IFAD, 2008). Access to and rights in land is crucial to the lives of rural people whose livelihoods largely depend on land and land-based production processes.

The contemporary development discourse, which since the 1990s has predominantly been framed within the theory of sustainable development, has added significant impetus to research interest in productive land. Taking the understanding that sustainable development is characterised by access to assets, resilience capacity, and agency, scholars in this theoretical discipline argue that access to and secure rights in productive land is critical for sustainable development. They frame their case thus: secure access to land reduces vulnerability to hunger and poverty, influences interest and capacity to invest in land, and enhances poor people's resilience to external shocks (IFAD, 2008), which can include drought, national economic depression, and even the death of breadwinners within households.

The former homelands of South Africa have endured long and complex histories of territorial manipulation, social engineering and perpetual reconfiguration of land administration institutions which are distinct from other areas of South Africa. Debates over rights to land become as interesting as they are complex to unravel (Wotshela, 2004; Hendricks, 1990). Among other things this has created an enduring legacy, with a disjuncture between *de jure* narrative or official customary land administration practice and the *de facto* situation as it is defined, understood and experienced by the local farming households (Okoth-Ogendo, 2008; Cousins, 2008).

Interest in the subject has been further fuelled by a growing interest in feminist studies, with the objective of advocating for the rights of and opportunities provided to women and young people to access and use productive land. This is largely informed by the understanding that women are the

majority land-users in South Africa, as well as in many other countries. It is widely argued that women's failure (both real and perceived) to enjoy secure rights on land is largely caused by the existence of traditional or indigenous African land administration regimes which are presided over by hereditary chiefly institutions with customary codes of practice. The view is that customary law regards women, unmarried men and girls as social and legal minors who cannot enter an agreement, own property or represent themselves in court.

The main objective of this chapter is to present a comprehensive discussion and analysis of the influential institutions of land administration that affect the rights and opportunities of small-holder farmers, especially women, living in communal lands. In this work, institutions are defined as the rules of the game, and organisations are the players (North, 1993). There are both formal and informal institutions. Formal institutions include written rules and agreements that govern contractual relations and corporate governance, constitutions, laws and policies. Informal institutions include codes of conduct, societal norms, culture and beliefs (Menard & Shirley, 2008). Organisations are constituted groups or structures of people whose mandate is to formulate and enforce the institutions, and include parliaments, political parties, trade organisations, civic organisations, traditional leadership, municipalities, and marketing boards. Discussion of these institutions is done in a historical manner, looking at a selected set of relevant state policies from the colonial era to democracy. The discussion of policies is complemented by an examination of colonial perceptions of traditional/African land administration systems in relation to rights and security of tenure embedded in the systems.

6.2 Approach to the Land-Related Research Effort

The research was done using two main research techniques: a literature review and fieldwork. The former was mainly aimed at giving theoretical guidance to the study and pulling out historical and contemporary, relevant land administration policies in order to position the study and its findings in current debates and compare it with work done elsewhere. Relevant academic literature that frames the thinking around the administration of communal (traditional) land tenure systems was examined. This exercise was followed by fieldwork, during which primary data was gathered. While the literature review opened the study process, later in the study the two research techniques were continuously and iteratively used by comparing findings from the fieldwork with the findings of work conducted elsewhere.

The empirical part of the study was conducted using quantitative and qualitative methods, as well as various data collection techniques, tools for data analysis, and methods of data presentation.

Quantitative techniques were used to identify and enumerate households with and without land, the number of land units, the sizes of land units, and cropping intensity. The statistical information obtained was useful in giving a picture of the pattern of land distribution, as well as an indication of the amount of land available to farming households. Gender-disaggregated statistical figures about land holding, water access and other resources necessary for farming also laid a much-needed empirical platform to engage with and draw conclusions around the topic of gender opportunities

and constraints. The figures alone, however, cannot explain certain things, such as how or why household A does not have an arable field while household B has hectares of land. Neither can the figures tell the story of what happens in the processes and procedures of acquiring land, or expose the underlying inter- and intra-household contestations and interests that play out in the broader agrarian sphere.

The series of data-collection activities started with a census survey of arable land parcels at each of the three sites. This was done using Google[®] maps and GIS software to demarcate and measure all land parcels located within the umzi (homestead) boundary. Arable lands lying outside of this boundary were not measured, as it was not possible to know which arable field belonged to which homestead.

Following this, the mixed-methods approach (discussed in chapter 2) was used to conduct in-depth land studies over a period of three and a half years. During this time arable plots were visited four times a year to record cropping activities, so that final figures of average cropping intensity could be calculated. In addition, all three tiers of arable land (where they existed) were measured: the *isitiya* (for vegetable cropping), the *igadhi* (for staple crops such as maize, beans and pumpkins) within the umzi boundary, and the *amasimi* (arable fields used in the same style as the *igadhi*, but lying outside of the umzi boundary). These quantitative techniques were complemented with open-ended interviews aimed at getting explanations for the observed state of cropping intensities.

Rights to control and access land presented a more complex and perhaps sensitive terrain in that a discussion on the theme would inevitably tread on village and even intra-household politics. This posed the likely situation in which women, perceivably the weaker social group, would be inhibited to open up freely in the discussions. This risk was addressed by adopting a gender-sensitive approach. An interview schedule was drawn up for conducting interviews with the same set of selected participating households over multiple visits, and in households where both the wife and husband were present, each one was interviewed separately during alternative visits.

Rules and practices that individual household units observe and exercise are often not significantly different from the overall regime of village rules. In fact, the former often presents a microcosm of the latter. Taking cue from this hypothesis, we took some of the findings from individual informants – especially on institutions (rules) – and tested them at focus group sessions attended by the ten participating households, key traditional leaders, and a number of other villagers. We conducted a total of three focus group meetings, two of which were held in the village, and one that was held at a hotel facility away from the village. Additional focus group sessions were held with people in the local traditional leadership structures only, to discuss local institutions (rules) and processes of land allocation.

Both inductive and deductive methods were used for data collection which, along with the data analysis, was done cyclically. For example, individual reports on the workings of local land administrative institutions were later taken to focus group discussions for testing.

6.3 Literature Review of Communal Land Tenure

6.3.1 Traditional land tenure regimes and rights of access and control

Land in the former homelands of South Africa (Transkei and Ciskei), on which the three study sites are located, is held under the communal land tenure model. The term 'communal land tenure' is invariably used to denote African traditional or indigenous systems of land rights and access. While there are ongoing debates about what *de facto* African land tenure systems should be termed, it is generally agreed that these property regimes have officially been called communal land tenure systems since the time of colonisation till the time of African independence. This term is contentious because it implies collective ownership of land, when in actual fact traditional tenure combines both collective and individual rights. Drawing from various bodies of work, Cousins (2008:10) offers a detailed summary of how traditional African tenure systems used to operate prior to colonisation:

All members of a group had rights of access to land, derived in the first instance from membership of the group or in some cases from political allegiance of the subject to the political authority of the group. Rights in land could also be obtained through marriage, migration, friendship and formal transfer. The exercise of any right was always limited by obligations and counterbalanced by the rights and privileges of others. Individual security was great, provided that the necessary respect for the ethical code of the group was maintained. Often a number of personalities exercised rights and claims in the same piece of land. Land tenure was both communal and individual and can be seen as a system of complementary interests held simultaneously.

However, Delius (2008) warns that it is difficult to establish the true character of pre-colonial African property regimes, largely because Africans of these times did not make and leave records. Instead, efforts to reconstruct the pre-colonial agrarian past mainly rely on accounts by outsiders such as colonial officials, missionaries, travellers and explorers, all of whom had little understanding of African systems due to language limitations and differences in cultural traditions and practices, amongst other things. Consequently, African traditional land tenure systems were designated as communal perhaps mainly from the outsiders' understanding that land was held on 'communitistic or communal basis' with chiefs as either owners or trustees. Accompanying this are misconceptions that under such systems individuals have no established land rights, that land rights cannot be sold or otherwise transferred, and that rules of succession will automatically degenerate into fragmentation (Okoth-Ogendo, 1982). In contrast, traditional tenure systems involved clearly defined individual land rights (for instance over arable and residential plots), together with group rights (for example, in grazing lands and forests). "These are in fact mixed tenure regimes comprising variable bundles of individual, family, subgroup and large group rights" (Cousins, 2008:6).

Not only did traditional tenure regimes allow for individual rights, but more importantly they offered security of tenure to land holders. The notion of individual and permanent rights in land was noted by Isaac Schapera in 1943 (Delius, 2008), who wrote that in Tswana-speaking communities, once a man was allocated land it belonged to him until he died and would be passed down to his heirs. No chief would arbitrarily claim it. In Pondoland, where Lutengele is situated, historically there are no

cases of villagers contesting ownership of fallow arable land, regardless of how long it had not been used. Rights in arable and residential land were inheritable and the right only lapsed when all kin left the community (Delius, 2008). Chiefs had jurisdiction over people and land, but not ownership in its Eurocentric conception (Hunter, 1936); when dealing with property rights, it is dangerous and inappropriate to universalise the application of terms such as 'ownership' and 'trust' (Bennett, 2004).

In addition, traditional land tenure systems offered right of access and control over land to women. In her early anthropological work in Pondoland and Zululand in the 1930's, Monica Hunter alludes to the freedom that women enjoyed with regard to rights to access arable land. She says that women had the freedom to cultivate anywhere in the community, provided they did not encroach on someone's plot. Such land would become hers just by virtue of having turned its soil by her hoe (Delius, 2008).

Colonisation and apartheid brought significant modifications to the traditional tenure regimes. Hendricks (1992) argues that state-sponsored forms of communal tenure were far different from the original pre-colonial African tenure systems. The State preferred to maintain and make official a distorted form of the African tenure system, mainly because it played into the hands of the dispossession and accumulation agendas of the colonial administration. It became more convenient and necessary to concentrate all powers over land to chiefs/headmen from the early 1900s until the peak of apartheid because these institutions had to – and did – play a critical role in the indirect rule administration model that the state was pursuing. In place of the traditional institutions that were used to govern African land tenure systems (such as community membership, ethnic traditions, cultural observances and social ethics), the state brought in the Roman-Dutch Law to provide the legal institutional framework under which access to land would henceforth be administered, interpreted and understood. The law superimposed foreign conceptual models such as 'sovereignty, ownership, and absoluteness' onto the traditional African property discourse. Not only were these terminologies inappropriate, but the Roman-Dutch Law's broader conception of property rights was at stark variance with local traditions. Whereas in Roman-Dutch Law, entitlement to property means *"to exclude other people from use of that property,"* the African indigenous law of property was more concerned with people's obligations towards one another in respect of property, than with the rights of people in property. In other words, the relationships between people were more important than an individual's ability to assert his or her interests in property against the world" (Du Plessis, 2011:51).

Of course the extent of distortion and attempts at modification varied across regions of the country. In the Cape Colony for instance, there was an attempt at individualisation that was set in motion by the promulgation of the Glen Grey Act 29 of 1894, which legalised the principle of one-man-one-plot inheritable only on the basis of a male primogeniture succession model. In contrast, there were no attempts to individualise land access rights in Natal. Instead, the State sought to promote and consolidate the existing customary tenure practices by codifying them. However, codification was done in a manner that exaggerated chiefly power and control over land. Until at least the early twentieth century, the Transvaal did not experience active state intervention in land tenure matters.

The beginning of Union Government saw the start of active territorial manipulation by the State which swept across all regions of South Africa and significantly modified land holding in the predominantly black rural areas. In 1913 the infamous Native Land Act was promulgated. This set aside about 7-8% of South Africa's surface land as 'reserves' for occupation by blacks only. This was followed by the Native Trust Land Act of 1936, which added 6% to that amount, giving a total of 13% of the country's land to black people (Beinart & Delius, 2015).

6.3.2 Security of rights under communal/traditional tenure system

The State's efforts to achieve total control of black people's access to productive land was complemented by sustained efforts to reconfigure the political landscape of the reserves that later became homelands, and subsequently (Transkei in 1976 and Ciskei in 1981) independent states. The enactment of the Native Administration Act 38 of 1927 and the Bantu Authorities Act 68 of 1951, amongst others, further reinforced and concentrated power in traditional leadership institutions (Du Plessis, 2011). In addition, in some villages in the former Ciskei and Transkei, headmen were appointed by the State without taking into consideration matters of royalty and lineage. This significantly eroded the credibility of traditional institutions of leadership.

Insecurity of tenure in the former homelands has been noted in several influential documents including the South African Constitution (1996) and the 1997 White Paper on South Africa's Land Reform Policy (Department of Land Affairs, 1997). The White Paper (1997) suggests that black people on communal lands enjoy second-class status and hence there is very little legal defence to protect them from arbitrary dispossession by those in power, including the State and traditional leaders. In the former homelands specifically, the problem is further compounded by the fact that different tenure systems and rights exist on top of each other. Freehold, Permission to Occupy, Quitrent, Trust and unregistered communal land tenure systems were and are still found in these places. So much has happened to these tenure systems through State intervention that some have been greatly modified, and some even overlap. This has led to uncertainty around the rights which landholders can claim and assert. Rights of tenure were further complicated by the State's programme of forced removals, which saw thousands of black families being evicted from the so-called white lands (including farms) and dumped in the reserves. Some evicted families were placed on land belonging to other families, where they have since lived for decades as "squatters" or *marhanuka* (De Wet, 1995). This created additional layers of tenure based on primary and secondary occupational accounts.

Insecurity of rights is not a characteristic inherent to indigenous or traditional property regimes only. However, in the case of South African land administration, insecurity of rights stems from the fact that these property regimes have been dislocated from the local institutions that defined and legitimised them (Ogendo-Okoth, 2008). From the 1980s in the Ciskei and Transkei (although to a lesser extent in the Transkei) the Tribal Authority system substantially lost its supremacy over village administration to civic organisations (including the South African Civic Organisation or SANCO), which were championing rights-based civil politics. This exacerbated the already-growing confusion over the role and legitimacy of traditional institutions. The confusion was further compounded in the

early 1990s when the National Party government issued a land reform programme which, among other things, legally banned the recognition of old-order tenure arrangements, including PTO certificates (Ntsebeza, 1999). The State abolished PTOs but did not issue a replacement, and the subsequent dismantling of homeland bureaucracies during the transition to democracy left a gap in local-level state-supported land administration structures (Hall, 2009).

6.3.3 Institutions of land administration in South Africa: A de jure account

An understanding of the history of land institutions is critical to our appreciation of the New Institutional Economic's principle of path-dependence, and has the potential to shed light on how past institutions of state control have affected the current affairs of land administration in contemporary communal South Africa.

Colonial and apartheid land administration institutions

Perhaps one of the earliest influential state-sponsored land administration institutions was the Glen Grey Act 25 of 1894, passed by the parliament of the Cape Colony. The Act was first applied to the residents of Glen Grey district, with the aim of extending it into other districts later. Under this Act, land was allotted to blacks at the governor's permission. Land parcels of four morgen were allotted to black males only. This land could not be bequeathed by will, or mortgaged. Upon the death of the land-holder, the land would be passed down to family members according to the law of male primogeniture (i.e. to the oldest surviving son). If there was no male heir, the governor would grant the lot, or proceeds of the sale thereof, to the female heir, and the allotted land was deemed to be held under communal tenure (Thompson, 1991).

This was followed by the Natives Land Act 27 of 1913. The Union Government's 1913 Land Act became the initial legislative framework in a long-time project of territorial segregation and social engineering that climaxed in the late twentieth century (Murata, 2007). The Act confined African rights on land to reserves that eventually became permanent or scheduled 'Natives areas'. Nineteenth century wars of dispossession had already placed a huge proportion of South Africa under White control. The South African Development Trust, and Land Act 18 of 1936 that was later enacted to release more land to blacks, did not substantially alter this position (Murata, 2007). The Trust had jurisdiction over the control and occupation of the land, which it exercised through its officials, normally the Native Commissioner and field officers. Land was allocated on the basis of lease-hold tenure, sometimes called Trust tenure (Van Averbek, 2013). An annual rental was payable by each plot holder in return for the right to occupy and use the land (South Africa Union, 1954).

Earlier on, the Native Administration Act 38, subsequently renamed the Bantu Administration Act of 1927, had been promulgated. The Act gave the Governor-General the power to banish any native or tribe from one area to another if it was deemed expedient for national interests. After about two decades, the Group Areas Act 41 of 1950 gave regulation to the acquisition, alienation and occupational rights to land, providing for four independent nation states (the so-called homelands of

Transkei, Bophuthatswana, Ciskei and Venda) and six self-governing territories (KwaNdebele, QwaQwa, Gazankulu, Lebowa, KwaZulu-Natal and KaNgwane).

Proclamation R5 of 1963 paved the way for passing regulations used to establish and control irrigation schemes in the homelands. The Proclamation empowered the Minister of Bantu Administration and Development to declare by Government Gazette any land deemed appropriate for the establishment of an irrigation scheme. Such land would then be transferred from its control by the local Tribal Authority to the South African Native Trust. Land on the schemes was held on a 'permission to occupy' basis (Van Averbeke, 2013). In 1969, Proclamation R188 was passed to further modify traditional tenure systems. Land governed by this proclamation was held under Permission to Occupy (PTO) and Quitrent tenure systems (Cousins, 2008). Whereas both Quitrent and PTO are part of the contemporary communal land tenure system, the former applied to surveyed land while the latter to un-surveyed land. Land under these property regimes was issued by district magistrates in collaboration with local traditional institutions such as headmen and Tribal Authorities (Ntsebeza, 1999). PTOs were issued exclusively to male heads of household.

Post-1994 land institutions

The post-1994 administration declared its intention to embark on a land reform programme during the Convention for a Democratic South Africa (CODESA) negotiations. The main driving motive of the programme was, and still is, to redress skewed land distribution patterns and insecure land tenure systems caused by the State's previous land administration policies. However, implementation of this programme since 1994 is widely acknowledged as a slow process. By 2008 only 5.2% of the 24.6 million hectares targeted in 1994 had been distributed (Lahiff et al., 2008). While restitution and redistribution progress is slow, the huge challenge of tenure reform, and more specifically the provision of mechanisms for secure tenure in communal areas, has not been addressed in rural areas. Thus far, efforts to implement tenure reform have mainly been directed at farm workers who lost their land rights during displacement, rather than at the majority of rural dwellers who have limited rights to the land they have access to. Lahiff et al. (2008) provides an overview of land reform between the years 2005 and 2008 with specific focus on redistribution and restitution programmes, and notes that tenure reform in communal areas received relatively little attention from policy-makers or implementers during the period under review.

One of the first Acts of transition was the Upgrade of Land Tenure Rights Act of 1991, which promised the conversion of apartheid land tenure to ownership. This Act, intended partly to facilitate the transfer of land to tribes, was not implemented. The Act was followed by the Development Facilitation Act of 1995, which introduced measures to facilitate and speed up the implementation of reconstruction and development programmes and projects in relation to land. It is the key spatial planning and land use management legislation of the post-1994 dispensation. In 1996, the Interim Protection of Informal Land Rights Act (IPILRA) was promulgated. This provides for the temporary protection of certain rights to and interests in land which is not otherwise adequately protected by law. The Act protects the occupation of persons who have been living on State land for a specified time. It includes all persons living on land in the former homeland areas, including traditional areas, for whom land is held in trust by the State. In the same year, the Communal

Property Associations Act of 1996 was introduced. This enabled communities to form juristic persons – to be known as communal property associations – in order to acquire, hold and manage property on a basis agreed to by members of a community in terms of a written constitution.

The White Paper on South Africa's Land Reform Policy of 1997 provided for the need to address tenure security problems and stipulated that all rights in land be registered. The White Paper demanded a move away from second-class to more secure land rights. It also stipulated that people are given the right to choose their preferred tenure system, to develop tenure systems consistent with the constitution, and to develop sound adjudicatory institutions (DLA, 1997). In essence, the White Paper stipulated that permits should be replaced by enforceable rights, and that ownership of communal land should be transferred to its current occupants (land users). Unfortunately, it did not indicate how this should be done.

The Communal Land Rights Act 11 of 2004 (CLaRA) attempted to provide a roadmap on how ownership of communal land could be transferred to its users. CLaRA proposed, among other things, that land ownership be transferred from the State to traditional communities living on communal land in the former reserves. It also proposed that individual land rights within communally-owned areas be registered, and that traditional councils administer the land and represent the 'community' as owner (DLA, 2004). CLaRA thus sought to improve tenure security by proposing to register land owners. It also sought gender equality in land holding by requiring land rights to be registered jointly in the name of all spouses. CLaRA was strongly opposed by civil societies and rural communities, who argued that it undermined rather than secured the land rights of rural people. It was also argued that the Act disadvantaged women who have access to land through their families but are not spouses. The lengthy processes around the development and subsequent withdrawal of CLaRA, and the absence of detail on critical aspects in the current Green Paper, underscores the fundamental difficulty of defining a politically acceptable and legislatively practical solution to communal tenure reform.

Thus far, the latest version of the government's land reform policy is offered by the Green Paper of 2011. However, the paper has been widely criticised for its failure to give direction and its lack of substantive content, amongst other things (PLAAS, 2011). While there is consensus that detail is lacking, the document does define a four-tier land tenure system, of which Communal Land Tenure – which is of particular interest to this assignment – is one (i.e. the fourth tier). In this regard, the Green Paper proposes setting up Land Rights Management Boards, and lower-level Land Rights Management Committees, composed of representatives of residents in a specific rural environment or settlement/s. The envisaged powers and functions of the proposed Land Rights Management Boards and Committees are not, however, defined. Further detail on communal tenure is limited and is effectively postponed by the statement that communal tenure requires its own separate policy due to: the complexity of communal tenure; the need for extensive consultations to achieve constitutional compliance; and the final nullification of the Communal Land Rights Act (CLaRA) by the Constitutional Court in 2010. That status of ill-defined institutions for communal land tenure arrangements and administration thereof thus persists without any vision of how this might be resolved, with long timelines needed for resolution at national level.

6.4 Empirical Findings at Lutengele, Sirhosheni and Mbekweni

The detailed findings on land size and utilisation are specific to the 30 case-study households. Given that a central theme of the research was on aspirations in relation to crop production, the case study households were selected from households with real interest in pursuing agricultural activities (amongst other factors, as discussed in Chapter 2). The initial representative socio-economic scoping survey (n=164) identified household access to arable portions, as well as their recent agricultural activity. It was recorded that 87% of respondents had access to arable land within the homestead and 69% had access to an *intsimi* (distant field). Of those households with access to arable land, 63% had cropped in the homestead gardens in the last year, while 49 homesteads (44%) had planted in their fields in the previous year (2012-13 cropping season).

The agriculturally active sub-group of the 164 respondents was thus determined. Across the three villages, it was calculated that 55% of the total number of respondents who were interviewed were agriculturally active within the boundary of their homesteads in the last year (87% with access x 63% who cropped) and 30% of all respondents were agriculturally active in fields in the last year (69% with access x 44% who planted). More detailed information was then obtained from the 30 in-depth case studies which were selected from those households who were identified to be agriculturally active.

While findings on *land institutions, tenure challenges and land availability* from the 30 case study households are expected to present a realistic sense of the wider situation in the villages given the commonalities, the findings on *fallowing and utilisation* must be understood to be derived from this smaller part of the agriculturally active population (55% active in home-gardens and 30% active in fields).

6.4.1 Landholding mechanisms and record-keeping

The study found that all participating households had access to and control over both residential and arable plots. In cases where there was some form of paper registration, the land was registered in the names of household heads, irrespective of gender. Permission to Occupy (PTO) certificates were found at Mbekweni, while at Sirhosheni and Lutengele landholders get documented in the record books of traditional leaders. Respondents reported that although land is registered in the name of one household member (usually the husband in households where there is a husband), this does not limit other household members' rights to access and control the land. All the respondents (100%) pointed out that registering land in the name of the head of household is in keeping with the Xhosa culture, but the land itself is the property of the collective household, with all its members – including women – enjoying equal rights of use.

In actual fact, rights in land are varied, including rights to use, to exclude others, and to dispose of the land (Van Averbeke, 2013). The researchers thus probed into which household member(s) had the power to exclude others from using the land, and to dispose of the land. At Sirhosheni and Lutengele in particular, respondents found it difficult to respond to these questions, mainly because

the concepts of 'exclusion' from land and 'disposing' of land do not form part of their life experiences. Respondents did not understand how it could be possible for a household member to sell land, because land belongs not to an individual but to all who share membership of that household. This corroborates views of scholars such as Cousins (2008), Okoth-Ogendo (2008), Delius (2008) and Kingwill (2008), who argue that concepts and terminology such as 'ownership', 'sovereignty' and 'power to exclude' are foreign to the original tradition of African customary law of property.

6.4.2 Land parcels and size

At all three study sites, arable plots are found in distinct land parcels. At Lutengele and Sirhosheni, a household would ideally have three distinct arable lands, namely the *isitiya*, the *igadhi* and the *intsimi*.

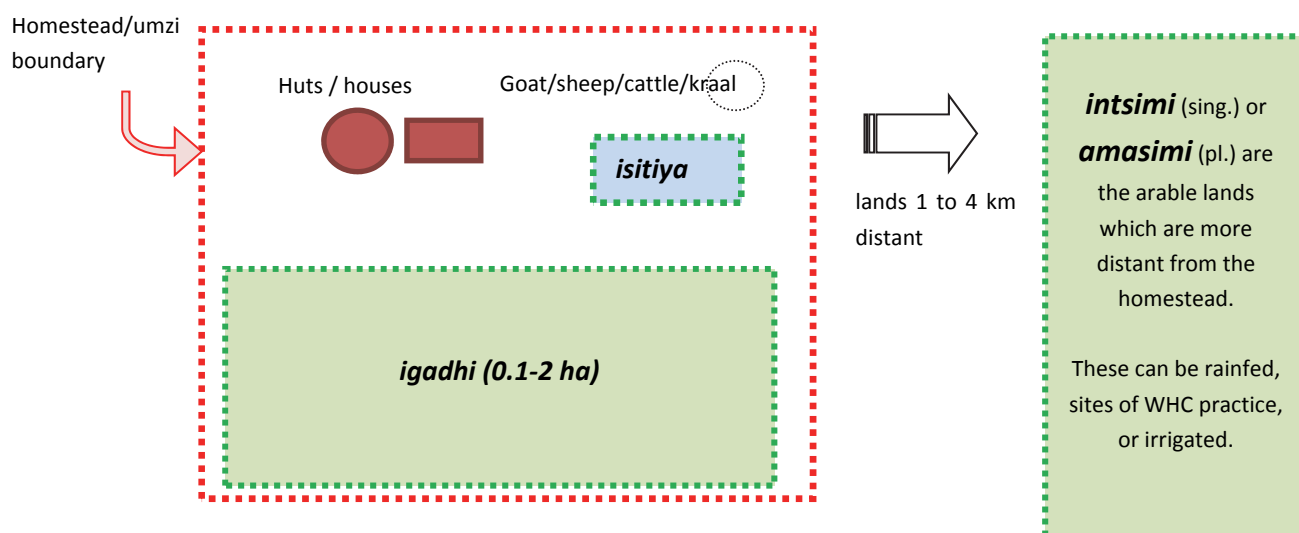


Figure 6.1: A schematic of the spatial layout of land parcels at the study sites

An *isitiya* is a vegetable garden within the homestead boundary. The *isitiya* is often used for growing kitchen vegetables such as spinach, cabbage, carrots, tomatoes and onions. It is often hand-watered with water from rainwater tanks or from springs and rivers. Water is fetched and carried by head or using donkeys, wheelbarrows or oxen-drawn sledges. The garden is fertilised using animal manure and household refuse.

A dry-land plot located within the homestead or umzi boundary is locally known as *igadhi*. The *igadhi* is used to intercrop sets of 'traditional' crops, including maize, beans and pumpkins.

The third land parcel is an arable field called the *intsimi*, which is often relatively distant from the homestead (anything from 300 m to 4 km away). The *intsimi* are used in a similar way to the *igadhi*.

In Mbekweni, households have access to only two types of land parcels (the *isitiya* and *intsimi*), making the situation there slightly different to the other two sites. The spatial layout of Mbekweni was methodically done by government officials following the recommendations of a betterment planning programme that was strongly promoted by the National Party government in the late twentieth century. Mbekweni is also different in that, unlike at the other sites, its arable fields are irrigated using water supplied by an irrigation scheme that was set up by government during the time of the village establishment in the late 1970's.

At each site, the size of arable land portions that farmers are using on each of the three identified land parcels were physically measured, shown in Table 6.1 below. While this sample size (n=30) is not intended to provide rigorous quantitative extrapolation to the wider population, they do provide a good indication of the general prevailing situation. The data provides a sound basis for exploring tenure challenges and informed the work on household agricultural aspirations which were linked to the three production spaces, each characterised by a particular approach to farming (e.g. scale, locality, purpose among other, and discussed in detail in Chapter 7). These parcel sizes resonate with wider experience and with observations made across the villages.

Table 6.1: Average size of land-holdings in case study households (n=30)

	Households (no.)	<i>Isitiya</i> (m²)	<i>Igadhi</i> (ha)	<i>Intsimi</i> (fields) (ha)
Lutengele	272	960	0.58	0.98
Sirhosheni	263	310	0.55	2.42
Mbekweni	380	780	0	0.56
Average		680	0.38	1.32

The size of the *isitiya* was in all cases less than 1000 m² (some 25 x 40 m as an indication) and smallest in Sirhosheni, which also had the largest fields (interestingly conspicuous in satellite imagery due to the red doleritic soils that prevail). The *isitiya* and *ighadi* sizes in Lutengele were the largest of the three villages, and in cases, the fields are located immediately adjacent to, and an extension of the homestead; a local response to the steep slopes and absence of flatter arable portions. At Mbekweni, with the smallest average land allocation, the *igadhi* as defined here, is absent due to the relatively dense settlement planning at the time of villagisation, and the fields are relatively smaller but importantly were allocated (and sized) as irrigated plots at the time of village formation. Across the three villages (n=30), the average *isitiya* size amounted to 680 m², the average *ighadi* totalled 0.38 ha, while field sizes measured up to an average of 1.32 ha.

These findings are typical of the region. In a study on fertility of home-gardens and fields, Van Averbek et al. (2008) consolidated information on population and land allotments in the former Transkei area from four sources and documented that 434 000 households were located in rural locations (i.e. not urban or peri-urban). Of these, 276 000 households (64%) had access only to a home-garden of average size 0.4 ha (i.e. no fields), while the remaining 158 000 (36%) of rural households had access to the both home gardens (0.4 ha) and fields of between 1.3 and 2.2 ha in

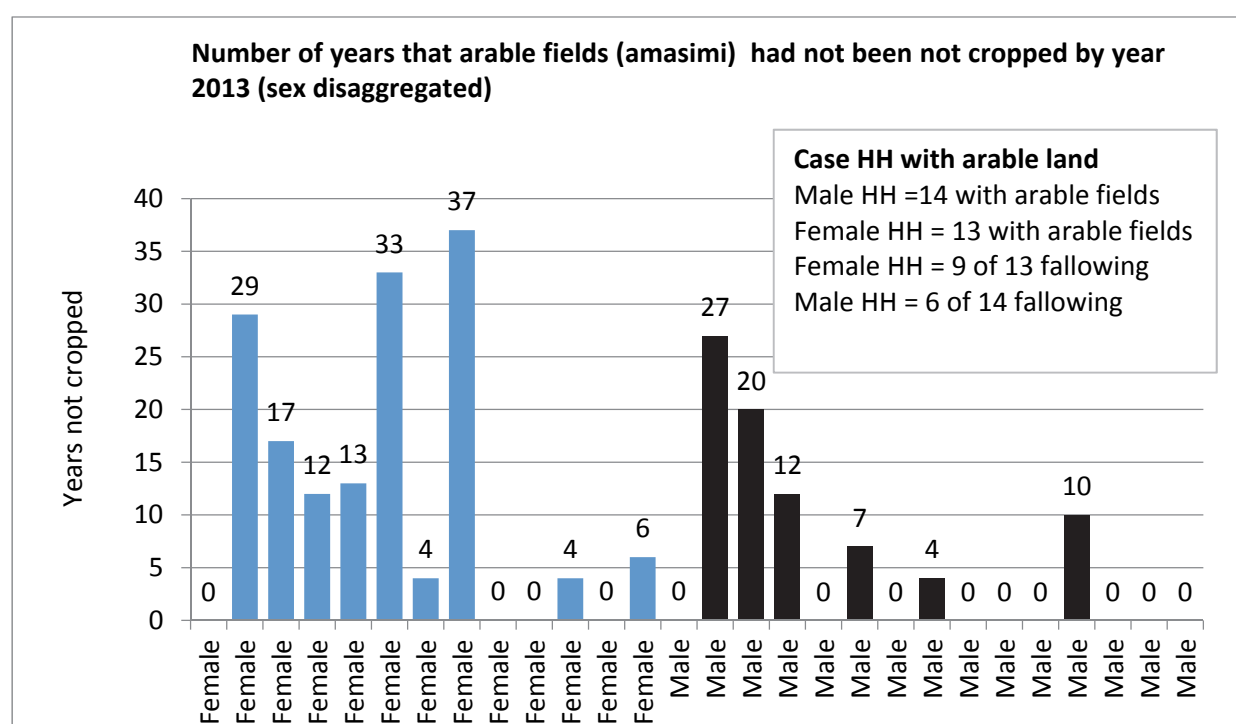
size. It is therefore reasonable confirmation that the selected villages sites and case-study homesteads represent a wider reality, given that the average size of the *igadhi/isitiya* that was measured in the present work ($0.38 \text{ ha} + 0.068 \text{ ha} = 0.45 \text{ ha}$) is close to the 0.4 ha of the 2008 study, and the average field size of the case study sites (1.32ha) is also within the range of field sizes documented in the 2008 study.

6.4.3 Incidence of use of land available for cropping

Fallowing

Land parcels at the study sites are generally of modest sizes, yet the research identified several cases of land fallowing. At Lutengele, fields had not been used for such a long time that some respondents had almost forgotten that their household has a field. This goes beyond land fallowing, to a situation where farming is postponed indefinitely.

The data presented in Figure 6.2 shows that by 1980, all but one household ($n=27$) were cropping in their arable fields. By 1995, the number of uncropped fields had increased by three only. In a period of 12 years, from 2002 to 2014, a total of nine households stopped cropping their arable fields. This means that between 1977 and 2014, a total of 15 households out of 30 have entirely stopped cropping their arable fields.



Note: Two of the 30 case study households did not have access to arable fields thus $n=28$.

Figure 6.2: Durations of land fallowing at the research sites (sex disaggregated)

One of the interesting findings is that the majority of fallowed fields (amasimi) belonged to female-headed households (Figure 6.3). In fact, out of the 13 female-headed households who reported having arable fields, only four are cropping them. Of these four, two are using the fields through

sharecropping. In this arrangement they do not work the land themselves, but instead allow farmers with energy and resources to use their land and provide them with a percentage of the harvested crop in return.

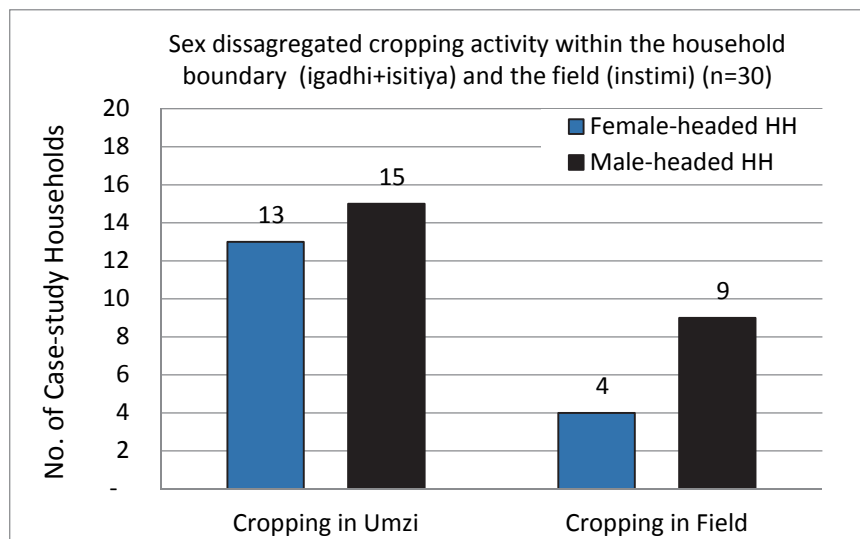


Figure 6.3: Number of households cropping their various land portions in 2012 (sex disaggregated)

While reasons for the underutilisation of land were varied (e.g. a lack of fencing, the distance from home, a lack of irrigation water, a lack of farming equipment and the theft of crops), female-headed households often cited their lack of husbands (*'andina ndoda mna'*) as one of their constraining factors. Findings such as this suggest, among other things, that the influence and effect of patriarchy in the South African agrarian domain is diverse, and warrants more careful consideration than is often the case in the wider discourse. At Sirhosheni, all female-headed households reported that they had not cropped their fields for periods exceeding five years. At this site, the Vayisi household reported that it had not cropped its field for 37 years. The household daughter who inherited the land upon the death of their parents was born after the family had stopped using the field. She never saw her family use this field, let alone has turned its soil with her own hand. Regardless of this, she regards the field as the family property under her control, without feelings or thoughts of insecurity of tenure.

There are several cases of arable fields that have not been used for decades at the study sites. A case in point is Lutengele, where some respondent stopped using their fields due to forced relocations that they suffered during an inter-tribal cattle-theft war of the 1990s. Contrary to orthodox perceptions about traditional leaders repossessing unoccupied lands, these pieces of land have not been contested by anyone or repossessed by the traditional leadership. The community recognises the land as the property of the individual households.

Land allocated to households can only get back in the hands of traditional or village leaders in one of two circumstances. Firstly, in the event that the household emigrates to another village, the land can be taken back by the traditional leadership and made available for reallocation to new land seekers. In practice this is a rare scenario because Xhosa households often belong to a much broader

web of extended family members, made up of uncles, cousins, nephews and nieces. Although these relatives may not be living in the same household, they are revered and their space in the household is actively recognised (*ngewase femilini*: meaning he/she is of our family). Often an emigrating household will give its land to these relatives, instead of submitting it back to village leadership.

Secondly, in situations where a landholder has proven to be a nuisance in the village (e.g. for being a serial thief or murderer), the village leadership can consult with residents, who may in turn resolve to chase that person out of the village, in which case their land gets repossessed by the chief. However, such scenarios exist more in historical narratives than they do in contemporary ones. The arrival of universal human rights, accompanied by binding national policies of democratic politics, has made it very difficult for communities to chase anyone out of their land. In addition, in the current dispensation, matters of criminal behaviour are the jurisdiction of the police and courts of law, not communities or traditional leaders.

6.4.4 Cropping Intensity

Cropping intensity refers to the sum of the areas of land cropped in a single agricultural year, divided by the area of the land in question, and is presented as a percentage. Thus a cropping intensity of 150% means that the field was cropped one and a half times in one year.

Measurement and field challenges

Cropping intensity was measured over the agricultural year and is a best estimate based on physical measurements of the cropped area at the time of fields surveys (October 2012 and July 2013), supplemented with detailed information from the food-grower/farmer.

The reality of production in the *isitiya* is unlike the *igadhi* or the *intsimi* (fields), and is characterised by frequent plantings of smaller beds of various vegetables. These multiple small plantings are prompted by frequent harvesting for food, by crop failure (due to drought or pests) during the growing season, and by the somewhat opportunistic availability of seedlings or seed. For instance, some farmers plant vegetables any time they obtain affordable seedlings or are given some for free. Re-cropping can take place during the growing period of the initial crop, or at the end of the season. The reality of this ad-hoc planting strategy made it difficult to accurately estimate cropping intensity, given that the intermediate measurements in the *isitiya* were based on the farmer's memory of plantings and re-plantings between the two visits (and physically demarcated in the *isitiya* with the researchers in order to allow measurement). To arrive at a reasonable estimate of the cropping intensity of the *isitiya*, the researchers had to adjust actual measurements of cropped areas with descriptions of crop failure and re-plantings that took place; a conservative stance was taken in doing this, thus tending to reflect lower intensities than memories perhaps suggested. While these field-research realities lead to a level of inaccuracy, the approach provides a reasonable (but likely conservative) best estimate of the intensity of use in the *isitiyas*, confirmed with numerous visits over the extended research period.

The issue of ad-hoc replanting was not the case in the *igadhi* and *intsimi* (fields) given the more extensive and uniform way of farming that characterises these. Here, typically maize, beans and

pumpkins, but also other field crops, are usually planted at one time at the start of the wet season, and were physically measured by the researchers augmented with more simple information from the farmers – either at planting or post-harvesting stage. The physical measurements that were made in the *igadhi* and the *intsimi* (fields) are therefore considered to be directly representative of the reality in the 2012-13 cropping year.

Findings on cropping intensity

The results show an average intensity of 175% in the *isitiya* (which average 680 m² in size across the three sites). On a site-by-site analysis, cropping intensity in the *isitiya* is highest at Lutengele (220%) followed by Mbekweni at 190%, explained by the higher availability of water due to storage tanks and hosepipe connections respectively. Although the tap water at Mbekweni is meant exclusively for domestic use, many households use it for garden watering though they are actively discouraged from doing so by the municipality responsible for domestic water service provision.

These intensities are typical of an irrigated scenario, where 160-180% cropping intensity is targeted in feasibility studies at field scale (Denison and Manona, 2007). The findings demonstrate that with some water provision, combined with the relatively very small scale and locality within the homestead, very high land resource utilisation is not only possible but actually practised. None of the water supply advantages are found at Sirhosheni, where until mid-2014 (the closing period of our data collection processes) distant low-lying streams and springs were the only source of water and the activity in the *isitiya* was largely but not exclusively a rainfed activity.

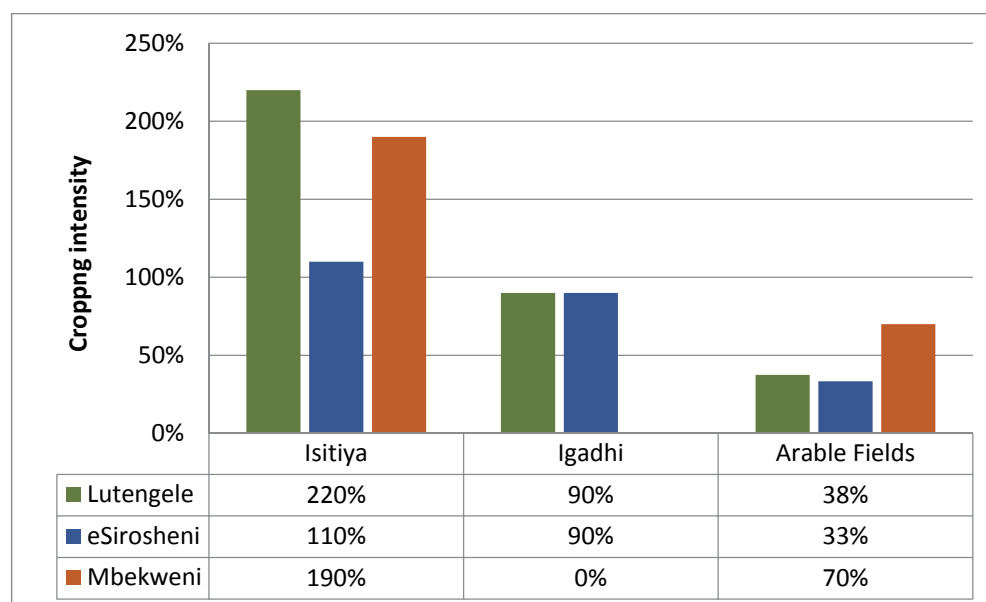


Figure 6.4: Cropping intensity for different land parcels

Igadhi arable portions are cropped similarly at 90% intensity in both Lutengele and Sirhosheni. Cropping intensity is lowest in the rainfed arable fields at Lutengele and Sirhosheni, with a higher intensity of 70% at Mbekweni. This is explained by the fact that during the survey period, and up to the last quarter of 2014, farmers at Mbekweni had some access to irrigation water using the old

piped scheme infrastructure, although mainly for supplementary irrigation and only by some farmers due to limited infield irrigation infrastructure. The high intensity of use in the *isitiya* and relatively high intensity in the *igadhi*, both located within the boundary of the umzi, is striking in comparison with the *amasimi* (fields) and re-iterates long-established trends of recession from fields to cropping areas within the *igadhi*.

6.4.5 Consolidated findings on land resource utilisation

The initial representative socio-economic scoping survey (n=164) identified access to arable portions as well as provided an indication of interest in agriculture, and frequency of use. It was recorded that 87% of respondents had access to a small garden (*isitiya*), 51% had access to a large garden (*igadhi*) and 69% had access to an *intsimi* (distant field) noting that many respondents have access to all three spaces, though more typically two. At Lutengele for example, most had access to an *isitiya* and *igadhi*. At Mbekweni, the small settlement plot sizes were sufficient only for an *isitiya* held by all, and most also had a field, but none had an *igadhi*.

Incidence of use by those who have access: The survey also showed that of those households with access to arable land, 63% had cropped within their homestead, while 49 homesteads (44%) had planted in their fields in the previous year (2012-13 cropping season).

First order approximation of overall arable land utilisation and intensity: The data from the two surveys was consolidated and is presented in Table 6.2. This provides a best estimate of land availability (access), incidence of use and intensity of use across the three villages.

Table 6.2: Indicative summary of land-holdings, use and intensity in the three research site villages

	unit	<i>Isitiya</i>	<i>Igadhi</i>	<i>Intsimi</i> (fields)
Percent of HH with access to land portions ¹ (n=164)	%	87%	51%	69%
No. Households with access to land portions ²	No.	800	466	628
Percent of those with access who cropped some of their land ³ (n=164)	%	63%	63%	44%
Average arable portion size (n=30)	ha	0.068	0.38	1.32
Intensity of use of those who cropped ⁴ (n=30)	%	173%	90%	47%
First order approximation of overall arable land available	ha	54	177	829
First order approximation of overall village arable land use intensity	%	109%	57%	20%

1. From household survey (n=164)

2. Extrapolated from 1. above, based on the household survey (n=164)

3. Use refers to cropping of some or all of the arable portion in the last year (n=164)

4. Field measurements and questionnaire data from 30 case study households. Intensity = (total area cropped in 1 year) / (total area available) thus 200% = double crop/yr.

The data in the table provides an indication of the available village land resource and the extent of utilisation for cropping. The relatively high overall intensity (109%) of the available resource in the

isitiya makes this an obvious priority for food production interventions these would build on existing activity, though relatively small in total land availability and noting only 63% of people who have land within the umzi, actually use it for cropping. The very low overall intensity of use of fields (inflated somewhat by the faltering irrigation system at Mbewkeni) still tells a familiar story of withdrawal from field production to more intensive production within the umzi (both in the *isitiya* and the *igadhi*). While this first approximation is only indicative in its absolute values, it provides strong evidence of preferences given the relative difference in overall utilisation, and thereby direction to interventions targeting food production.

6.4.6 Long term trends of shifting cultivating patterns from fields to households

The prevailing low incidence of use, cropping intensity and lengthy fallowing in the arable fields in particular, reflects conspicuous and shifting cultivating practices. Cultivation was observed to be moving away from the arable fields to the arable plots within the homestead/umzi boundary, i.e. the *igadhi* and *isitiya*. A triangulation of oral evidence gathered in the field, in which the elderly spoke nostalgically of “the good old times” during which households had abundant food from farming, along with the data presented in the above figures, enabled the researchers to construct a picture of the progressive decline of field farming reflected in the findings above.

Shifting cropping patterns in the Eastern Cape have been noticed and documented since the early 1970s (for example, Bundy’s seminal study in 1979 of the rise and fall of South African peasantry). In a study of smallholder farmers in the Gogela village in the upper escarpment of the Eastern Cape, not far from the Drakensberg, Murata (2010) found that field cultivation was at its peak from the early missionary era to the mid-1960s. Since the 1980s, farmers have been progressively shifting to cropping within the umzi boundary, where farmers practise intensive vegetable gardening in trench beds. Andrew and Fox (2003) studied farming patterns in the coastal Willowvale district using aerial photography from 1942 to 1982, and found that land area covered by fields dropped by 51%, that the no. of gardens increased more than four-fold, and that yields from gardens were much higher than yields from fields. They concluded that the shift from fields to gardens was a process of intensification that helped farmers to maintain yields in the face of resource shortages. Fay’s findings more recently and in the same area, reinforced the persistence of the trend, and recorded 82% of people active in home-gardens with only 11-37% active in fields in some way (Fay, 2013). Both sets of research highlighted fencing as a key issues, and as expanded later in Chapter 7, fencing along with mechanisation (also highlighted by Fay as a second most listed constraint) are among priority challenges to field cropping that were reported by respondents in this study.

Van Averbeké et al., (2008), provide an insightful explanation for the preference for production within the umzi. They identified higher soil fertility status within the homestead arable lands (*igadhi*) due to proximity to kraal manure and ease of haulage, and they motivated that intensification efforts were better justified in this space, rather than fields, a view also supported by Walker (2011) in Thaba’ Nchu in the Free State. Van Averbeké’s team highlighted the innovative technology adaptations to animal drawn planters that supported a maize-bean-pumpkin intercropping system, a

crop-mix evidently strongly preferred by participants in this study as these were the main crops in the *igadhi* and fields, also documented in Chapter 7.

These trends reinforce the findings of this study that there is a widespread preference for cropping within the boundary of the Umzi, rather than the more distant fields. When viewed in the light of the socio-economic findings of high levels of poverty, food shortages and hunger, the findings on land utilisation provides clear direction as to local preferences and opportunities for the future for increased food production.

6.4.7 Organisations and land access institutions

Institutional setup

Land is allocated by local traditional organisations which include the chief and his tribal council (*amaphakati*), and the headman or sub-headman and their councils. Some findings of this research study are that local structures of leadership (organisations) are traditional only to the degree that they are built around the chieftaincy and constituted to some extent using the principles of past local traditions. Moreover, they are indigenous only to the degree that the people entrusted with the roles to enforce the institutions/rules are local and bear lineage histories long enough to prove that they are legitimate citizens of the community. Beyond this, however, it becomes difficult to demonstrate the traditional or indigenous nature of these structures of local leadership, and by extension, the institutions (formal and informal rules and policies) thereof. Figure 6.5 summarises the organisational (leadership) structures that establish and enforce the institutions (both formal and informal rules and policies) of land administration.

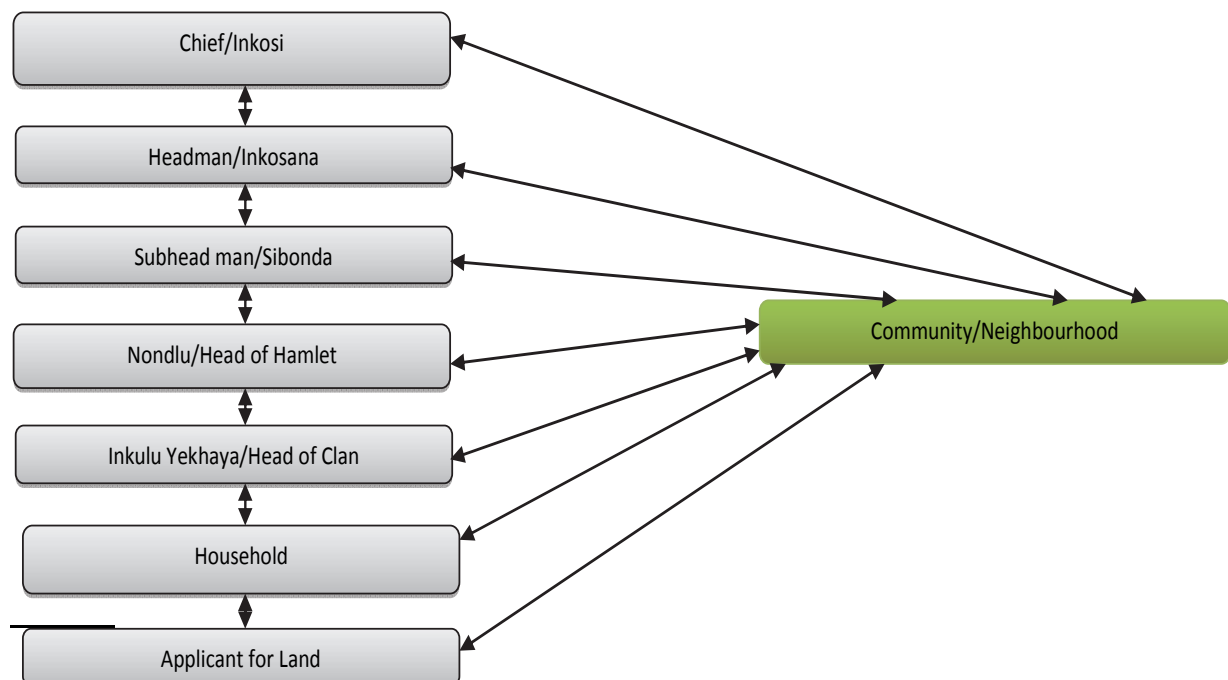


Figure 6.5: Relevant organisations in land administration at the three project sites.

The household is the lowest cell in the hierarchy of traditional organisations that partake in land administration. Although historically households have been headed predominantly by males, this has changed significantly. For instance, 45% of our randomly selected study population was headed by female members, and a national survey carried out in the early 2000s revealed that 37% of South African households were female-headed (Walker, Aliber & Nkosi, 2008). High death rates and a declining interest in marriage were cited as some of the reasons for this state of affairs. There are varied informal rules in the three villages that govern how household members (both female and male) access land through, among other means, application to the local traditional leaders and inheritance within the family and household. At Lutengele, Sirhosheni and Mbekweni, arable and residential lands are allocated separately. Often people start by acquiring residential land, and then later apply for arable land. Both female and male household members have rights to move out and establish their own independent homesteads; this can only be done when an individual is grown up and mature, so that they have ability to fend for their new home. Mature children who want to establish their own homes consult the head of the household, who in turn tells the head of the clan (*inkulu yekhaya*) in cases where such a head exists.

Institutional process: Identifying land and application to traditional leader

The process of applying for land is often initiated by the applicant, who sets out to look for an empty piece of land. This search is often started by looking for possibilities within the applicant's household and broader family's lands, and spreads out to that of their immediate neighbours. If this fails to give them a result, they widen their search to cover the whole village. The rule is that the applicant must identify the land themselves, and only approach authorities to seek permission to occupy or use it. When the applicant has identified the piece of land, the head of the hamlet (*nondlu*) takes the applicant to the sub-headman (*sibonda*). The sub-headman and his council (*amaphakathi*) assess the request. If they approve of it, they physically peg the plot and officially hand it over to the applicant. This procedure applies equally to both female and male applicants.

What seems to be a more informal institution is payment of a token of thanks. At Lutengele and Sirhosheni it was found that applicants for land give some token to both the sub-headman and the headman, thanking them for the land. The items that make up this token vary from community to community, but it generally consists of a bottle of brandy, two bottles of beer, two bottles of soft drink and R100. Although this is not compulsory it is common practice that every applicant gives thanks. Informants' attitudes towards the payment of the token varied. Some said it is not fair because it constitutes an indirect way of making people pay for communal land, while others said it is fair because traditional leaders are meant to 'eat' from the land of their ancestors. Despite these different views, all the informants reported that this rule is applied equally to both men and women, and said that there was no case that they knew of where someone failed to get land because they could not pay the token. Whether this is because everyone can afford the token, or because no one starts the process of applying for land without making sure they can afford to pay it, is not known but would be useful to ascertain.

When the land is finally allocated, the headman takes the applicant to the chief, who often works from local Tribal Authorities offices with his traditional council. The Tribal Authority writes the name

and identity number of the applicant in his list of residents and issues the applicant with a letter (Tribal Resolution) that they submit to the local office of the Department of Agriculture and Land Affairs. Historically, at least until the early 1990s, the Department would offer such applicants Permission to Occupy (PTO) permits. However, at the inception of democracy PTOs were, in policy at least, banned. Despite this, some people in Mbekweni were issued with PTOs as recently as the mid-2000's. In Sirhosheni and Lutengele, some were issued with letters by the chiefs acknowledging their occupation of the land, while others did not even have such letters. The only proof the latter have to show their rightful occupation of the land is that their names are recorded in the headman and chief's records.

6.4.8 Methods of land acquisition

Land can be acquired through various transaction processes which include applying to village traditional leaders, inheriting, leasing, and buying. Although none of the 30 participants have obtained land through leasing or buying, focus group discussions at Mbekweni revealed that these transactions were happening in the village.

Decisions to allocate land are influenced by a number of factors that get considered, a salient one being that land is allocated in order to support families, especially children and wives. This means that an applicant must have a family, or must prove they have dependents. Historically, applicants would have to be married to qualify for land, but the current low numbers of relationships through marriage have changed this. Thus, if not married, one needs to have children in order to qualify for land. In practice, this rule has significantly skewed the situation in favour of women applicants, because it is they (and in particular, single mothers) who can prove that they have children to support. When applying for land, unmarried fathers cannot use children to support their application, because in the research study sites the dominant practice is that children born in relationships other than marriage live with their mothers, and by extension, with their mother's families. In practice some old unmarried men do get land, but the process involved is reported to be far more difficult.

Table 6.3 shows how the heads of the 30 participating households obtained the land they are holding, and the data it contains gives evidence to the argument that women and men are acquiring land through similar processes.

Inheritance and succession

Information gathered from literature studies and using empirical data collection techniques, especially interviews and focus group sessions, demonstrates that in the Xhosa tradition, the oldest male child is regarded as the *indlalifa* (heir apparent) who inherits household property, including land, at the death of parents. However, just like other sectors of traditional practices, the practice of succession has not been spared by processes of social change.

Table 6.3: A gendered count of how land was acquired at the three study sites

Gender & Marriage Status	Number of Beneficiaries	Method of Acquisition
Widows	8	Inherited from husband
Single women	2	Through applying to traditional leaders
Single women	5	Inherited from parents
Married men	6	Inherited from parents
Married men	8	Through applying to traditional leaders
Single men	1	Through applying to traditional leaders

At Lutengele, Sirhosheni and Mbekweni respondents reported that succession to land is practised in multiple ways. While some households still follow the traditional route of passing land to the oldest son at the death of parents, others take more pragmatic approaches. In some households, the land gets inherited by a child – son or daughter, oldest or youngest – who has demonstrated that they care for the existence and development of the homestead (*umzi*) and its affairs. Such qualities are demonstrated by participating in household activities such as rituals, and helping with household needs, amongst other things.

In other households, following the death of both parents the land is not passed on to one particular offspring at all. The reasoning behind this is that the parents' home belongs to all descendants, sons and daughters, young and old, married and unmarried. All of them and their children call this home *khayakhulu* (the great home), and all have equal rights of access and use. There is a fear that if the home gets inherited by one particular child, this individual may exclude other descendants' rights during times of interpersonal rivalry and conflicts.

These variations notwithstanding, what stands out in stark clarity is that where a household comprises husband, wife and children, the husband is the head of the household and the land is registered in his name. Upon his death, the land automatically passes on to his wife, and it is only after the death of the wife that the land goes to the children. These findings are similar to those found by Kingwill (2008) in her study of how households value and practise land succession processes upon the death of original landholders in the communities of Fingo and Rabula villages of the Eastern Cape who have freehold title.

6.4.9 Perceptions and influences

Perceptions of tenure security with some misunderstandings

The existence of different modes of holding land, where some landholders are issued with PTO certificates, others with letters from chiefs and others with nothing, creates confusion. A PTO certificate acknowledges the rights of the plot holder on residential land only, and is silent about rights on arable plots. All arable plots are measured and pegged by the local Tribal Authority, who

keeps a register of plot holders and updates it in response to land exchanges and emigration. Community members at Mbekweni thus feel that their rights on land are secure.

At Mbekweni, about 80% of the interviewees reported that PTOs are certificates of individual Title Deeds, and hence argued that they have the right to sell, exchange, lease or sharecrop the land. However, this interpretation is not shared by their Tribal Authority, which reported that PTOs are not Title Deeds, hence land holders do not have rights to sell land. The Tribal Authority clarified the issue further, stating that plot holders have the right to sell *developments* on their sites, such as accommodation infrastructure, if they decide to leave the village. In this case, the buyer automatically assumes occupational rights of the residential land, and such transactions are recorded in the Tribal Authority's books. As a result, there are active land transaction processes taking place at Mbekweni. Leasing and sharecropping arrangements are formulated between the landholder and the leasee without the involvement of local leadership.

The position is somewhat different at Sirhosheni and Lutengele, where levels of confidence in security of tenure are mixed. At these sites, land holders reported that they do not have papers for the land they hold, save their names being recorded in the headman and chief's books. While some reported that they feel that their rights on the land are secure and legitimate, others raised concerns over the possibility of losing their lands, especially to the state or the local traditional leadership. The former base their perception on the argument that their rights are incontestable, because they were allocated the land by legitimate leadership structures which did so following customarily recognisable processes of land allocation. The latter argue that although they are not aware of any case in these villages where land was repossessed by leadership or contested by fellow village members, it is still necessary to have some form of 'paper proof' of one's rights because things are changing and the world is progressively becoming less predictable.

The introduction of the Roman-Dutch and the Anglo-Saxon Laws of Property in the domain of land administration which took place during conquest and the subsequent colonial rule led to the entrenchment of a paper-proof ethic in which documentation is the single legally recognizable proof of right in property. This ethic has been embraced by the post-apartheid government, yet two decades into office it has not been able to issue landholders with such documents (although there are a few instances where PTO certificates are still being 'illegally' issued). Not surprisingly, there is not much happening in the land market at these sites. Land holders do not live in fear of losing their land, and all the interviewees reported that they feel their rights on land are secure and uncontested. However, they suspected that this could change if they were to lease out their land to interested farmers. Leasing out land when they do not hold certificates of rights makes them feel uncertain that they will win a case if the leasee refuses to give their land back.

Women's desire to have land registered in their names

The findings on land institutions in general could mask some undercurrent, gendered power contestations that might be playing out to impede or frustrate women's aspirations for optimal land use, within what Jacobs (2004:5) calls the "domestic sphere". Participants were thus asked if they aspire to have more land and/or have the land registered in their name, rather than in the name of their male household members. All the respondents said 'no' to wanting additional land. Women

respondents said that having land registered in their names would not make a difference, for in actual fact it is they who are working on and controlling the land, and some have husbands who are away from home, working as migrant labours. Those with husbands at home reported that men often concern themselves more with animals than the fields. Yet commentators such as Jacobs (2004) are sceptical and find it difficult to accept results such as this as a true demonstration of the absence of patriarchal oppression and women's grievances over rights in land. The author warns that the most effective demonstration of domination and oppression is an oppressor's ability to manipulate the oppressed to a point where the latter fails to consciously recognise that they are under oppression. In addition, in strongly patriarchal societies, demanding equal land rights between men and women might be regarded as unheard-of and socially abominable. In these contexts, women are unlikely to fight for outcomes which they think are impossible to achieve (Jacobs, 2004).

Variable influence of tribal authority

In some communities there is no sub-headman; instead there is the headman (*inkosana*) then the chief and paramount chief (*inkumukani*). At Lutengele, where there is both a sub-headman and a headman, the latter seems to rubber-stamp decisions on land allocation that are taken by the former. Where there is no sub-headman, such as in Sirhosheni and Mbekweni, the headman assumes the duties of the sub-headman. These differences are to a large degree a result of the differential successes with which State programmes and policies designed to modify traditional leadership were implemented across different regions of the country. The State's need to implement the indirect rule programme (the State ruling African communities through African traditional leadership structures) saw the State actively appointing or even creating headmen, especially in the former Cape Colony, starting from the early 20th century until the emergence of independent homelands and self-governing territories. Interviews across the three sites revealed that a sub-headman (*isibonda*) is not born (*isibonda asizalwa*), but elected. This means *isibonda* is not a traditional or hereditary post, which is one of the issues that many scholars writing on the subject of traditional leadership in South Africa tend to overlook. The sub-headman does, however, play a critical role in matters of local land administration.

The chief and his council are the supreme body of authority in community affairs, including the allocation of land. Their resolutions override that of all lower structures of administration including the headman, sub-headman and clan head. But this structure has long been modified to align its compositional character and model of administrative practice with constitution dogmas that include democratic governance, representation and gender equality. The Department of Traditional Affairs and Local Government set up a policy which stipulates that such traditional councils should be at least 33% women. It further prescribes that 40% of the council's members must be elected by communities and 60% appointed by the Tribal Authority. These policies are monitored and enforced by the Provincial House of Traditional Affairs and Cooperative Governance which is empowered to disapprove and nullify any traditional council it deems not compliant with national policy.

Distortions of traditional leadership

Processes of modification and distortion of traditional institutions have resulted from local government's piecemeal attempts to incorporate tribal villages into its sphere of governance. This

led to the municipalisation of rural South Africa that got vigorously pushed and entrenched into the national administration system in the wake of the reincorporation of the former homelands into mainstream South Africa at the fall of apartheid. Currently, all that we call traditional villages, the supposed repositories and crucibles of independent, unique tribal cultures and identities, have been transformed into local governments wards, at the helm of which are politically elected ward councillors who report to municipal legislatures which are constituted by an ethic of modern administrative political economy. Yet these ward councillors co-exist with traditional leaders in a precarious and uncertain power-sharing arrangement. To this day it is not known if it is the chief or the ward councillor who reports to the other.

Furthermore, the overwhelming influence of the National Constitution in this subject cannot be overemphasised. Section 9 of the Constitution (RSA, 1996), which provides for the right to equality, is very influential with regard to how land is allocated. Section 9(3) “provides that the state may not unfairly discriminate directly or indirectly against anyone on one or more grounds, including, race, gender, sex, marital status, colour, age, culture, ethnic or social origin”. In addition, the Department of Land Affairs’s influential policy documents, including the White Paper on South Africa’s Land Reform Policy (DLA, 1997) and the Green Paper on South Africa’s Land Reform Policy (DRDLR, 2011), emphasise equality in land allocation and unfailingly refer to the principles entrenched in the Constitution as the guiding institutions in all processes that pertain to land distribution.

One of the effects of this is that land is now being allocated to anyone who applies for it, with little or no regard for what local institutions say about who qualifies for land. At Mbekweni for instance, unmarried youth, both female and male, are getting land. At the time of this research work, a portion of about 100 m × 300 m was being opened for new settlements especially for the youth. It thus begs the question: how traditional are the traditional institutions of leadership and land administration in contemporary black rural South Africa? This has far-reaching implications on how contemporary commentators and policy makers need to engage with and frame the agenda of inquiry on traditional institutions and land administration in the democratic dispensation.

This does not mean, however, that traditional institutions have been completely reformed and converted. With resilient local patriarchal mind-sets playing out as cultural norms, gender stereotypes seem to be delaying the realisation of desired social change. A rigorous enquiry using interview schedules and focus groups was conducted with the aim to understand the extent of the influence of women in local decision-making processes such as land allocation. Key informants such as headmen and chiefs, as well as ordinary community members, reported that males dominate leadership structures. Of all the local organisations listed above, respondents said that the only ones a female community member can lead are the sub-headman-ship (*isibonda*) and headman-ship (*inkosana*). During apartheid, the state tampered a lot with traditional positions and headmen were appointed by and reported to district magistrates.

Women’s involvement in traditional leadership

At Sirhosheni and Lutengele, although the headmen encourage women to be members of their council (*amaphakathi*), the women refuse, citing cultural norms. Women informants said they have

known *amaphakathi* as men and not women and they do not have the desire to change tradition. It is only at Mbekweni that women are part of the headman's council. Positions such as head of clan, head of hamlet, chief and paramount chief are very traditional and have a religious element. These people find their leadership legitimacy and duties in renditions of lineage connections and genealogical networks of families, clans and tribes. As such, one of their fundamental duties is to connect the dead and the living members of their groups. According to our informants, this is exactly why women cannot preside over these offices. The Xhosa community's wellbeing and that of their nation revolves predominantly around the kraal – animal slaughtering and supplication through eating meat and drinking and offering traditional beer (*mqomboti*) to ancestors is typically done in the kraal. Culturally, women are not allowed to enter the kraal, which makes it technically impossible for women to preside over rituals. Moreover, women are excluded from these positions because of entrenched biological beliefs (myths). When a woman is in her menstrual cycle she is believed to be unfit to preside over any ritual that is intended to connect the family with their ancestors.

Yet according to women who participated in this project, this physical exclusion does not translate into their marginalisation with regard to decision-making processes. The informants reported that decisions on community affairs are not taken by individuals or leaders alone; instead, they are made at public community meetings usually held at the *komkhulu* (headman or chief's place). This is where important matters are discussed, and everyone present, including women, has the right to voice their opinions. The roles of the chief and headman's councils (*amaphakathi*) are reduced to discussing community affairs but not making resolutions. At Lutengele, informants said that the role of *amaphakathi* is merely *ukuhleba* (gossiping) about community issues with the headman.

6.5 Conclusions

The dynamics of land administration and gendered power relations that have been revealed by this research are multifaceted and unique. It is useful to situate local problems in global frameworks of understanding, but the authors argue that in some instances such frameworks may pose the risk of masking subtle and unique localised realities. Meaningful local debates with the ultimate aim of informing policy and intervention strategies in the domain of land-based livelihoods and land administration need to be situated in and informed by the unique local South African context.

Thus, while it might be contrary to wider narratives to claim that institutions of land administration do not constrain women's aspirations to use productive land at the three study sites, this work could not find evidence to the contrary. A review of land administration institutions of the current national administration has demonstrated that there are both policies and acts of law that not only encourage women to use land, but more importantly, *command* local leadership structures to give land to women as a constitutional imperative.

While the sample size of the case study households (n=30) was not intended to provide rigorous quantitative extrapolation to the wider population, they still provide a good indication of the arable

land sizes that homesteads have in the villages, how much and how intensively it is used. These findings, while indicative, resonate well with wider experience and field observations in the area.

The summary findings are that most people have access to a crop production space within the boundary of their homestead (87% have a small *isitiya*, 51% have a larger *igadhi*) and 69% have access to a field. An average of 63% of the respondents crop some or all of arable portion within the umzi, and only 44% on average cropped their fields in the 2012-13 year. By combining the findings from the representative survey (n=164) and the detailed assessments of the 30 case study households, a first approximation shows low overall resource utilisation in relation to the total available field resource of the three villages (20% *overall intensity* on an indicative 829 ha), moderate resource use in the typically rainfed *igadhi* (57% *overall intensity* on an indicative 177ha) and relatively high resource use on the typically watered cropping area of the *isitiya* (109% overall intensity on an indicative 54 ha).

These first approximations depict a situation of gross underutilisation of the arable resource in fields (averaging 1.3 ha), moderate utilisation in the *igadhi* (averaging 0.38 ha), and significantly high utilisation in the much smaller *isitiya* (averaging 680 m², equivalent to 0.068 ha).

The indicative findings of land resource utilisation resonate with experience and wider observations (Fay, 2013, Van Averbeké et al., 2008; Andrew and Fox, 2003). They provide further evidence for the prioritisation of crop-production efforts within the zone of the umzi (both *isitiya* and *igadhi*), and for land-exchange interventions in the *intsimi* to liberate the fields from those who don't wish to or cannot use them and make them available to those who want to and are able. The question of whether people are interested to pursue this parallel agenda is often raised and convincing answers to this are presented in Chapter 7.

The institutional findings show that there seems to be no contestation or competition over land. Somewhat unexpectedly, given the wider narratives, and even in the two villages where traditional leadership is strong, there is no evidence to link the ongoing underutilisation of land to elements of institutional gender bias. While small but important exceptions such as *makoti* status present unique challenges for particular sub-groups, it was found that women generally are able to access greater areas of arable land for their own use (consumption and/or sale) if they want to, understand the local processes to be followed, and seem to view these as practicable. Specific caution was taken to account for undercurrent gendered power contestations that impede women's aspirations, by asking women if they aspired for more land and/or to have the land registered in their names. However, not only did all say no to more land, women respondents said having land registered in their names would not make a difference. This results from the observed and increasingly documented entrenched perception of land as a family entitlement, not an individual entitlement. The main limitations of the land institutions appear to apply to both women and men, though it is important that any intervention actions would have to build on a gendered analysis of intervention scenarios, and their likely implications.

What emerges clearly is that everyone's property rights are uncertain due both to the significant misalignment between policy and practice (by the State) and the local evolution, even ad-hoc

tailoring of traditional land governance institutions. In policy, the State talks about the banning of old-order rights in land and tenure reform in communal and other areas, but nothing has been done save for the continual extension since 1996 of the Interim Protection of Informal Land Rights Act. This has both weakened and rendered uncertain tenure security among land holders. However, it is important to make clear that this uncertainty relates not to their own rights of use, but to the consequences of leasing out land, or other transactions in relation to their pieces of land. People fear that there is no guarantee that borrowers will be compelled to return the land when a verbal or written agreement expires because in reality there is no organisational order that provides certainty in the land-exchange market. And while at the moment other constraints appear more critical in explaining underutilisation than land access itself, the lack of institutional certainty has the potential, if not now then in the future, to dis-incentivise land exchange. Similarly, the findings on the absence of impediments of access to land for women may be altered in a situation where land is more widely used as a local economic resource and competition for land increases.

The much-needed institutional order in the land market can only be brought about by realigning traditional and modern institutions so that they articulate a common position regarding rights in land. At a national level this is a long-standing and likely extended challenge and the establishment of local land administration systems is one pragmatic way of addressing rentals and leasing at present, with sale and collateral mechanisms subject to future and more contiguous national changes in law. Because land institutions are deficient and they dis-incentivise exchange and investment, tenure and administration remain key domains of intervention engagement for agriculturally-based initiatives, with a necessary continued emphasis on women's access. However, other critical elements of the farming system appear significantly more important in explaining the low agricultural resource-use by women and men at the three case study sites than the weaknesses in existing land institutions.

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Chapter 7 Farming Knowledge and Aspirations

J Denison, C Murata, L Conde, A Perry & N Monde

7.1 From the Resource Base to Farmer Aspirations

The socio-economic, water and land assessments at the three villages identified the resources at people's disposal and their actual use thereof. It also documented agricultural water management coordination efforts and technical support interventions in water storage and food production. It was established that there are substantial local primary resources for crop production albeit with related institutional and investment impediments. The homestead, or *umzi*, and the food production spaces of the *isitiya* and *igadhi* within the *umzi*, were found to be available to most people and were the sites of highest cropping activity.

Of the 164 homesteads in the initial socio-economic scoping survey, most have access to land within the homestead (87% have an *isitiya* average size 680 m²; 51% have an *igadhi* of average size 0.38 ha) while 69% have access to a field of average size 1.32 ha. The same survey showed that 141 of these homesteads (86%) are interested in pursuing agriculture in some form, though the findings were only indicative and showed substantial caution on their part due to the awareness that profitability was questionable and production support was not easy to obtain, among other challenges faced around marketing knowledge, finance, and irrigation water availability. The in-depth case study work showed intensity of use was highest within the homestead boundary with the *isitiya* and *igadhi* used some 7 and 3 times more intensively respectively, than the fields (calculated by combining incidence of use and intensity of use). The average size of arable land available was also found to be significant, with the *isitiya* averaging 680 square metres, the *igadhi* averaging 0.38 ha, and fields averaging 1.3 ha in size.

The water resource assessment showed that for Lutengele and Mbekweni the available water resource for irrigation in major rivers and dams is substantial and only fractionally used; it also showed that a lack of water for cropping results primarily from insufficient water infrastructure and a lack of knowledge of agricultural water management techniques (runoff and rainwater harvesting).

When combined, the above findings present a picture of substantial water and land availability, significant but yet undefined interest in future agricultural production, and evidence of intensive cropping within the *umzi* (*isitiya* and *igadhi*) but much less so in the fields. The question then addressed with specificity in this chapter through detailed engagement with the 30 case study households, informed by this baseline of information is: With attention given to the farming system and with a sense of realism given to smallholder skills and context, *what kind of farming do smallholders want to practise in these various spaces and what challenges do they face?*

The first half of this chapter presents findings on farming knowledge and skills of the 30 case study households and highlights priority areas of interest for knowledge development and preferred ways of learning. The second half of the chapter describes the participative development of typologies of

farming in the context of resource evaluations and local farming experiences. The typology and farming systems schematics were used as instruments to facilitate engagement on aspirations for crop production. In the exploratory work on aspirations, it became evident that it was necessary to establish who was the agricultural decision-maker in the household; the household head is not always the agricultural decision-maker particularly in the context of migrancy. This is theoretically clarified and practically embedded in the participative analysis of aspirations. The chapter concludes with a description of constraints that participants identified in relation to achieving their aspirations, leading to the development of suitable intervention responses, detailed in Chapter 8.

7.2 Capacity Development through Knowledge and Skills

The international development community such as the World Bank, FAO/UNESCO-IIEP and the International Labour Organisation (ILO) has prioritized skills development. The ILO (2000) argues that basic life skills such as numeracy, literacy, problem-solving, management, and communication and negotiation skills improve confidence and capacity to explore and try new income-earning opportunities. Similarly the FAO (2010) notes that skills development is key to improving rural productivity, employability and income-earning opportunities. Skills development enhances food security and has the potential to improve sustainable rural development and access to more wealth through improved livelihoods. McGrath (2005) acknowledges debates which contribute to the urgency of supporting innovation and knowledge systems, both of which impact on and integrate a rural community's ability to produce. The challenge which arises is how to build on the existing skills and knowledge of communities and individuals so that they can access new ways of achieving their goals.

Piketty (2014), in his widely acclaimed work on the inexorable progression of inequality within capitalist societies since the 18th century, based on inequality data from 20 countries, brings an additional dimension to the emphasis on knowledge. He argues that one of main forces for convergence (reduction of inequality) is the diffusion of knowledge through investment in training and skills, thereby increasing overall productivity growth. A widely recognised problem is that the transmission of agricultural knowledge is both difficult and slow (Stevens et al., 2012), contributing to a national crisis in agricultural extension in South Africa. In order for knowledge-based interventions to have any chance of being effective they must therefore be built on dynamic and rapid knowledge exchange systems to achieve uptake of new information by many. The need for dynamic knowledge exchange systems has informed the first of the eight proposed interventions outlined in Chapter 8.

Additional hindrances exist in basic education levels. It is widely recognised that human capital, usually measured by the education level of the head of the household, or the average education of the working-age adults, is a major factor in opening up opportunities for the productive capacity of households (FAO, 2010). However, despite efforts in South Africa to advance equal education, social and gender differences are still widespread, creating a shortfall in human capital in the agricultural sector. In other words, a deprivation of knowledge and skills is manifest in women's abilities to read,

write, count, make calculations, keep records of income-generating activities, and communicate and negotiate for fair prices and loans. Education and training are powerful tools against poverty and hunger and is linked to women achieving their productive goals (Longwe, 1998; Malik & Courtney, 2011); improved education thus contributes towards women's empowerment within the agricultural context, as well as in other contexts. The FAO (2010) argues that when women receive the same levels of education, experience, and farm inputs as men, there should be no significant differences between male and female farmers' levels of productivity, and thus empowerment.

According to Doss (2013), not only can education (or a lack thereof) directly impact on productivity through the improvement of agricultural practices, but it can also indirectly impact on how women deal with intra-household injustices by increasing their bargaining skills and power.

7.2.1 Defining knowledge, skills and capabilities

Knowledge acquisition and skills development are both important as aspects of human capital development. Winterton et al. (2005) define knowledge as something that is acquired and stored intellectually. It comes from learning or experience and is held in people's minds as a resource that they can tap into. Knowledge is also viewed as an interaction between intelligence (capacity to learn) and situation (opportunity to learn). It includes underpinning theories and concepts, as well as tacit knowledge gained from experience.

Skills are a combination of useful practices that require considerable training to acquire (Winterton et al., 2005); equally, they may be acquired through practice, without formal training. Developing one's skills requires practice that will lead to competent, expert, rapid, and accurate performance. Problem analysis and solving, effective decision-making, mentoring, collaboration, team interaction, and team work, for example, are all skills that are acquired through training or repeated practice.

McGrath (2005) states that economic and social challenges call for a different skills set to tackle the challenges of food security. McGrath identifies a number of elements necessary for skills development in rural areas, including the following:

1. The importance of developing both technical and generic transferable skills, including social and communication skills, self-organisation, bargaining, and entrepreneurial skills.
2. The importance of developing the political and organisational skills of farmers' organisations.
3. The need to support and build on existing skills, innovation and knowledge systems of farming/rural communities.
4. The need to build capacity between individual farmers and their organisations (i.e. to develop and improve partnerships with other service (international) organisations, provincial and national departments or other parastatal agencies).
5. Skills development needs to be seen in conjunction with a set of other inputs, such as micro-credit.
6. The importance of offering flexible training delivery in the proximity of rural households.

Therefore applied knowledge and skills constitutes what is known as ‘competencies’ or the individual’s the ‘know-how’. These can be assessed against the intended learning outcomes of, for instance, an agricultural training programme, to obtain insight into the advances that are required in a person’s level of knowledge, skills and abilities to achieve successful crop farming.

Somewhat differently, ‘capability’ is a term that describes the characteristic of being capable. In other words, it is the condition that permits an individual to acquire power and ability to learn and do something within his or her capacity; these may be abilities not yet developed. Capability can lead to competence, as the latter is the result of the application of a combination of knowledge, behaviour, attitude and skills. These terms are further defined by the UNDP (2010:20) as follows:

“Capacity is the sum of a series of conditions, intangible assets, and relationships: all parts of an organisation or a system being distributed at multiple levels. Individuals have personal abilities and attributes, or competencies that contribute to the performance of the system. Organisations and larger systems have a broad range of collective attributes, skills, abilities, and expertise, collectively termed capabilities. Capabilities can be both technical (e.g. application of organic fertilizers, marketing and communication) and social-relational (e.g. mobilising and engaging actors to collaborate towards a shared purpose). Finally, capacity refers to the overall ability of a system to perform and sustain itself.”

One of the factors contributing towards capability expansion is education. Although education is key to agricultural productivity and thus poverty reduction, it is noted that education alone may not lead to empowerment and improved economic activity (Chant, 2007) and agency and reflexivity must be, to coin a phrase, cultivated. The following sections will explore this further.

7.2.2 Agency and reflexivity

This chapter places particular focus on individual capacity (a person’s ability to perform tasks, which is determined by their knowledge, skills and attitudes) in order to further understand how these may constrain women’s agency and empowerment in relation to agricultural livelihoods in the context of this study. Here *agency* is understood as the ability to act upon situations, in other words, “...the ability to make a difference by acting on or against external constraints and to transform the structures and systems from which they arise” (Barnes, 2000:25). As such, it is also recognised by the research team that individual capacity should go beyond knowledge and skills to include another kind of capability associated with *reflexivity*. Reflexivity refers to “self-transformative capacity” (Delanty, 2005:120) and in the context of this study means the ability of people in the workplace to develop their own capacity to reflect on, review and change in response to contextual factors and improved understanding of practice (SADC REEP, 2002). Ongoing reflexivity is needed in seeking new and better ways of responding to complex issues faced by farmers, and can be effectively mediated through agricultural learning or training programmes run by extension officers or other facilitators. In this study, learning is understood as a process concerned with internal changes which modify the way in which a person interprets and engages with the world: how the mind looks at the world, interprets it and acts on it (Edwards, 2005a). According to Greeno (quoted by Edwards, 2005b) this

requires the acquisition of knowledge or participation in a set of activities. These can be mediated in, for instance, training and skills programmes with a transformative learning orientation.

7.2.3 Indigenous knowledge in agricultural livelihoods

Warren (1991) stresses the importance of ‘indigenous knowledge’ when investigating the knowledge gaps of rural people. Indigenous knowledge is the local or traditional knowledge that is unique to a given culture or society, and as such, is the basis for local level decision-making in agriculture, health care, food preparation, education, natural-resource management, and a host of other activities in rural communities (Grenier, 1998). In this work, indigenous knowledge includes knowledge which may be acquired from external agents but has been ‘indigenised’ to a point where it becomes intricately embedded in the local socio-cultural fabric. Indigenous knowledge is often acquired informally, through community gatherings, social networks, parenting, folklore and myth. This kind of learning is also referred to as *social learning*, often defined as “a way of organising individuals, organisations, communities and networks, that is particularly fruitful in creating a more reflexive, resilient, flexible, adaptive and, indeed, ultimately, more sustainable world” (Wals, 2007:38).

It is also recognised that the basic component of any country’s knowledge system is its indigenous knowledge, which encompasses the skills, experiences and insights of people as applied to maintain or improve their livelihoods. Many formal institutions of learning, including universities, are progressively recognising the value of, and tapping into, indigenous knowledge systems in their pursuit for knowledge production (Bell, 1979; Hunn, 1993).

Indigenous knowledge is also the social capital of the poor, and a community’s main asset to invest in its struggle for survival – to produce food, to obtain shelter, and to achieve control over life. Development agents (NGOs, government, institutions, donors, local leaders, and the private sector) need to recognise and value indigenous knowledge in their interactions with local communities, and appreciate that local knowledge is generated from social practice or social learning processes (Atran, 1990). Understanding local indigenous knowledge is thus essential when developing an intervention strategy.

7.2.4 Skills development and learning through mediation

Formal education refers to education which occurs in formal institutional settings, and includes compulsory basic education (primary) as well as secondary and tertiary education. Education is seen as activities aimed at acquiring general knowledge, attitudes and values, and training is defined as the acquisition of occupational or job-related skills. The number of years spent in formal education is an important determinant for achieving competency over new technology, as well as an important determinant of increased agriculture (Sikwela, 2008). Education acts as a catalyst in the flow of information, making it easier for farmers to accept new technology or knowledge; it also makes it easy to interpret agricultural information, and is thus important in developing new knowledge and skills.

Thus far a broad overview of how education and skills development contribute to agricultural

practice has been provided, but there is need for a deeper understanding of how people learn, and particularly of the processes of mediating agricultural knowledge. Education and skills development are often dominated by *positivist* approaches, whereby knowledge (i.e. information about the world that is assumed to be objective and value-free) is transmitted to the learner. The context in which this knowledge was generated is deemed inconsequential, as is the learner's own context. This perspective has led to what Freire (1996) calls the "banker's model" of education, where facts are seen as knowledge, and an educated learner is one who has "banked" a lot of knowledge (Peters & Wals, 2013). Freire calls for an alternative education approach that focuses on developing self-awareness and empowered individuals – a transformative process that happens between people, rather than a one-way flow from the informed to the ignorant (Freire, 1996).

Turning knowledge into practical wisdom which is integrated and applied requires a process which is different from those conventionally applied in agricultural skills development programs (Peters & Wals, 2013). In order to develop an effective learning program it is important to understand that learning is contextually embedded – physically, socially and culturally. Burt & Berold (2012) draw on *constructivist* theories to explain that we learn through our interaction with others in response to changing situations. We also learn by applying what we know and responding to what happens. Situated learning theory, which builds on constructivist learning theory, emphasises that we learn through social practices, for example through managing our use of water resources in particular ways (Burt et al., 2014), and this requires a form of pedagogy in which the scientific concepts should connect with people's everyday knowledge so that the concepts make sense and can be internalised. This brings the processes of knowledge mediation to the fore by placing importance on the learner's context and perspective of the world (Burt et al., 2014).

Support-situated or contextual learning processes

In order to support the effective development or improvement of agricultural practices, the mediators of these practices (agricultural extension officers, NGO workers, etc.) need to deeply understand the contexts in which these learning practices take place. They also need to design knowledge tools and resources in ways that support the practices that people are already involved in, and address questions that the learners have about their practices. From these mediated learning processes new knowledge can emerge in order to shape and inform existing practices in new ways.

Integrating local and specialist knowledge

Local knowledge alone can become self-referential (and so not lead to new learning) and too contextually inscribed. Similarly, knowledge of practices produced elsewhere (e.g. in scientific institutions) can be too abstract, or represented in ways that do not connect with practice. Using a question-based approach to learning mediation, based on and always related (but not limited) to actual contexts of practice, can facilitate a double "knowledge flow" process.

Adopting social learning and transformative learning approaches

Another way of understanding learning as a mediated social process comes from Wals (quoted in Mukute, 2010), who says that in a risk society, the aim of learning is not just to know, but also to be able to organize (as individuals, and as organizations, communities and networks) in order to be more reflexive, adaptive and sustainable in a world where human actions have consequences that

are far more complicated than we can foresee. Social learning processes engage people in collective activities and social practices that make up our daily lives. Social learning thus promotes the following (Reed et al., 2010): changes in cognition amongst individuals; changes in social practices; and changes in the activities and actions of social units.

Building a knowledge network

Knowledge networks are assumed to support social learning processes, bring together traditional and specialist knowledge, and collectively work towards improved practice. However, it is also recognised that in order to build a knowledge network it is crucial not only to understand the context in which the practice takes place, but also how this local practice is situated within the broader socio-ecological context. The skills required to develop a knowledge network include the ability to identify, access and select relevant local specialists to assist in verifying knowledge. The practitioners must have the capacity to engage with local questions and expand learning based on a wider knowledge of practices in responsive ways.

If the agricultural sector is serious about supporting the empowerment of women and men to better their agricultural practices, then learning must be a central consideration and a core, ongoing process. This can best be achieved by mediation of agricultural knowledge through dynamic learning processes that contribute to changes in social practices for improved agricultural livelihoods capability, and respond to context-specific challenges that relate to a particular practice, as well as linking specialist knowledge to these context-specific problems. It requires focusing on the learning theory in an engaged, dynamic process that supports and shapes people's capacity to think, reflect and act, rather than a simple process of handing out information.

7.3 Auditing Farming Knowledge and Skills

Winterton et al. (2005) propose a theoretical framework that can be used as the mechanism through which knowledge, skills and competencies (KSC) can be identified and applied to a skills audit (described later in this section). Competency is 'the ability to do the job', and thus a combination of knowledge and skills. In an attempt to investigate the KSC of women on land and water projects at the study sites, the framework of analysis proposed by Winterton et al. was applied. The underlying objective of the study was to identify the KSC gaps that prevent research participants/rural women from carrying out their farming activities to an optimum standard, in the context of the capability approach adopted for this study at both conceptual and analytical levels.

The study identified knowledge and skills (including indigenous knowledge) acquired through formal and informal processes. The study looked at three categories of KSC, namely the technical skills, management skills and soft skills (behavioural competencies) required when undertaking farming (see Table 7.1). A skills audit is a common tool that is normally employed when analysing a person's skills. The skills audit for this study focused on four components of data collection, namely: (1) a skills analysis, or the identification of skills and knowledge farmers need to undertake their farming effectively; (2) the identification of skills and knowledge held by project beneficiaries; (3) an analysis

of skills gaps, which compares skills and knowledge held by people; and lastly, (4) an analysis of the training needs, and identifying how skills gaps can be addressed within training models or strategies. This includes helping to build upon existing professional development skills sets, and building capability towards sustainable agricultural livelihoods, food security and empowerment.

Table 7.1: Categories of KSC for effective farming practices (Winterton et al., 2005)

CATEGORIES OF KSC INVESTIGATED		
Technical KSC	Managerial KSC	Soft skills KSC
Crop production	Farm/project management	Communication
Plant nutrition	Human resource management	Conflict resolution
Soil preparation	Financial management	Negotiation
Disease and pest management	Business plan development	Strategic/critical thinking
Tillage operations	Record keeping	Problem analysis
Weed control	Accountability	Problem solving
Irrigation	Ability to read and write	Team building
Water and land management	Business etiquette	Positive attitude
Feeding	Time management	Desire to learn
Housing and handling	Meeting management	Motivational skills
Animal health care	Basic computer skills	Listening skills
Marketing	Market awareness	Self confidence
Value adding and packaging	Entrepreneurship	Coordination and facilitation
Maintenance and operation	Accessing information	

The skills audit survey was developed to measure the skills capacity and skills shortages amongst farmers, and particularly women, in their present context. The outcomes documented help to address the shortage and gaps for effecting farming practice, which is one of the capitals or inputs needed to improve sustainable livelihoods and agricultural capability.

7.3.1 General agricultural findings from the audit

Skills and knowledge can be acquired in various ways, for instance in the form of structured training and education or through social learning and media. New knowledge can be facilitated by farmer-to-farmer engagements and other learning tools. Local knowledge networks can be formally instituted and facilitated, or may build on endogenous systems that have been in existence for extended periods of time. In the assessment of existing levels of knowledge, respondents were asked to self-assess their knowledge on various food-production and farming activities, and identify where they acquired their knowledge. This assessment led to a discussion on the interests, agricultural aspirations, learning needs and challenges of respondents.

The skills audit first enquired about basic agricultural practices, using the sampling methods and field research approach detailed in Chapter 2. The findings are based on the agricultural skills survey responses of the 30 case study households, as well as a subsequent focus group discussion that further informed the analysis.

7.3.2 Crop differentiation in the *igadhi* and *isitiya*

The study found that in most homesteads a home garden (*igadhi*) is separated from a small irrigated food plot (*isitiya*). In the *isitiya* mostly vegetables are planted (Table 7.2). There is a range of widely popular vegetables including cabbage, spinach, butternut, carrots and onions and more. In addition, 30% of the respondents in Lutengele indicated that they plant herbs for food and for medicinal purposes. Farmers report intensive farming in the *isitiya* with multiple crops in a year, which is possible because it is small and requires limited labour, finance, and water for irrigation.

Table 7.2: Frequency of crops grown in the *isitiya* (n=30)

Crops	Lutengele %	Sirhosheni %	Mbekweni %
Cabbage	95	90	80
Spinach	90	70	75
Butternut	60	30	2
Carrots	75	40	15
Onion	65	46	30
Potatoes	40	30	10
Peas	65	10.5	3
Bean	20	10	15
Herbs	30	2	2
Tomatoes	19	10	2
Beetroot	20	8	2
Red Pepper	10	3	10
Cauliflower	10	0	0
Maize	2	5	4
Pumpkin	5	2	1.5
Garlic	5	0	0

The larger *igadhi* is typically rain-fed, although in Lutengele it is often partly irrigated by hand or hose-pipe from water-storage tanks collection from roof and ground surface runoff (roads, ditches, overland flow). The results show that the *igadhi* is mainly characterized by the planting of maize, beans and pumpkins, which is a most important food source. All the sampled households from Lutengele and Sirhosheni reported that they grow maize in the *igadhi*. Other major crops grown include pumpkin, beans, cabbage, and potatoes. Maize is produced for the home, to use for food and making umqomboti (traditional sorghum-maize beer). It is also used to trade locally for vegetables, livestock feed and food, with small surpluses sold at the local market.

Table 7.3: Frequency of crops grown in the *igadhi* (home garden typically rain-fed) (n=30)

Crops	Lutengele %	Sirhosheni %	Mbekweni %
Maize	100	100	93
Beans	32	46	29
Pumpkin	52	63.3	41.33
Potatoes	16	10	5
Spinach	10	10	40
Cabbage	7	4	30
Butternut	0	0	0
Peas	0	0	0
Other	3.33	3.33	3.33

Respondents

indicated that they choose to use both the *isitiya* and *igadhi* mainly because they want to diversify their crops, which are grown in different ways (intensively and hand-watered, and extensively and rainfed, respectively). Most of the respondents stated that they plant maize, beans and pumpkins in the *igadhi* and vegetables in the *isitiya*. Additionally, respondents reported that they mainly use these during the summer season when there is a lot of rain.

Conservation of water and irrigation

Sixty-three percent of the respondents across the three sites irrigate in the *isitiya*, and this way of farming sometimes extends into the space of the *igadhi* during the wet season. Methods used on smaller plots include low-cost hand watering techniques, with water hauled from local sources or from storage tanks. Thirty seven percent of people do not irrigate for reasons which include inadequate infrastructure, and a lack of knowledge about agricultural water techniques. In reality there is quite some diversity in water consumption, linked mainly to interest in agriculture and water infrastructure availability, as detailed in Chapter 4. At Mbekweni, some people have informal connections or are able to buy bulk water from those who have connections to the surrounding irrigation infrastructure on the village periphery – demonstrating the reality of multiple water use. In Sirhosheni there is one case where a pond was built adjacent to an owner's garden for irrigation purposes (see general case descriptions in Appendix 1). At Lutengele, government-funded rainwater harvesting tanks enable supplementary irrigation, detailed in Chapter 5. Across all three sites, water for crop production within the homestead was reported as a key constraint and the need for skills and knowledge on this aspect was rated as high.

Soil Fertility

Many of the thirty residents interviewed have some knowledge about composting and applying manure to increase the fertility of their soils, and residents know that better soils, as managed appropriately by adding supplements, increases nutrients for crops (Pawluk et al., 1992). The methods of applying nutrients can be organic or inorganic. The majority of respondents from Sirhosheni and Mbekweni (70%) apply manure from their animal enclosures (kraals) to their gardens, while 10% of respondents apply commercial fertilizer to their crops. This practice is the reason behind the findings of much higher fertility in gardens than in fields by Van Averbeké et al., (2008), underscored by the smaller size of the garden relative to the manure resource and the

proximity of the kraal and related relative ease of cartage. In limited cases in Sirhosheni and Mbekweni, people use industrial fertilizer in combination with manure.

At Lutengele, 90% of respondents use compost to keep their soils fertile, and none of the respondents from this village reported the use of inorganic fertilizer in their gardens. The NGO WESSA has influenced and adjusted agricultural practices towards adopting strategies of natural and to an extent, organic farming methods. Among the participants at Lutengele, methods such as applying compost and manure to crops were encouraged by WESSA, and have been widely adopted, perceived as cheaper and healthier alternatives to industrial options. Although this work did not investigate soil fertility on arable plots, more than 70% of the respondents across the three sites reported that they routinely invest in inputs to increase soil fertility. Compost is a limited commodity but with ongoing training and skills development compost is viewed by respondents at Lutengele as adding value and is increasing in incidence of use.

Pests and diseases

The results show that the majority of respondents at Sirhosheni and Mbekweni use pesticides and insecticides (70% and 100% respectively), whereas Lutengele residents have opted to use natural methods for killing unwanted pests.

7.4 Specific Findings of the Audit

The consolidated data in Table 7.4 shows a number of skills and knowledge necessary for crop producers to benefit from food gardens and field crops. The results show that the majority of respondents rate their knowledge as competent in basic skills, such as determining the seed depth (63.3%) and determining inter- and intra-row spacing (93.3%). Residents share knowledge about when to irrigate, including what times of the day and how often. More training could be carried out and is desired in relation to acquiring skills for this kind of farming (3.3%). Household members are able to determine when plants are nutrient-deficient (60%), and participants are able to select appropriate planting methods for various crops 53.3% of the time.

Table 7.4: Assessing basic knowledge and skills across the three sites

Knowledge/Skill	Not competent %	Competent %	Very competent %
Determining seed depth	33.3	63.3	3.3
Selecting appropriate planting methods for various crops	46.7	53.3	0
Determining inter- and intra-row spacing	6.7	93.3	0
Irrigation scheduling and frequency	46.7	53.3	0
Application of herbicide and fungicide	86.7	13.3	
Planning and carrying out harvesting appropriately for various crops	40	60	0
Determining the amount of fertilizer for various crops	70	30	0
Soil and water conservation measures	90	10	0
Farm record keeping	90	10	0
Packaging of produce	83.3	16.7	0
Determine nutrient deficiency symptoms in crops	40	60	0
Calibration and use of spray	96.7	3.3	0
Maintenance of water pump	96.7	3.3	0
Storage of produce	86.7	13.3	0
Financial management	96.7	3.3	0
Knowledge of marketing contracts	96.7	3.3	0
Price determination of your produce	83.3	16.7	0
Knowledge of the market of your produce	83.3	16.7	0
Mean (indicative only)	70.8%	29.0%	0.2%

While the mean doesn't necessarily mean a whole lot, as it assumes equal weight for all categories, the detailed results are of interest. Only one farmer of the 30 considers himself very competent, and in just one category – determining seed depth. In 6 of the 18 areas of assessment, more than half of the respondents indicated that they think they are (moderately) competent. Of these, most people (94%) are confident about their plant spacings and depths. Around half or more of the farmers (54%-60%) feel competent in planting techniques, timing of irrigation, managing fertility and harvesting properly. However, only a fraction, between 3.3% and 16.7%, are confident in the 12 more technical and marketing-related competencies of farming. Capability in water-management, working with small-farm equipment (i.e. calibrating and operating sprayers, maintaining watering systems, operating tractors or pumps), financial management, and knowledge of marketing contracts and pricing, are all generally self-assessed as 'not competent'.

The skills assessment provides direction to the areas where skills development and knowledge generation efforts need to be initially focused. Despite the relative dearth of capability, it was observed that most households have a real interest in increasing production, and possibly selling surplus within and outside of the village. Most respondents want more hands-on and practical learning-training, and communicated a clear preference for informal knowledge-exchange systems

which are locally based, rather than external formal courses. DVD's and on-farm demonstrations are thought to be particularly useful, while approaches centred on books, manuals, pamphlets and attending workshops are all generally unpopular.

7.5 Formulating Farming Typologies

The exploration of agricultural aspirations within the 30 case study households took place iteratively over 3 years of the project. The water, land and agricultural information collected during various surveys, interviews, focus group discussions and field observations provided both contextual and detailed information and led to the formulation of locally applicable farming typologies. These were refined through an intensive participatory process. Participants positioned themselves comfortably within a typology, and in collaboration with the research team finalised its characteristics and explored the constraints and opportunities each typology faced. Aspirations were explored through a facilitation process where each farmer identified a farming typology which reflected his or her primary farming interest in 5 years' time. In the light of these aspirations, the constraints and opportunities of participants were identified. This process led to the formulation of implementation strategies, described in Chapter 8.

7.5.1 Considerations in typology development

Farming typologies are useful in characterising sufficiently similar groups of farmers (using a set of factors to differentiate them from each other) and providing insight into their different contexts and challenges. It has been explained in Chapter 1 that for this project, the term *smallholder* is used to include people farming in home-food gardens, in fields and on irrigation schemes for a variety of purposes, who share a set of common factors which are mainly linked to small scale (informed by the type and intensity of farming) and weak or systemically distorted market linkages. In South Africa the term *smallholder* is associated with black farmers and communal tenure regimes. The classic smallholder farmer typology is used by Vink and Van Rooyen (2009), who classify smallholders in communal areas into subsistence, emerging (i.e. semi-commercial) and commercial. While providing some insight, these are often observed to hold insufficient differentiation to be useful, and more nuanced typologies are needed to understand smallholder opportunities (Cousins & Chikazunga, 2013) and respond to diversity.

Wegner and Swart (2011) explore which kinds of farmers will be producing food for the world by 2030, and argue the case for multi-pronged strategies that respond to different kinds of farmers at the same time, each with niches and opportunities that have to be carefully identified to exploit existing potential. They consider subsistence (family farmers), small investor farmers (mixed purpose) and large-scale farmers, operating under low-external input and high-external input systems, each with specific advantages. Kirsten and Van Zyl (1998), in defining smallholder farmers in South Africa, argue the case that profitable and efficient farming is often incorrectly linked to large-scale commercial agriculture, and highlight that a number of characteristics including farm size, enterprise size, income and turnover must be considered in a smallholder context. The implication is that simplification of typologies can be self-defeating in an intervention design context. Farmers

might easily locate themselves within an oversimplified group, but more differentiation is necessary to contemplate specific challenges and formulate suitable targeted responses.

There is also a strong case made both globally (Wegner & Swart, 2011) and locally (Kirsten & van Zyl, 1998) for the relative advantages that smallholder farmers have over large-scale farmers in many competitive contexts: smaller manageable scales of farming; the opportunity to use family labour efficiently; combining farming with other livelihoods activities; and the ability to self-finance, amongst other advantages.

Moving then to existing typologies for smallholders, Denison and Manona (2007) identified four different kinds of farmers on irrigation schemes, using three interdependent factors – profitability (including purpose and market engagement), irrigation farm system complexity (gravity furrows, pumped, high-tech), and scale – to arrive at the typology below (Table 7.5). While this is particular to irrigation, the similarities in context are sufficiently similar to inform the development of typologies that apply to the research participants, most of whom are supplementary irrigators (63%), albeit with a limited water supply.

This typology has similarities to others developed in South Africa. Van Averbek and Mohamed (2006) identified a set of *farming styles* at Dzindi Irrigation Scheme which, while somewhat different from typologies, is considered useful to inform this discussion. Their categories of ‘food farmers’ (types 1 and 2), ‘profit-makers’ and ‘employers’ were identified by considering farming objectives, attitude to risk, mechanisation, crop-choice, intensity, and marketing approach.

Table 7.5: Typology of smallholder irrigation farmers as per Denison and Manona (2007)

Farmer typology	Typical plot size	Irrigation system method (complexity)	Purpose of farming and farming system
Food plot farmer	< 0.5 ha	Canal irrigation or moveable sprinklers (low complexity)	Mainly for own consumption with some local marketing
Small-holder (or peasant farmer)	1 ha to 2 ha	Canal irrigation or moveable sprinklers (low complexity)	Diverse purposes in line with diversified livelihoods of plot holders. Varied approaches to production, reflecting moderate risk appetite. Local (urban) markets dominate, but with assistance distant city markets could be accessed.
Business farmer	> 2 ha	Simple overhead or micro-irrigation (low or medium complexity)	Full-time, commercial farming that includes engagement with distant markets. Highly productive farming systems are necessary and access to finance could be a requirement.
Equity-labourer	Consolidated land-holdings	Complex overhead or micro-irrigation	Commercial farming with strategic partner who manages the enterprise, whilst plot holders are farm workers, who also receive a share in the profits in return for providing the land.

(Denison & Manona, 2007)

Similar factors are listed by Cousins and Chikazunga (2013) to distinguish smallholders from commercial farmers, and also to understand the differences between types of smallholders. They propose that the following variables are relevant: i) the objective of farming, ii) the proportion of output that is marketed, iii) the contribution of farming to household income, iv) the use of family labour or hired labour, v) the degree of mechanisation, vi) capital intensity, and vii) access to finances. They then draw on the work of Christen and Anderson (2013) who segment smallholders into three groups: non-commercial smallholders; commercial smallholders in loose value chains; and commercial smallholders in tight value chains. These sub-groupings were differentiated by what the farmers grow, how they engage with markets as buyers and/or sellers, and how those markets are organised. Cousins and Chikazunga (2013) then arrived at the following typology for South African smallholders (Table 7.6):

There are clear similarities between the “subsistence-oriented smallholders” and the “food plot farmers” and “food farmers” of previous works; the ‘market-oriented smallholders’ (both loose and tight value chains) are analogous to the ‘smallholders’ (though all-inclusive), and the ‘small-scale capitalist farmers’ are closely similar to the ‘business farmers’ and the ‘profit-makers’ of previous works. These typologies and underlying perspectives on how best to group farmers for varied analytical purposes informed the typologies developed for the project.

Table 7.6: Typology of smallholders in as per Cousins and Chikazunga (2013)

	Subsistence-oriented smallholders	Market-oriented smallholders in loose value chains	Market-oriented smallholders in tight value chains	Small-scale capitalist farmers
Objective of production	Household consumption	Household consumption + cash income	Cash income + some home consumption	Profit
Proportion of marketed output	None or insignificant	50% or more	75% or more	Very significant
Labour	Family	Family + some hired	Family + significant numbers hired	Hired
Mechanisation	Very low	Low	Medium to high	High
Access to finance	Absent	Some	Significant	Very significant

Cousins & Chikazunga (2013:20)

In considering the typologies that would be useful for the research participants, the researchers considered key factors from the literature and the ongoing research process and arrived at an emphasis on: purpose; scale and location (linked to zones of the *isitiya*, *igadhi*, and *intsimi*); Intensity (cropping intensity); family labour; mechanisation; and external dependency (strength of linkages with external markets, reflecting integration and risk). The typologies that were developed in this way differentiate different ‘levels’ of farming, each requiring a fundamental (or quantum) shift in

some of the key factors; the typologies were central to the process of formulating aspirations and constraints, and to the intervention planning that followed.

7.5.2 Smallholder farming typologies applicable to the research sites

The typologies which resulted have unintended but undeniable similarities to a subsistence, semi-commercial, commercial grouping, but include substantial additional detail which allows farmers both to position themselves and to assess their particular challenges. Each typology requires different farming capacity (i.e. resources and capabilities in action) and different kinds of support interventions, both in technology and scope. The typologies take the sub-factor of farming location – the ‘*isitiya*’ (irrigated kitchen garden), ‘*igadhi*’ (field inside the boundary of the homestead) or ‘*intsimi*’ (more distant field) – into account. These locations, which are based on actual practice and a local understanding of how different land parcels are used, characterise scale (smaller to larger) and to a large extent the type of farming (intensive to less intensive) and crop choices. Five groupings were thus identified as relevant to the research sites (Table 7.7), reflecting types of farming at the sites.

Table 7.7: Typologies at the research sites

Typology	Key characteristics: Purpose / labour / risk appetite / external dependence	Approximate scale and location	Crop mix
A: Food grower – low productivity	People who grow <u>primarily for home consumption</u> (and social exchange) but with <i>low productivity and minimal surplus for cash sale</i> . <i>Low-investment low-risk farming approaches</i> .	< 200 m ² <i>isitiya and igadhi</i>	vegetables greens maize pumpkins beans tree crops
B: Food grower – high productivity	People who grow <u>primarily for home consumption</u> , with <i>high productivity and sale of surplus</i> . <i>Low external dependency</i> . Primarily hand-watered.	0.1-1 ha <i>isitiya and igadhi</i>	
C: Food and cash farmer	Farming with intention of <u>significant cash sale requiring external markets</u> . Land preparation is mechanised but family labour predominates. Significant external dependency, moderate risk. Loose value chains predominate.	0.5 ha to 2 ha <i>igadhi and intsimi</i>	food and high-value cash crops
D: Business farmer	Farming for <u>cash sale to external markets</u> and where the farming enterprise makes a <u>dominant contribution</u> to livelihoods. Employed labour. Mechanised. High external dependency & high risk. Marketing though loose and tight value chains.	2 ha to 20 ha <i>intsimi</i>	intensive veg green maize field crops
E: Equity labourer in a contract arrangement	Residents who have rights to land and water and <u>no intention of farming actively</u> , but instead lease or sharecrop. Low financial risk, high contract risk.	field scale with consolidation of multiple plots	commodity crops

What is important here is that each typology requires a different combination of intervention responses to meet needs of the farmers, given their practices and available resources.

The first category, Food-Grower (Low Productivity) was only established because it characterised where many of the people consider themselves to be at present. No-one, it will be seen, wanted to remain at a low productivity level and everyone who placed themselves in this typology was keen to 'grow' to a different way of farming with greater benefits

7.6 Enquiry into Aspirations

7.6.1 Participatory enquiry based on intensive information exchange

The typologies, systems diagrams and other key information such as approximate production input costs were used in a participatory process of focus group sessions with farmers, in order to clarify their aspirations. An initial workshop was held to explain and refine the typologies before arriving at the draft typologies, used in the detailed 2-day workshop. The sequence of activities in the 2-day sessions was carefully planned to ensure that all discussions on aspirations were centred on the available resources and pragmatic expectations of support, taking into consideration lifestyle, financing, risk, and livelihoods.

Table 7.8: List of discussion items addressed in sequence at the workshop on aspirations

Discussion Items
• Defining the typologies that individual farmers are currently farming under
• The farming resources e.g. land, tractors, skills, etc. available to each farmer
• Estimated harvests, marketing practices and consuming patterns
• Constraints and challenges
• Farming aspirations in light of present constraints and resources
• Intervention opportunities and strategies
• Challenges and opportunities of each intervention strategy

The main rationale for adopting a participatory planning approach in focus group sessions was to find the best possible way of aligning and integrating expert knowledge (documented in bodies of literature and policy guiding frameworks) with local farmers' experientially-informed insights and advice. The items listed in the table above were used as thematic areas around which discussions were shaped over the two-day focus group meetings (one for each research site).

The demographic composition of participants was largely informed by the embedded overarching objective of the research assignment, which is to elicit and document gender dynamics *with special focus on women* in the domains of agrarian food production practices, as well as resource access and control. In light of this, it was felt that including young and elderly participants, both female and male, created the opportunity for discussions that could expose and demonstrate gendered experiences, capabilities, constraints and aspirations in crop production and associated practices (including decision-making and access and control over resources).

The themes were arranged so that participants began by describing what they are doing and what they possess (i.e. their resources); they would then build on this information to present the state of their aspired future. Starting the discussions with the concrete (what they are doing) and then moving toward the abstract (what they aspire to) helped ease the participants into the sessions. It also helped them knit together coherent narratives that meaningfully connected experience, capabilities and aspirations.

The focus group discussions were facilitated by the research team using mainly the local isiXhosa language, and English only in circumstances where the translation of specialist input was needed. Flip charts and tape recorders were used to record the discussions. During the discussions the role of the research team was restricted to prompting farmers to talk. This was done by stating facts, narrating incidents, or arguing a case in support of or opposition to a speaker's points of view.

At all three sites this approach worked very well, especially in discussions that revolved around farming practices, available farming resources, aspirations and constraints, as well as marketing and consumptive practices. Participants did the bulk of the talking, with the facilitator only getting involved when asking for clarity on certain points, probing for more detail, or occasionally re-directing the line of discussion.

At the level of intervention strategies, the research team became more actively involved in the discussions. The domain of intervention strategies is largely a technical area in which local expertise often needs input from professional personnel. The design and implementation of intervention strategies often involves the interaction of multiple stakeholders and organisations in decision-making. There are several technical considerations that are considered in discussions on intervention opportunities, not least costs and institutional support. In view of this, the research team had to give some guiding opinions, especially on costs and opportunities or lack thereof of mobilising funding for different possible intervention strategies. In addition, the team gave examples of best practices implemented elsewhere in agro-environments similar to the study sites. This notwithstanding, the research team ensured that any intervention strategy to be proposed was aligned with local aspirations, values and farming objectives.

7.6.2 An agricultural systems view

The research team adopted an agricultural systems view when engaging in agricultural enterprise discussions with respondents. The approach is built on the fundamentals of crop budgeting (input costs and enterprise benefits); it includes the human and social capital elements key to knowledge and organisational dimensions and it emphasises market considerations and linkages. The agricultural systems view builds on the considerations that are typically used in agricultural feasibility studies (Gittinger, 1982), though only with indicative costs to facilitate the discussion; it also builds on other works promoting integrated thinking in smallholder farming irrigation (such as van Auerbeke & Denison, 2013 and Bembridge, 2000). These multi-factored, interconnected and holistic ways of viewing farming are simplified in Figure 7.1.

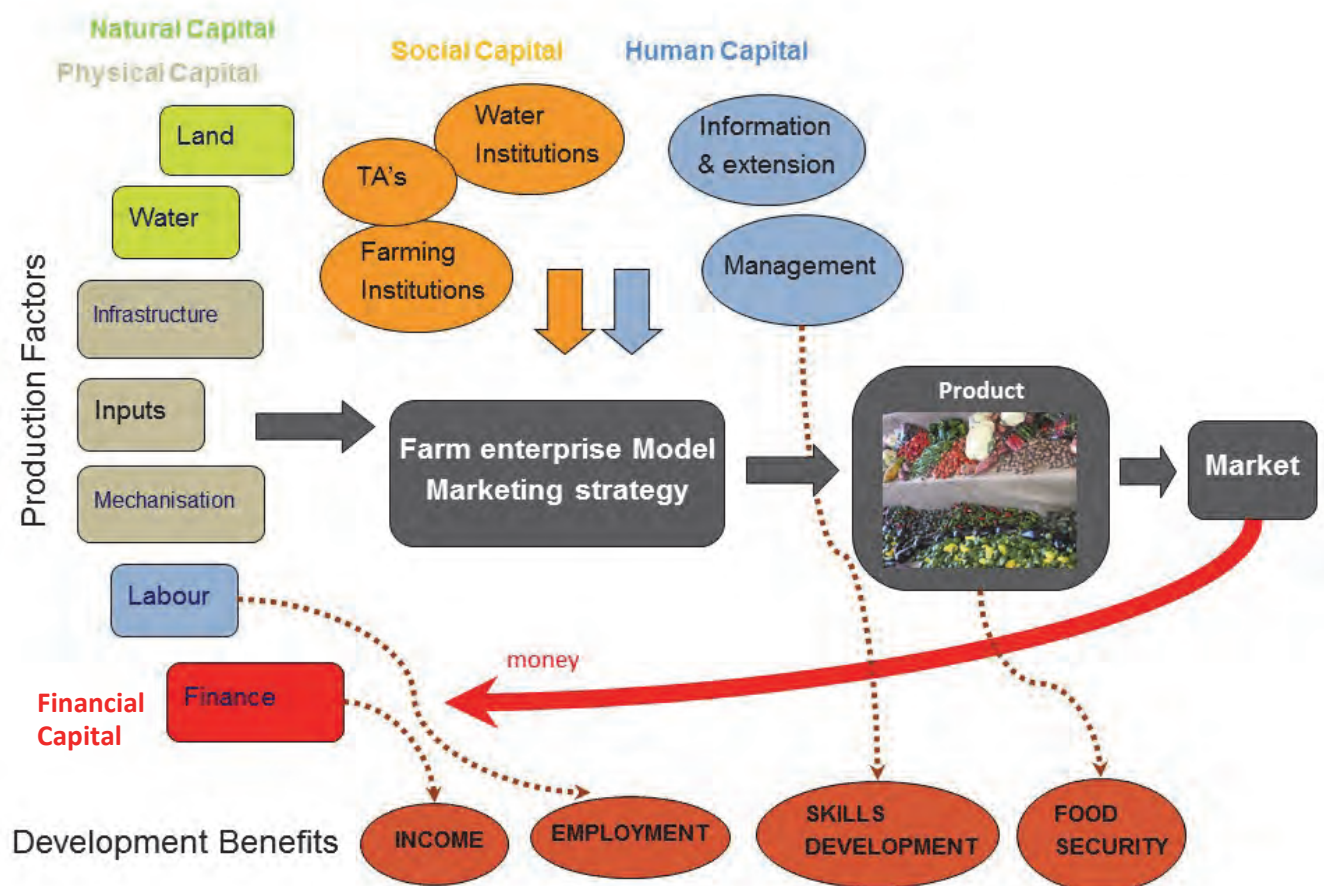


Figure 7.1: A systems view of the farm

7.6.3 Whose aspirations – the household or the individual?

The unit of analysis in this project is the household – the family members and their collective assets. However, agricultural decisions are made in various ways by different families, depending on their situations. The gendered dimension of agricultural decision-making is important and varies, particularly in relation to age, marital status and migrancy. The resources of the homestead – particularly land resources, but not always water or agricultural implements – are almost without exception understood by respondents as being family (i.e. homestead) resources, and not individual ones. Within this unit, access rights are variably negotiated or assigned by tradition.

Some farming investment decisions were found to involve the entire household even when the household head is a migrant worker, whereas other farming decisions are taken by whoever is resident and capable of doing so. This reality requires an understanding of how decisions are made in the household. While people attended workshops and were interviewed as individuals, they primarily reflected the agricultural aspirations of their household unit, albeit led by one individual in practice. The sex, age, education, etc. of the individual in the household who drives the farming activity is still highly relevant, as any interventions to help drive their individual (and collective household) aspirations must respond to them as individuals.

Influences on decision-making

The household is the historical focus of the family, with various forces at play in the form of cultural norms and individual/personal preferences; they are also arenas of modernisation in civil democracy and gender equality. With household cultures and values being non-static and highly evolutionary, the meeting of these various forces sparks contestations for primacy which often result in piecemeal displacements and adaptation, as well as mutation of the weaker individuals.

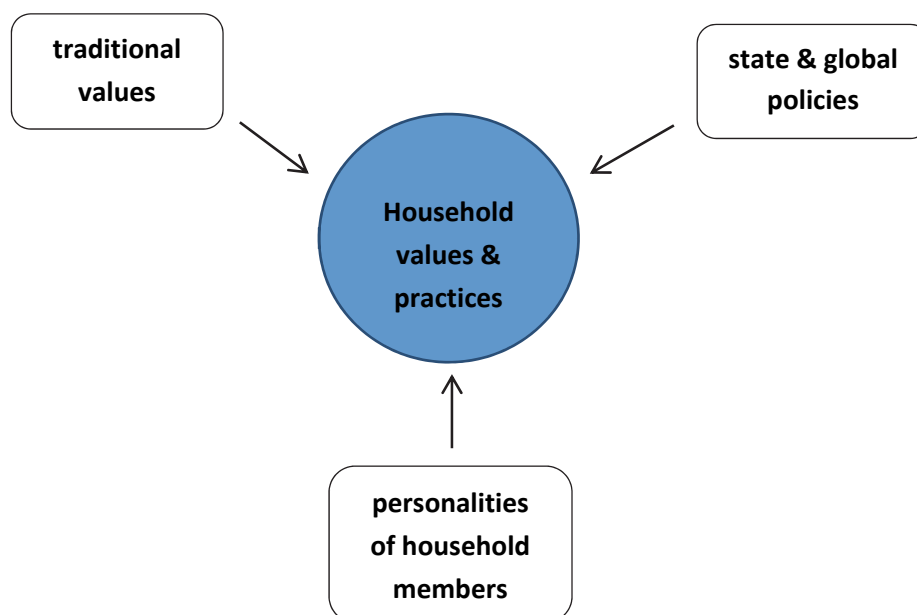


Figure 7.2: A conceptual framework of factors influencing the nature of household values and practice

Decision-making is a term used to describe processes by which organisations (including households, families, village leadership, companies and states) make choices, determine judgments, and come to conclusions that guide behaviours of their individual members and the collective of the entity (Harris, 1998). This section deals with decision-making processes that take place within the household around farming choices and processes. Often household decision-making is a complex phenomenon that varies according to the nature of household activities, ethnicity and gender. Our investigation of agricultural household decision-making in three villages revealed that household decisions, including those related to resource control, rights to water use, labour allocation and distribution of proceeds, are often made jointly by household members, especially husband and wife. However, each one's level of participation in the process varies substantially according to the nature of the decision that needs to be made. There are two major types of farming decisions that are typically made at household level.

Strategic decisions

The first type is strategic decisions, which are taken at the highest level. Here a decision concerns general direction, long-term goals, philosophies and values. These decisions are the least-structured and most imaginative; they are the most risky with the most uncertain outcome, partly because they reach so far into the future and partly because they are of such importance. Because of their

importance, especially in light of the degree to which they affect the future of the household, such decisions are often made by the head of the household in consultation with other household members. Farming-related strategic decisions include applying for land, transacting in land and transacting in big livestock such as cattle. At the study sites, a complete household comprises husband, wife and children, and in such cases the husband is automatically household head. While the proposal for the need to take a strategic action for the household may come from either the husband or wife, or even from children in cases where they are mature and economically active, the processes of making strategic decisions largely involves husband and wife, in consideration of other adult members' views, but it is the husband who makes the final decisions.

The process is different in households which are headed by women, although there are noticeable variations. In this category, the woman household head has the final word in strategic decisions though influenced variously by male family members. Single woman-headed households experience different power dynamics to widow-headed households where more complex marital family influences are at play. In the former, the household is either in the woman's natal home that she might have inherited from her parents, or on her own piece of land acquired by her own initiative. While her household is an integral part of her family and clan network of kin, and in such situations decisions although often taken in consultation with family members, these peripheral dynamics are comparatively simpler in nature. Widow-headed households often live on the homestead of the woman's marriage, which in many cases is interlocked in the late husband's family network. In these cases strategic household decisions are often taken in consultation with the relatives of the late husband.

Operational decisions

These are everyday decisions that respond to the daily needs of a household's farm enterprises. These decisions involve when and how to do land preparation, when and what to plant, the selling of small produces such as bunches of vegetables, and even the disposing of the proceeds thereof. Such decisions are often impulsive and made with little thought. Their impact is immediate, short-term, short-range, and usually low-cost. These decisions can be made by a wife or husband in the household without needing to consult with the other first. What interviewees emphasised, though, is that it is strongly advisable that the decision-maker reports to their partner about the decisions they have taken as the consequences of one bad operational decision would be minimal, but a *series* of bad or sloppy operational decisions could cause harm. In households where husbands are migrant workers, operational farming decisions are largely the domain of women.

The overriding convention at the study sites is for important household decisions to be negotiated between mature household members. At Lutengele and Sirhosheni, when women were asked how farming decisions are made in their respective households, the majority responded by saying "*siya thetha thethana*" (we negotiate) – but this does not mean that there are necessarily equal power relations between women and men in all the households.

Understanding agricultural decision-making in the household

The household is a crucial unit of social organisation in which decisions of consumption and production are made. These decisions are made in light of the well-being and socio-cultural and economic status of the household. Decision-making processes involve negotiations between household members and the balancing of decisions between work for income, and self-consumption (Devkota, Rauniyar, & Parker, undated).

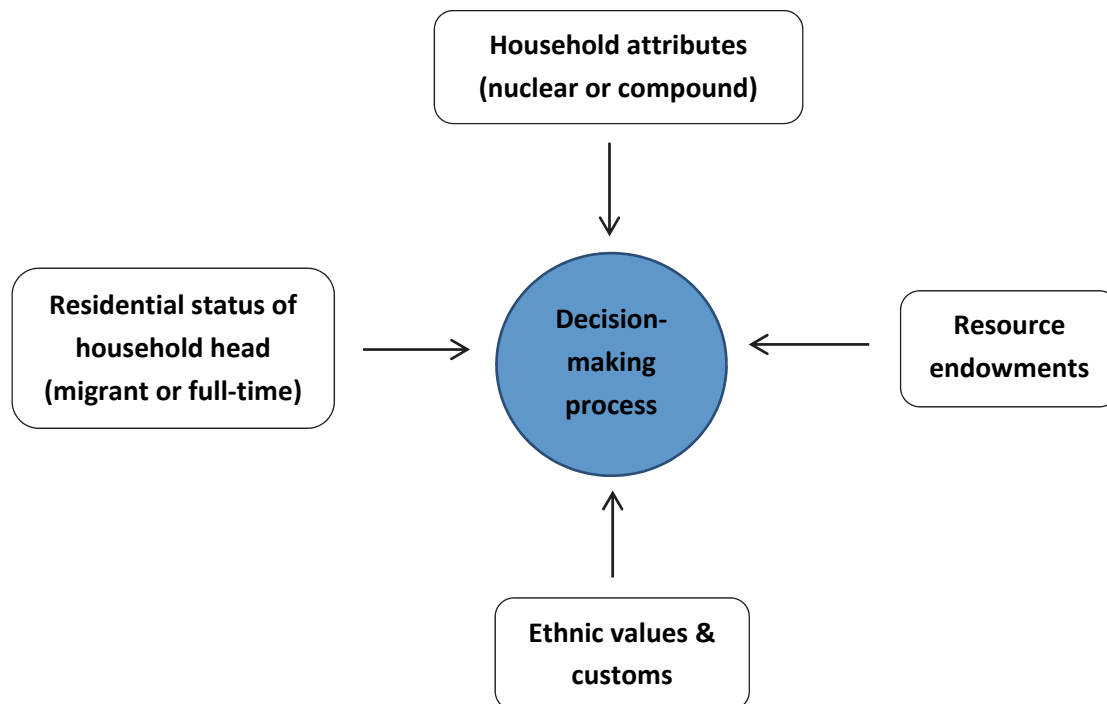


Figure 7.3: Factors influencing household decision-making

The *values and customs* that are observed by the ethnic group to which the household belongs provide an overall cultural framework in which strategic and operational decision-making processes take place. For instance, in the Xhosa tradition it is given that a husband is the head of the household, and that the cultural values and observances of his clan apply in the household of his marriage. Of course, pragmatic compromises may be made here and there to suit different challenges and adapt to emerging cultural forces such as civil democracy and the human rights movement.

Secondly, *household attributes* (i.e. whether a household is nuclear or compound) significantly shape the processes of decision-making. Nuclear households comprise a single nuclear family that includes parents and children, and whether the parents are single or married is not very important. What is essential is that nuclear households live alone, in a social space of relative independence from the powers, influences and decisions of extended family members such as uncles, brothers, sisters and in-laws. Women in such households have very strong power to participate in and influence decision-making, mainly because it is only them and their husbands who control the resources. Besides, many such homesteads are often established when the woman is already living with the man as his wife.

The couple look for land and then establish their homestead together, with the woman contributing in various ways. This empowers her to make decisions around the resources of the household. The situation was found to be different in compound households where, for example, married sons continue to live in their natal homesteads alongside with their parents and siblings. In cases like these, young married women (*makoti*) often have limited voices in decision-making processes. Available resources such as land and draught power belong to the wider family, and not exclusively to the *makoti* and her husband. This means that access to these resources is gained through longer and sometimes more complicated processes of negotiation and decision-making where a much larger pool of role players is involved.

The *residential status of the household head* is very important in determining how decisions are made. The extent of women's participation in decision-making is experienced differently between those whose husbands are full-time residents at home, and those whose husbands are migrant workers and only get home on holidays and at leave time. In the former case, lots of decisions, including some of an operational nature such as choices of land preparation methods, go through discussion processes. Interviewees reported that although constant reporting to and discussions with one's spouse may not be an institutional requirement, it is important that they feel involved. In the latter scenario where husbands are migrant workers, the women (wives) become *de facto* household heads who are responsible for making decisions on the majority of operational issues. However, this does not exempt women from having to report some of their decisions to their husbands. For instance, hiring tractors for land preparation comes with a financial cost to the household, and such decisions often get reported immediately, usually through phone calls, so that the husband can remit the money home.

Finally, the *resources* that a household has impact on how farming decisions are made. Farming resources include land, financial reserves, labour, equipment and draught power, amongst other things. Poor-resource households (e.g. those with very few financial reserves) tend to follow strict and heavily-guided processes of decision-making regarding how money gets invested, and where to plant crops. In such households consultation is often intense and sometimes characterised by tensions and contestations. It is common knowledge that whenever there is a scramble for resources, the weaker parties loses.

7.6.4 Agricultural decision-makers and migrant household heads

Age and education of household heads

Data from the wider-scale livelihoods survey (18% household sample in the villages, n=164) provides perspective on the age and formal education of household heads. The age of the household heads vary widely, from 16 to 90 years of age, with the average of 56.6 years across the three villages somewhat shrouding the reality of age diversity. Most of the household heads are women (61%), and education levels are generally low, with 58%, 61% and 78% of household heads (Lutengele, Sirhosheni and Mbekweni respectively) having Grade 4 or above, equivalent to basic numeracy and literacy or better. This means that across the sample, 34% of household heads have less than Grade 4 and struggle with basic literacy and numeracy.

Table 7.9: Age and education of household heads (n=164 in 3 villages)

Research Site	Average age of people making farming decisions	% of HH heads with less than Grade 4 education	Percentage of women-headed households
Lutengele	54	42%	53%
Sirhosheni	58	39%	78%
Mbekweni	57	22%	52%

It is interesting that a commonly-reported occupation status at all three study sites was that of ‘farmer’, suggesting that most respondents classify food-growing as a primary activity. However, it may also be the result of the reality of high unemployment, where members of households end up spending a majority of their time at home, involved in some sort of agricultural activity by default.

Agricultural decision-makers and migrancy

Aspirations need to reflect the reality that household resources are shared, and that an agricultural enterprise, while often a collaborative family pursuit, is led by a decision-maker. So who are these decision-makers whose aspirations are documented to reflect the reality of their households? The detailed case study investigations survey (n=30 households) revealed that the household head is not always responsible for all agricultural decisions. This theme was further explored and clarified, and migrancy was found to be a key factor in the delegation of farming decisions.

The data presented in the rest of this section pertains to the 30 case study households, particularly to those individuals who make the majority of agricultural decisions. Of the 30 households, three of the household heads (all men) are migrant workers. In these three cases, and through extensive focus group discussion on this issue, the impact of migrancy on decision-making was thought to be representative of the many similar homesteads in each village, where the head is a migrant worker, and decision-making on practical day-to-day matters of agricultural work is done by the resident senior woman of the household.

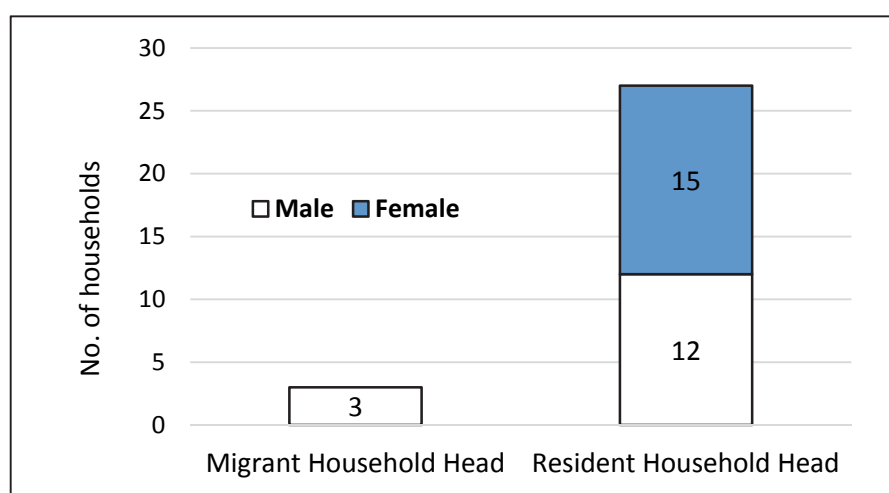


Figure 7.4: Migrancy of household heads in case study households (sex disaggregated)

In determining aspirations with the 30 case study household representatives, it is the views of the *resident decision-maker* that are presented. The earlier discussion on the dynamic nature of agricultural decision-making highlights practical divisions of ‘operational’ and ‘strategic’ decision-making responsibilities. Thus, the engagement was with those who reflect the agricultural aspirations regarding the household’s physical and financial assets. There 15 male-headed and 15 female-headed households in the 30 case study households, but when it comes to agricultural decision-making and aspirations, the three homesteads with migrant male heads are represented by women. This results in 18 case study households where women are the primary agricultural decision-makers, and 12 case study households where men are primary agricultural decision-makers, noting again the nuances of negotiation and collaborative decision-making that were narrated by respondents.

Age of agricultural decision-makers: In the case study households, the sex-disaggregated data in Figure 7.5 shows 3 women and no men who are younger than 35 and 4 women and 1 man between 35-49 years. Most of the farmers fall into the 50-64 year age group (12 in total, 5 of whom are women) and over 65 years (10 in total, 6 of whom are women). This concurs with well-established facts in literature showing that agriculture is largely pursued by the middle-aged and the elderly in these settings. However, a different and useful perspective is that 20 of the 30 case study households, all of which are keen to pursue intensification and/or expansion of their agricultural activities, are headed by people within a highly productive age-group (<65yrs).

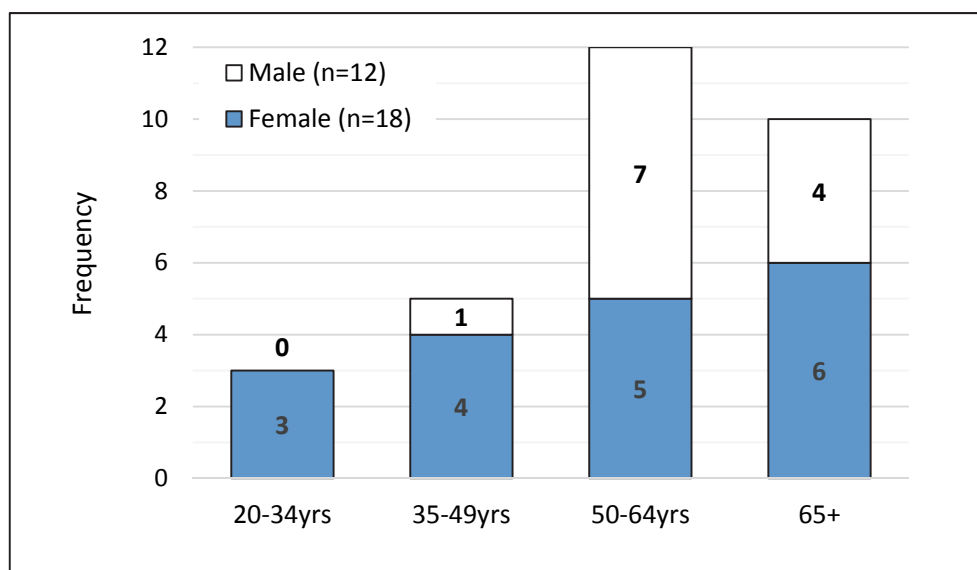


Figure 7.5: Age distribution of agricultural decision-makers (sex disaggregated) (n=30)

7.7 Aspirations of the Agricultural Decision-Makers

7.7.1 Aspirations reflected by future typologies

Once the typologies were collaboratively defined, people were asked to place themselves currently, and then consider where they want their agricultural focus to be in 5 years' time. The current and future agricultural aspirations of the case study households are thus reflected in relation to a typology (as detailed earlier in the chapter). The aspirations, reflected by the primary agricultural decision-makers of the households, are shown in Figure 7.6 and discussed according to each typology below.

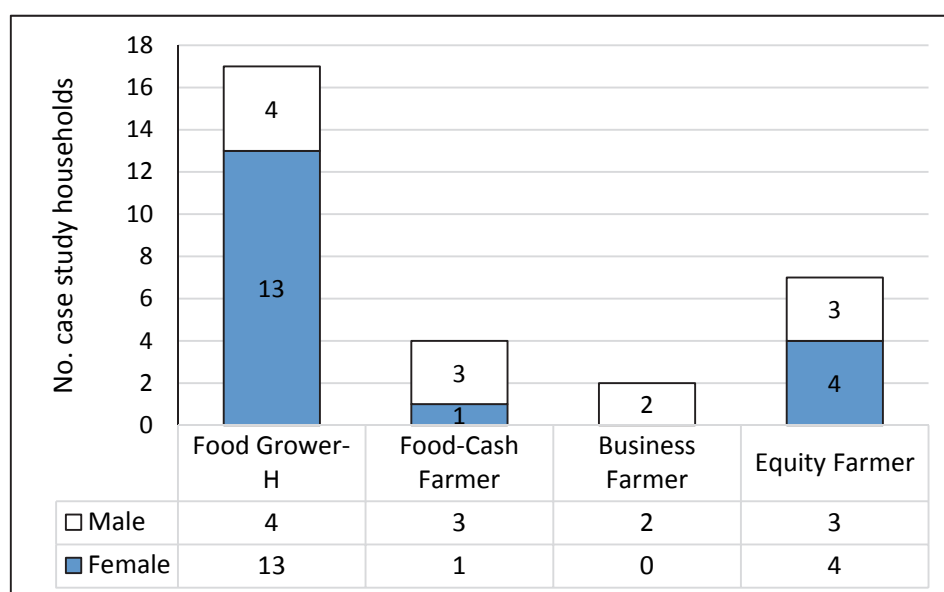


Figure 7.6: Aspirations reflected in type of farming (sex disaggregated, n=30)

High Production Food growers – 17 out of 30

It was found that 17 of the 30 farmers are primarily interested in home food production, using low-risk and low-cost agricultural methods, with farming interest primarily limited to the *umzi (igadhi and isitiya)*. Most of these farmers (13) are women. This group mainly comprises people who are presently trying, somewhat marginally by their own admission, to produce food, but are aware they are short of knowledge, skills, implements, water storage, inputs, etc. to achieve what they want. Yet they continue to invest modestly in food-growing attempts, demonstrating commitment despite obvious skills and resource shortfalls.

This aspiration is characterised by animated narratives of intensively farmed *isitiya* for fresh vegetables (approximately 200 to 800 m² in size and planted 2 to 3 times a year), and the larger *igadhi*, planted with rain-fed food crops typically planted once a year. Intercropped maize, beans and pumpkins, along with bananas (in Lutengele) and winter lambing pasture (oats in Mbekweni) were recorded as crops of primary interest in the *igadhi*. Two of the 17 farmers in this group ranked themselves in the high-producing grower category already, presently obtaining ad-hoc cash returns

from surplus, and passing food freely on to neighbours and those in need (in the spirit of '*ubuntu*'). They chose to stay within that group with the aim of intensifying and expanding, but did not aspire to make the jump to the more demanding and moderately risky 'food-cash' category.

Food-cash farmer – 4 out of 30

Four of the participant households fall into this category and are keen to plant at increased scale with markets in mind. It is of interest that three of these farmers are presently generating income from planned farming activities; two are intensive food growers, and one (a 24-year old single woman from Mbekweni) is in a crop-share arrangement (providing land). The latter has seen the possible yields and returns and now wants to farm and reap the profits herself. The food-cash farmers are differentiated by their practice during the rainy season of expanding the intensive way of farming typical to the *isitiya*, into the *igadhi*. This is made possible by their investment in water harvesting and conservation methods combined with on-site water storage (tanks) and simple watering techniques, which together support a larger area under intensive vegetables in the wet season. The seasonal surplus is marketed locally within ad-hoc and informal (loose) value chains, mainly within the village but occasionally to more distant markets via bakkie traders.

Business farmers – 2 out of 30

The two farmers who aspire to being near full-time, market-oriented business farmers categorised themselves as food-cash farmers at present, i.e. they successfully generate consistent supplementary food and significant farm-based income, though this is seasonal. On the back of these successes and experiences they articulated willingness to take more risks and farm at larger scale. They were both aware of capital needs, likely logistical challenges and marketing hurdles, where they responded with entrepreneurial confidence, conditional on receiving support for a list of challenges that are discussed in the next section. Their ages are 63 and 71 years, one at Lutengele and the other at Sirhosheni, and they typify 'entrepreneurial farmers', estimated by Shackleton et al. (2000) at 1% of the agriculturally active populace.

Equity-labourer farmers – 7 out of 30

Seven of the case study households see their primary agricultural efforts in 5 years' time focused on arrangements of crop-share or farming with partnerships of some sort. What this group has in common is a desire to use their available (family) resource of fields to generate income (and food in cases of crop-share), but not be directly involved in the farming process. The lesser return was accepted because it was more certain, and took little effort or investment. These arrangements, which were listed and explored by participants, face a number of institutional and financing challenges, not least land-exchange arrangements, pricing, and knowledge of contracts. Of the 7 who aspire to this outcome, 6 are presently producing marginally by their own self-assessment, and their lives and interests are focused elsewhere. The seventh is currently in the high food-grower typology, but along with the rest has decided that in future direct agricultural engagement is not for them; however, they see the value of the resource and want it to generate income. While it is of interest that three of these seven households are represented by an agricultural decision-maker who is over 70 years old, age is not a determinant of typology, and age is well-distributed across the other typologies.

7.7.2 Trends and trajectories in aspirations

The assessment of aspirations was based on a ‘typology now’ versus a ‘typology in five years’ time’ visioning exercise. By analysing the present and future aspired-to typologies, it was possible to look at trends and trajectories. The present and aspirant typologies are plotted in Figure 7.7.

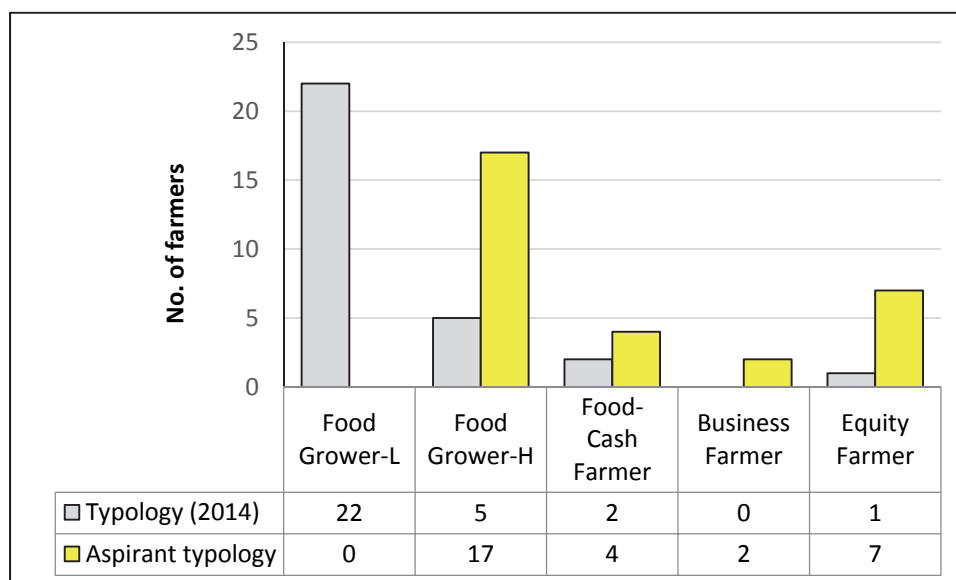


Figure 7.7: Self-assessed present typology (2014) and future aspirational typology

General trend of aspiration to increase farming activity: On observation of the graph there is a clear trend to increase farming activity in future. None of the participants are interested to continue as low-productivity food producers, with these 22 moving into other more productive farming categories, mostly high-productivity food growers, but also food-cash, business and equity-labourer farmers. The aspirations reflect an increase across all categories, and a complete departure from any interested in continuing as a marginally active, low food grower. High-productivity food growers increased from 5 to 17, food-cash farmers from 2 to 4, business farmers from 0 to 2, and equity farmers from 1 to 7.

The total number of farmers involved in some aspect of cash farming (i.e. food-cash, business and equity typologies) almost doubles, from 8 (of 30) at present, to 13 (of 30) aspirants. The general trend of increased (aspirational) farming activity is also presented in the pie-charts in Figure 7.8.

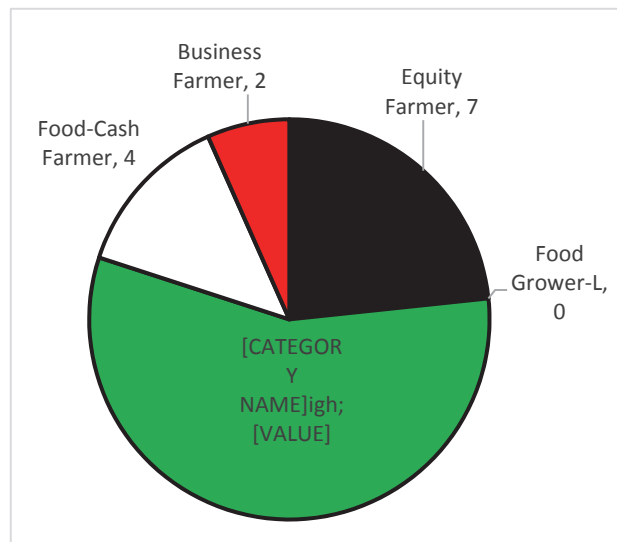


Figure 7.8: Future aspirations for farming based on project typologies (n=30)

The increase from 1 to 7 smallholders interested in an equity-labourer arrangement seems important, as these are people who recognise the economic value of their fields but don't want to farm themselves; however, in developing an equity-labourer arrangement they are constrained primarily by land-exchange institutional impediments and contracting knowledge. This requires targeted institutional development responses, but no farming intervention whatsoever. The agricultural enterprise development is left to local capitalist market forces involving local business farmers, or to outside corporate entities as the agricultural enterprise drivers. On this, people hold the view that there will be interest for uptake of available unused land if the institutional deficiencies can be rectified. This concurs with calls for land-tenure interventions to facilitate consolidation and pave the way for business or corporate farming within communal tenure regimes (National Planning Commission, 2012; Sender, 2015).

Age in relation to aspirations: The ages of the aspiring farming decision-makers is an important factor to consider. Crop farming at any scale beyond small (but intensive) *isitiya*, particularly irrigation farming for the food-cash and business farmers, demands high levels of activity and energy, and a willingness to engage with risks and external markets. Figure 7.9 shows the ages of respondents in relation to their aspirations.

There is diversity in age across the food-grower and food-cash farmer categories, but the business-farmers and the equity-labourer groups do not contain any people younger than 50. The data and the narratives do not indicate any age-related preference, though it is apparent that five of the six farmers who aspire to the more risky categories of food-cash farmers and business farmers are all over 60 years of age. The discussion with farmers on this suggested that farming experience is key to successful cash-income generation from farming, which explains to some degree the age-related findings in these two categories.

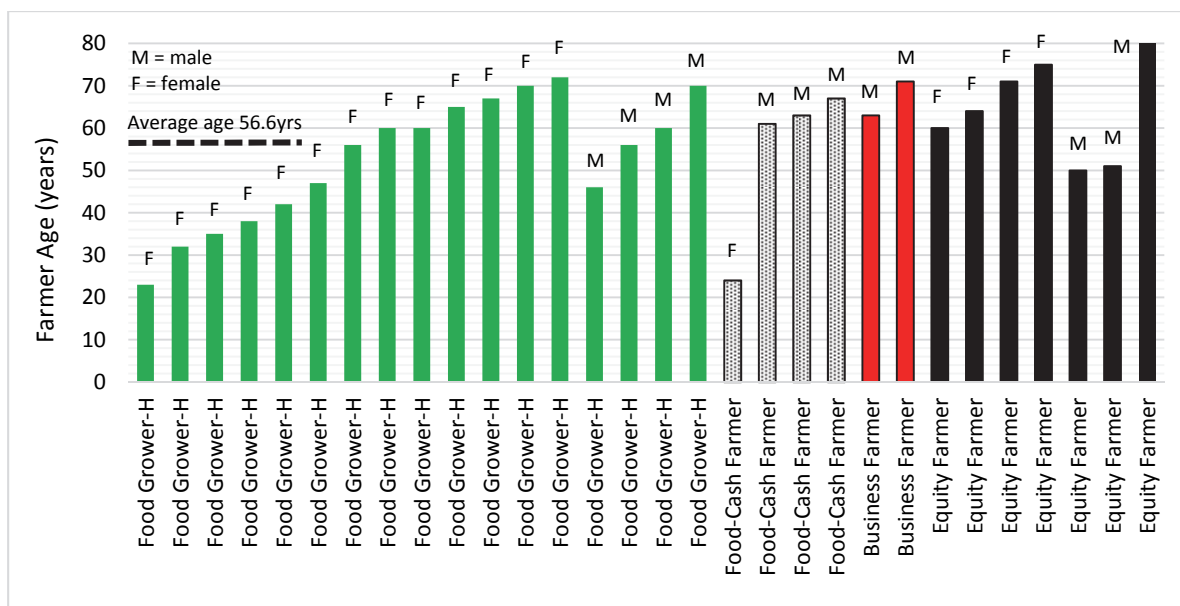


Figure 7.9: Age and sex of farming decision-maker and type of farming aspiration

Aspirations for expanded farming activity linked to previous successes: There seems to be evidence of a growth trajectory where aspirations for greater farming activity are built on previous successes at a smaller scale. The following is of interest:

- In the case of the four aspiring food-cash farmers, which is the first category with moderate risk and significant market engagement, albeit localised, three of the farmers are presently generating income from planned farming activities. Two are intensive food growers, and one is in a crop-share arrangement.
- In the case of the two aspiring business farmers, both are presently successful food-cash farmers. Having seen the income benefits of farming for mixed purposes at moderate risk with limited market engagement, these farmers want to move into the business of farming. Their successful experiences have provided them with the knowledge and confidence that they can succeed in a larger and more intensive, risky venture.

This movement 'upwards' suggests a trend where movement into a higher production category is based on the success of a present, relatively lower intensity and lower risk category.

Discussion with participants indicated that the typologies cannot be seen as a linear trajectory of steady expansion/intensification, but one more aligned with the idea of a quantum leap. This is because a jump to a more intensive/larger-scale typology requires fundamental shifts in the way that farming is carried out (particularly in relation to sources of input finance, mechanisation and marketing strategies), as reflected in the key defining factors of the relevant typologies. This concurs with what Aliber and Hall (2012) termed a 'ladder-up'.

Following from this, all of those with a more business-focused aspiration (food-cash and business farmers) were quick to acknowledge the many limiting factors in their present situation and in relation to the aspired growth of their farming enterprises. They were clear that any growth would require that a range of institutional impediments and constraints were tackled in order for them to successfully make the quantum leap (i.e. be assisted to climb up the ladder to a new typology). Issues of mechanisation, fencing, input financing and securing more reliable markets were primary in the narratives (refer to the detailed section on constraints that follows).

The findings on aspirations are of primary significance in going forward, in that they provide parameters within which to define appropriate response strategies in terms of learning processes, water and crop technologies, and market-access support, all for different scales and responsive to the different needs of each typological group.

7.8 Constraints to Achieving Aspirations

Broadly defined, a constraint can mean anything that may limit or completely prevent people from achieving their desired goals. In the farming domain, such constraints are looked at in relation to the systems view, which recognises that the farming enterprise comprises several components including land, water, infrastructure, mechanisation, labour, inputs and finance (van Auerbeke et al., 2011; Bembridge, 2000; Backeberg & Sanewe, 2013), each of which must perform at a particular level in order for the whole farm system to function optimally. Constraints are viewed in relation to aspirations, and this section discusses the constraints that women farmers in particular face at Lutengele, Sirhosheni and Mbekweni, where food security is low. The information presented is based on findings from the multiple participatory workshops that were held with participant groups of farmers at each site (n=30) and addresses a number of key factors within the systems framework discussed earlier in the chapter.

7.8.1 Knowledge and skills

Food production and marketing knowledge were found to be primary constraints, as self-assessed by participants (Chapter 7). The villages have long histories of a crop cultivation tradition that dates back for generations. Over time, several strands of skills and knowledge have been used and new ones adapted and indigenised through contact with external communities such as missionaries during colonial times, as well as from national developments thereafter. In the early 1900's, black farming at various scales and for various markets was a vibrant one, but the 1913 Land Act and exclusionist policies, modernisation and urbanisation have widely undermined agrarian values. However, participants from all three villages demonstrated a vocal perspective that showed resilience in their desire to plant food, particularly (but not only) within the *umzi*. Their field production knowledge base is strong in the areas of traditional crops (maize, pumpkins, beans, sweet potatoes, spinach) but weak in higher-value vegetables with cash-crop potential. The crops that are chosen largely support a tradition of subsistence farming, with smallholders having very little intention in the past to generate cash income, although they now show a high interest in cash-generating opportunities that might be exploited.

Diversification has taken place at Lutengele, with intensive vegetable cropping intended for cash sale, and these farmers are linked to agricultural knowledge networks facilitated by NGOs. However, the set of local indigenous and indigenised farming knowledge at these sites does not support marketing of production beyond loose (informal, local, ad-hoc) value chains, as this has not been a part of their recent history or practice. While agricultural support interventions have initially focused on food production, marketing (both for input and output) is now an issue to be addressed as overall production steadily increases. Farmers find vegetable production more skills-intensive than traditional crops and more difficult to grow successfully, and given the high water needs of vegetables (seedlings and vegetables need almost constant watering, albeit supplementary), solutions for water are widely sought. While the Lutengele WESSA group was using multiple water-management methods (small storage, rainwater harvesting and conservation techniques), the farmers at the other two sites had limited or no knowledge of these methods.

The high soil fertility needed for vegetable production requires more intensive fertility management responses (manuring, composting, supplementary fertiliser) and plant protection, and few farmers possess these skills. Those with interest in field agriculture are also not idealistic. They see value in partnerships, land-consolidation and economy of scale, and are aware of some of the related risks. But while knowledge on how to create and/or mobilise local institutions to respond to these challenges is available (local land institutions, for example, facilitate leasing), it is not known locally. The findings on knowledge gaps corroborated the initial skills audit. Interest levels in knowledge-sharing, participation in training and field visits is high, with knowledge-sharing networks partly in place through existing farmer groups or associations. One solution identified from experiences at the Lutengele research site in particular is to intensify information flows into and between individuals in existing social or farming networks. The knowledge mediation intervention builds on experiences and is a strategic and dynamic response to addressing knowledge gaps.

7.8.2 Land

Arable land is one of the critical resources in farming. The suitability of land to crop farming is often considered in light of three factors: physical quantity, tenure and arability (land quality). This work focused on the first two factors. An extensive study of the sizes of available land parcels and tenure systems used at the sites was conducted and is well documented in Chapter 6 of this report. It was observed that although households generally hold land parcels of modest sizes, land size is not a constraint and there is widespread land underutilisation at these sites. Land tenure factors were investigated from a gendered perspective in relation to control and user rights. It was found, somewhat contrary to oft-repeated narratives, that there are no obstacles to women accessing or using their (family's) land, but transaction rights are limited by the communal tenure regime which facilitates crop-share through informal institutions, with leasing arrangements uncommon and institutionally risky.

Through focus group discussions and from research findings of work done elsewhere, a possible tenure-related constraint was identified which may occur when landholders want to transact in land with investors from within and outside of their villages. The complexity of the traditional land tenure

system, which is practically a bundle of both collective and individual rights attached to a single piece of land, makes it difficult, even practically impossible, for individual landholders to transact in land, especially with external investors. There is clear scope for administrative mechanisms to be put in place that formally documents and recognises the status quo of family-rights while at the same time adapts this to enable market-related leasing for timelines conducive for agricultural investment, of 5 to 10 years.

7.8.3 Water

A lack of, or limited access to irrigation water is a high-ranked constraint for intensive production. In the context of the *igadhi* and *isitiya* (i.e. farming land with the *umzi* boundary) water was cited as the primary constraint at present. In the fields, a number of factors came into play at similar priority levels to each other: the need for fencing, mechanisation, input finance and market-linkage development. These factors explain the low cropping intensity at all three sites. Chapters 4 and 5 of this report provide details on the research processes and elaborate findings on productive water resources, water use and issues of reform. In brief, the water situation at the three sites is one of severe water shortage that coexists with abundant resources contained in water bodies that include dams, major rivers and springs. At Lutengele there is abundant water following in the Umzimvubu River all year round, approximately ½ to 1 km walking distance from the village, although with an elevation difference of 150-250 metres. Water sources at Sirhosheni, including rivers and springs, are largely downslope relative to arable land. Mbekweni is supplied by the Bushmanskrantz Dam (Notiki Dam) with plentiful water available for irrigation of the 175 ha in the vicinity of the village, but access to water is prevented by administrative confusion linked to the water policy hiatus since late 2013.

At the first two sites the water resources are natural and controlled by the communities. An investigation of rules of use and access found that there are no institutional constraints at these sites. The water problem here presents in the form of a lack of infrastructure to draw water from sources to arable lands. At the third site of Mbekweni there are both infrastructure and institutional issues. The dams are owned by the Department of Water Affairs, which also controls its rights of use and access. Water from Notiki dam, up until the end of 2014, had been dedicated to the irrigation of arable fields by farmers at no cost to themselves. At the end of 2014, the department closed the water supply, arguing that farmers were not using the water productively. Besides this recent development, some farmers have shifted their farming interests from arable fields to home gardening, but the water supply system is not connected to residential sites. As a result of this all, farmers across the three sites largely depend on rain for crop production, though with a significant percentage (63% of the 180 sample households) supplementing by hand watering food and fodder crops in both the *isitiya* and *igadhi*.

Those who have markedly increased their use of productive water have done so in two ways. Firstly, as is well illustrated by many households in Lutengele but also in the other two villages, the more active crop farmers have water-harvesting systems capturing water from roofs and from overland runoff, with storage of 20 000 to 30 000 litres in the homestead. Secondly, some have accessed

water from systems intended for other primary uses, such as in Mbekweni, where homestead growers connect where they can to both the domestic system and the bulk irrigation supply outside of the village. In times of severe shortage, people fetch water from rivers and springs, critical for seedlings and early season planting. The discussion of water constraints also showed workable, demonstrated local solutions to accessing greater water quantities where it is primarily needed (i.e. the cropping areas within the boundary of the *umzi*), both in present-day practice, and in relation to aspirations. These observed and recorded water-access solutions were multiple water-use systems in practice – roof-water and surface-water collection systems, bulk irrigation, garden-supply and domestic water, all mixed in terms of source and use, depending on the homestead priorities at the time.

7.8.4 Infrastructure and fencing

Fencing is one of the largest constraints at all three sites. Due to the farmers' inability to fence their arable lands, stray domestic animals, mostly cattle and goats, destroy the crops. This has disturbed farming efforts, mostly at Lutengele and Sirhosheni, where farmers cite a lack of fencing as the dominant reason for stopping field cultivation. At Lutengele for instance, very fertile, arable fields that lie on the alluvial and wet banks of the Umzimvubu River are largely unused because of the fencing problem, though reasons cited also included crop theft as well as other production constraints. A lack of effective fencing also affects farming in the *igadhi*, and some have resorted to using tree branches for fencing. This is prone to destruction by cattle, while small animals such as goats still get into the fenced field through the big holes between the branches. Sometimes heavy winds blow such fencing down.

Domestic animals are widely kept across rural Xhosa communities and they are an important component of the livelihoods and socio-cultural systems of these communities. Amongst the Xhosa people, cattle farming dates back to pre-colonial times, and the practice is resilient and has adapted to different combinations of livelihoods strategies over this period. In communal rural setups generally, and at these sites in particular, grazing lands are not zoned separately from arable and residential areas, as would often be the case in surveyed and planned betterment villages. Rather, pasture lands at these sites is among and between arable fields. In situations like these, any efforts to promote crop cultivation need to consider effective means of controlling animal movements, and in the long-term such efforts may have to consider cost-effective ways of sustaining a symbiotic relationship between crop cultivation and animal husbandry in these communities.

7.8.5 Mechanisation

There is limited access to mechanisation at all three sites confirming well established findings of very low mechanisation prevalence in South Africa more broadly. Sender (2015) notes that between 1981 and 2004 tractor, density reduced steadily from 142/100 ha to 43/100 ha, which is much lower than international norms – and the situation is likely much worse in the former homelands, given resource limitations generally. This problem mostly affects farming efforts at land preparation stages, when tractors are obviously needed the most. Limited access to mechanisation manifests in two major ways at these sites. Firstly, tractors are physically in very short supply. For instance,

Sirhosheni and Mbekweni each have a single businessman who offers tractor services, using one tractor. High demand of the tractor services naturally lead to farmers joining long queues on the waiting list. As a result, some farmers end up planting too late in the season, leading to poor harvests. In worst-case scenarios, some farmers end up completely failing to plant in some seasons. Secondly, the cost of various soil preparation services (which include ploughing and disking) is often considered high by local farmers, with the lack of competition being a key reason for this.

Despite the high cost, farmers with a history of or interest in field cropping noted that affordability was not the critical constraint (indicative values discussed were R 2700 to R 3400 per hectare for ploughing-disking, with the higher value including harrowing). The late husband of one of the farmers at Sirhosheni used to hire out tractors for land preparation. This business, the farmer argued, was still viable as the demand was there, but it needed a hands-on person to run the enterprise. This conversation led to discussing the opportunity of operating a tractor business along the same principles as the taxi industry. A participant from Mbekweni, a taxi-operator himself, noted that with loan financing support and some mentoring, this was a viable, bankable option. State support or subsidisation of service providers – such as tractor services – can enable smallholder farmers to overcome obstacles related to scale and coordination problems and to act collectively to overcome high transaction costs (Aliber & Hall, 2012).

7.8.6 Labour

Male migrancy to cities and mines for employment opportunities has left the burden of hard farming chores such as ploughing and clearing the land largely to women, children and the elderly. Old age contributes to the withdrawal of the elderly from active farming, especially on arable fields which in most cases are located away from the homestead. To further worsen the labour problem at these sites, the youth are moving away from farming activities, as has become the trend broadly across South Africa. This leaves women as the final, principal labour force. Besides the reality that some of the farming activities such as land clearing and ploughing are often too hard for women, women also have to balance time for farming with attending to their multiple domestic chores, including cooking, fetching water, and attending to children.

At Lutengele and Sirhosheni, some farmers reported that they stopped using their fields due to the absence of their husbands (either through death or due to labour migrancy). In fact, very few female-headed households reported that they use their fields for farming; their primary interest is to farm within their *umzi*, but with various purposes and outcomes in mind, including food and cash. Households that comprise mainly the elderly depend completely on hired labour for their farming, from land preparation to transporting the harvest home, to thrashing. Although labour for hire is generally available at all three sites, this is a very expensive way of farming, especially in light of the reality that these farmers depend on social grants to finance their farming enterprises.

7.8.7 Inputs

The sites practise a two-tier crop cultivation system, comprising traditional crops on the one hand and high-value vegetable crops on the other. The former, which is often the intercropping of maize,

beans and pumpkins, make up what has traditionally been the staple diet of the local communities, although recent developments such as the embracing of new foods including rice and bread as important daily dishes is acknowledged. Seed for these crops is often home-made. Farmers select and keep seed from the previous season's crop, thereby limiting their dependency on the external market. However, in a few cases farmers opt to buy treated and higher-performing seed from the market. Vegetable crops are mainly spinach, cabbage, carrots, onions, tomatoes, beetroot and potatoes. These are relatively new crops in the communities and it naturally follows that knowledge and skills to manage them are still in formative stages. It was also recorded that farmers are not able to grow their own seedlings effectively, making them dependent on the external market to acquire them. Seedlings for all varieties of vegetables are priced at R 15-R 20 per bunch of 15 units. For soil fertility, farmers mainly depend on artificial fertilizers that they buy from urban centres, often at R 550 per 50 kg bag. Although supply is generally good and reliable for all these inputs at the three sites, the distance to the market points (i.e. the nearest urban centres) is a common constraining factor. At Lutengele, for instance, farmers pay a sum of R 62 for a return trip to Port St John's town to buy inputs, in a context of average incomes of less than R 1500/month. This amount excludes the price of fertiliser bags themselves.

While most participants communicated insufficient knowledge to inform optimum buying choices, they confirmed it was possible to obtain fertiliser, seed and plant-protection chemicals if they needed. One critical input is access to a good variety of healthy vegetable seedlings. While some seedlings are readily available from street hawkers in Queenstown (40 km from Mbekweni) and Butterworth (30 km from Sirhosheni), the nursery at Port St John's is not reliable in seedling variety, price and plant health. This is an important constraint to achieving high-intensity production given that a ready supply of healthy seedlings results in shorter cropping durations. Access to healthy seedlings is therefore a priority for attention in any intervention.

7.8.8 Finance

The one factor that seems to cut through all other constraints is the lack of sufficient financial capital to support farming activities and buy inputs and resources. The areas have limited income-generating opportunities, and financial capital is extremely low, as evidenced by the socio-economic survey. As a result, farming is mainly financed by incomes from social grants, remittances, and sometimes piece-jobs that some farmers occasionally do within their villages. The positive influence of cash grants on agriculture is documented by Fay (2013).

A lack of adequate financing is constraining farming in relation to investments (fencing, water, access) and inputs (tractors, etc.). It is important to note that farmers said the cash grants they receive (mainly child support and pensions) are not enough to support field farming, and this is the reason why most of them are not using their fields any more. However, they said that the grants can reasonably cover their investments, but only at the level of the *igadhi* and the *isitiya*, whereas financing for field cropping input is widely out of reach. Indicative financing requirements linked to the different farming typologies were estimated by research participants as follows:

- i. Food grower high production = R 500-R 1 000 in *isitiya* and *igadhi* (homestead)

- ii. Food-cash farmer = R 2 500-R 4 000 in home garden in the *isitiya* and *igadhi* (homestead)
- iii. Business farmer in a 5 ha field = R 20 000-R 25 000 in the *amasimi* (fields)

There are financing mechanisms in various departments that can be mobilised to support smallholder farmers (e.g. the Comprehensive Agricultural Support Programme (CASP), and the Resource Poor Farmers Subsidy) but these are limited in total amount given the need and demand, and are often difficult to access administratively (Joubert, 2015). Five of the case study households (in Lutengele) have previously obtained support from the RPF subsidy, and have significantly benefitted from those systems which are all still fully operational 6 years later. None of the other home food growers or farmers in the project area, however, have been successful in obtaining support, despite numerous attempts. Farmers from Sirhosheni narrated an absence of response to promised mechanisation for field-level maize production, and Mbekweni farmers have had their irrigation water supply to their fields cut off due to conflicted, higher-level institutional factors. There is a clear need to mobilise the already existing, and apparently well-suited subsidy mechanisms, and in addition develop targeted smart-subsidies, such as could be linked to funding a tractor business.

7.8.9 Value-chains and marketing

Due to the relatively low levels of production and small volume of local cash sales, there is generally no marketing problem at present. Where farmers want to sell, they are usually able to do so within the village, in multiple small sales. Lutengele farmers occasionally take bananas, maize, pumpkins and other crops to Port St John's for sale. Problems with marketing are anticipated in the future if more farmers produce in bigger quantities with the intention to sell – particularly for the business-oriented farmers.

7.8.10 Summary and schematic presentation of constraints

The ranking of constraints was attempted with farmers, in the context of the overall system schematic used in the sessions, but it was observed that participants gravitated to attributing success to just one parameter, such as: "All we need is fencing then everything will be fine," or "We need tractors, then the rest is fine". However, when queried about other elements such as financing, the same recipients would acknowledge that other constraints were also serious issues. In order to obtain better insights and avoid a simple prioritization of one problem – which in a systems view is not particularly useful – an attempt was made to assess the severity of the challenge for each element of the farming system and in relation to each typology.

This exercise led to the schematic in Figure 7.9 which provides a visual picture and explanation of the level of severity of constraints for each typology, as well as the overall challenges. While a simple scoring is provided to assist ranking, this gives an equal weighting to each factor (implying each element is equally challenging, which is not the case in reality) but it does at least provide an overall sense of where limited investment resources might best be focused. Interpretation of the schematic shows with reasonable confidence where priorities should be focused.

- **High Productivity Food-grower:** This has limited and manageable challenges, mainly requiring investments in household-level water infrastructure (water storage tanks, ponds or connections to bulk-systems) and on food production knowledge interventions. The Lutengele case in Chapter 5 shows how this kind of intervention can be done and demonstrates sustainability and positive impact. Water and land institutional impediments are insignificant as people are farming within their 'umzi' which is an entirely uncontested space where women have relatively unrestricted access to use available land for crop production.
- **Equity laborer typology:** This option requires a single, if challenging, institutional intervention that facilitates effective land-leasing transactions so that people with land can let others use it, facilitated by secure and defined lease arrangements. This could be achieved through major changes in the national legal and policy framework to achieve individual title to land, but this is both highly unlikely to be politically acceptable, or to take place in the near future. The only practical alternative is to pursue a local land registration and administration process, with leasing rather than sale (or use as collateral) in mind.
- **Food-cash farmer typology:** The constraints for the food-cash farmer mainly relate to the lack of ability to finance water infrastructure investments, fencing, mechanization services access, and perhaps less limiting than these, improved market access. Most of these farmers will be farming within the umzi when these are large (1-2 ha), and in their own rainfed fields, and the scale of their aspirations is such that they would not need to expand (i.e. lease other fields).
- **Business farmers:** As is well-known, this typology faces a raft of significant institutional and infrastructure investment and financial challenges. Intervention responses to support these farmers are multi-fold and complex and have a financial and institutional-transformation emphasis.

cross all of the typologies that people aspire to, knowledge and skills development, water infrastructure investments and fencing are dominant constraints. As aspirations move to larger farming scales, with more engagement with external markets, water and land institutional impediments become more important to address, and in the case of business farmers, critical challenges with multiple factors of the farming system are anticipated.

While the typology of food-grower low productivity was defined to accommodate the present production status of many of the participants, no-one aspired to remain at that level, and everyone wanted to grow more, either through intensification or expansion or both. It is of significant interest, and in fact a qualitative validation of the typological and aspirational body of work conducted, that the relative indicative rankings show that the two typologies with the least constraints account for 24 of the 30 case-household aspirations. In other words, most of the participants have themselves, prior to the analysis as set out here, aspired to the two typologies which have the combined lowest set constraints. These findings on aspirations, combined with those on land availability, use and intensity, give very clear pointers to where future interventions should be focused to build on local interests and needs, available resources.

Constraints	High Productivity Food Grower		Food Cash Farmer		Business Farmer		Equity Labourer	
Farming knowledge and skills	2	Have some capability in relation to traditional crops, but vegetable production and irrigation skills needed	2	Have some capability in relation to traditional crops, but vegetable production and irrigation skills needed	4	Intensive crop production knowledge essential but currently limited	0	Responsibility of lessee, not landholder
Land use rights	1	Within the 'umzi'; women's rights of use are secure	1	Within the 'umzi'; women's rights of use are secure	3	Some will use own fields but scale limited by inability to lease more land. Major institutional impediments	4	Institutional impediment critical; must have secure lease rights to facilitate/incentivise land-leasing
Land control rights	1	Within the 'umzi'. Exclusion, enforcement rights are secure, transfer rights never contemplated	1	Within 'umzi' and in family fields, so rights are secure, with no need to transfer rights	4	Institutional impediment critical – not able to use as collateral, or lease larger areas with any security	4	Institutional impediment critical; must have secure lease rights to facilitate/incentivise land-leasing
Water resource availability	1	Collected rainfall can suffice if WHC infrastructure is in place	2	Collected rainfall can suffice with WHC infrastructure, though this is more costly/risky given the increased farming scale	2	WAR policy and regulations support, but institutional weakness brings high risk (Mbekweni)	0	Responsibility of lessee, not landholder
Water infrastructure	4	Rainwater storage tanks essential for summer and winter continuity and for sufficient scale	4	Rainwater storage tanks / ponds essential for summer and winter continuity and for sufficient scale	4	Irrigation infrastructure essential at field scale	0	Responsibility of lessee, not landholder
Fencing	2	Need fencing around the umzi, but given small garden scale, often have local solutions	3	Due to increased scale of farming, fencing around larger umzi's, and fields is limiting	4	Fencing at field scale essential and major capital cost item for small business farmers	3	Short-term leasing interest unlikely without fencing in place. Long term leases (10yrs plus) provides incentive for lessee to fence
Mechanisation	1	Mainly hand-cultivated	3	Scale requires a jump to some mechanisation, possible but difficult to find locally	3	Scale requires mechanisation in fields, on time and cost effectively	0	Responsibility of lessee, not landholder
Labour	1	Family labour predominates	2	Family labour with occasional employed local labour; affordability issues	2	Employed labour essential and affordability limits willingness, so profitability is key here	0	Responsibility of lessee, not landholder
Access to inputs	2	Only small quantities needed but sources distant	2	Only moderate quantities required but sources distant	2	Inputs are generally available and the challenge is a logistical and financial one	0	Responsibility of lessee, not landholder

Constraints	High Productivity Food Grower		Food Cash Farmer		Business Farmer		Equity Labourer	
Ability to self finance	1	Difficult but are able to finance from cash grants, remittances and ad-hoc sales	3	Smaller scale, but input costs are significant relative to family income	4	Agricultural financing is essential	0	Responsibility of lessee not landholder
Access to markets	1	Ad-hoc sales intended for local market; not expected to be limiting, unless there is high take-up of this typology leading to saturation	2	Mainly loose value chains but need access to external, tighter chains outside the village to maximise cash	4	While some business farmers may benefit from ad-hoc loose value chains (bakkie traders, etc.) risk exposure demands market institutional engagement and access to tight value chains (supermarkets/processors)	0	responsibility of lessee not landholder
Score (indicative ranking only)	17		25		36		12	

4	critical
3	serious problem
2	moderate problem
1	marginal/manageable
0	lessee not landholder issue

Figure 7.10: Level of difficulty in addressing constraints linked to farming typologies

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Chapter 8 Conclusions and Recommended Interventions

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The final chapter brings the body of research work together, following the findings of the water, land and skills evaluations and the assessment of farmer aspirations. A suite of practical evidence-based interventions is presented which responds to opportunities, aspirations and constraints, with an emphasis on women's empowerment in relation to food production. National policy direction and wider developmental considerations are first drawn from the National Development Plan (NPC, 2011), followed by a summary of the main findings of each of the thematic areas of the research work. The final part sets out an outline description of the proposed interventions to meet people's agricultural aspirations given their available resources and identified challenges.

8.1 Policy Imperatives and Agricultural Development Directions

The National Development Plan (NDP) developed by the National Planning Commission (NPC, 2011) presents a holistic assessment of the water and agricultural complex, farm enterprise and production factors, and how these relate to smallholder irrigation farming. It identifies a number of strategic elements that must be addressed and in fact emphasised to take the national rural development and agrarian reform forward. These are presented next.

Smallholder links with large-scale agri-business: While the NDP focus of rural development is on smallholders throughout, strong links with commercial partners and the commercial sector are central to the Plan: "Some under-used land in communal areas and land-reform projects might need to be used for commercial production and established agricultural industries must be enabling partners" (NPC, 2011:219). The Plan emphasises new entrants, value chains, and the development of women's skills and capabilities. Specific interventions to achieve these are not provided, but the NDP notes that creative combinations between opportunities need to be found.

Empowerment of women: Black empowerment and gender economic empowerment have been identified as a priority in the formation and expansion of new businesses, including agri-business, with an emphasis on value-adding. Gender discrimination is reported to be a continuing problem despite efforts that are being made to address the issue. Weaknesses are reported within the institutions responsible for promoting gender equity, including the need for equitable land and water allocation.

Extension – calling for a new cadre: Skills development in the agricultural sector, including entrepreneurship training, is highlighted as critical. This would include the training of a new cadre of extension officers to respond to the needs of smallholder farmers and assist with their integration into the food value chain.

Land and tenure: Tenure security is acknowledged as being vital to secure an income for existing farmers and new entrants. The Commission emphasises the need for tenure security, particularly

within communal systems. “Failing to adequately address tenure security for black farmers in the communal areas and under the land reform program would pose a major risk to agricultural expansion. As long as these farmers (especially women farmers) do not have secure tenure they will not invest in the land and agricultural production will not grow at the rate and pattern required for growth in employment” (NPC, 2011:25). Tenure security for black farmers (especially women) in communal areas and under the land reform programme does not provide the various mechanisms essential for a thriving land market. A land market is needed to facilitate the exit of some irrigation farmers and allow the entry of new ones (i.e. securing rights of use through formal lease or sale); nor is it possible to secure loans for agricultural production without having title to the land.

Local land administration implied: While highlighting the key issues of tenure security generally, the NDP gives a clear pointer to the value of local administration solutions. “The focus should be on cooperating with traditional leaders to secure tenured irrigable land supported by fully defined property rights. This will allow for development and give prospective financiers and investors the security they require” (NPC, 2011:220). The NDP thus talks about cooperating with traditional leaders in order for investors (at any scale) to secure traditionally-administered land with better-defined rights.

Growth markets and employment: The potential for smallholder agriculture (particularly irrigated agriculture) to expand is linked to high-return crops such as macadamias, pecan nuts, rooibos tea, olives, figs, cherries and berries, although the overall scale and climatic suitability is comparatively small for these. Irrigated vegetables are a high-value but also volatile market which could expand by 25% through better linkages to local rural markets, and more distant Southern Africa Development Community (SADC) markets (NPC, 2011:224). Similarly positive are the grain, oilseed and livestock industries, with strong upstream and downstream linkages. The downstream linkages, agro-processing and other support services that are available to create sustainable jobs in these markets are significant.

Value chain interventions and market linkages: The NDP explains that the traditional approach to rural development and improving agricultural income in poor countries is to help farmers move up the value chain by supporting agro-processing (NPC, 2011:228), but notes that in South Africa most value chains tend to exclude small, new or black farmers. The potential role of supermarket chains as a key point of entry into a higher-return market is highlighted, which concurs with international experience (Green 2008 and Sender, 2015), but it requires sophistication to achieve quality and reliability of food supply to outlets. Establishing market linkages must therefore go hand-in-hand with considerations of consistency of quality and supply at farm level.

Cooperatives: Given the dominating presence of existing agro-industries, only niche opportunities for agro-processing exist in the value chain. Importantly, the Commission notes that these “cannot sustain group projects or cooperatives” (i.e. production cooperatives) due to their size and given the need for quick market responsiveness, which is not facilitated by group decision-making. The Plan identifies some cooperatives (e.g. bulk purchasing) that can be key organisations to achieving

collective market bargaining power with other commercial players in the value chain (NPC, 2011:229).

Multi-faceted strategic interventions: The Plan recommends connective infrastructure and emphasises the need to support agricultural enterprise. Government investments, it notes, should support investment in water and irrigation infrastructure, markets for small-scale farmers, sustainable agriculture, land transfers, and skills transfer. It is clear that more investment should be directed toward providing innovative market linkages for new entrants and small-scale farmers in communal and land reform areas.

This list of priorities and considerations provide clear direction as to the how the numerous challenges to smallholder agriculture must be addressed to achieve successful growth of the smallholder sector. The interventions which were formulated and presented at the end of this chapter respond to the reality on the ground as documented in the body of research work, as well as to the analysis of the NDP and the strategic imperatives in relation to rural development and agricultural water set out in the NDP.

8.2 Key Findings Informing the Intervention Strategies

The thematic areas of the study are documented in detail in the previous chapters of the report. An understanding of the socio-economic context of rural households in the three selected villages of the Eastern Cape, and of the roles and responsibilities of the women in these villages, provided important contextual information for the work. This knowledge informed the in-depth thematic research on water, land, skills and agricultural aspirations that followed. Detailed conclusions are presented at the end of each chapter, and are synthesized here with an emphasis on those findings that have led to the proposed interventions. These interventions are thus evidence-based and will, it is proposed by the authors, facilitate the empowerment of women who have an interest in cropping, to increase food production in different ways and in the different spaces that are at their disposal.

8.2.1. Socio-economic overview and spatial demarcation of cropping

The socio-economic scoping survey (n=164) confirmed what is widely known to be the case in densely settled rural areas of South Africa occupied mainly by black South Africans. The sites are characterised in socio-economic terms by substantial material poverty. More than 85%, 81% and 84% at Lutengele, Sirhosheni and Mbekweni respectively live below the Lower Bound Poverty Line, calculated in 2012 at R 468 per person per month. There is high unemployment (between 72-78% are either unemployed or work in the informal sector) and a high incidence of social grants (63-89%). Hunger is prevalent, with 70-94% reflecting insufficient food over the last year, and 17-30% having had no food at all for one day or more in the past month. Asset ownership is low generally. For example, many people do not have their own latrines, so a large number of respondents (10%, 25% and 25%) defecate in the veld, while additional people use their neighbours' latrine.

The situation at the three selected villages is significantly worse, based on government indicators, than the average situation in the Eastern Cape. Despite this obviously dire state of material poverty, the people of these communities cannot be characterized by these socially and economically disturbing facts alone.

Many, though not a majority, are engaging in activities that improve their food insecurity, and generate small but important contributions to their livelihoods from cropping. It was found that most people in the three villages expressed some interest in an agricultural component in their livelihoods in the future (86%; n=164), but are acutely aware of their farming-resource inadequacies, of marginal profitability, and of the multiple risks involved. After accounting for those who have do not have access to arable land, and those who did not use their fields and home-gardens in the previous year, an estimated 30% and 55% respectively, of the total village populations invested in some form of crop production in 2012-13. Of those who grow crops, this is mostly for their own consumption, though 29% sell some produce within the village. Only 4% on average grow food for sale outside of their village.

This activity, while small in total agricultural yields, is important in that it shows agency and determination to act and is important developmentally. The team also observed a sense of resilience amongst people, enthusiasm and energy, willingness to participate, and curiosity in where the research might lead. Laughter and humour characterized interactions, rather than the depression that might be associated with such hardship and material suffering.

Zones of production and their access and use

It became evident that across the three sites, most respondents spoke of different farming spaces and related water-use practices, and importantly used different isiXhosa words to separate these. The spatial terms of *umzi*, *isitiya*, *igadhi* and *intsimi* (explained below) became important in discussing and understanding how a household views its land assets, and how it uses them differently for crop production. These spatial zones of crop production have thus informed the research process in general and also influenced the set of implementation strategies that were developed. The spatial elements of these arable portions within and outside of the *umzi* were differentiated for the study and are shown in Figure 8.1.

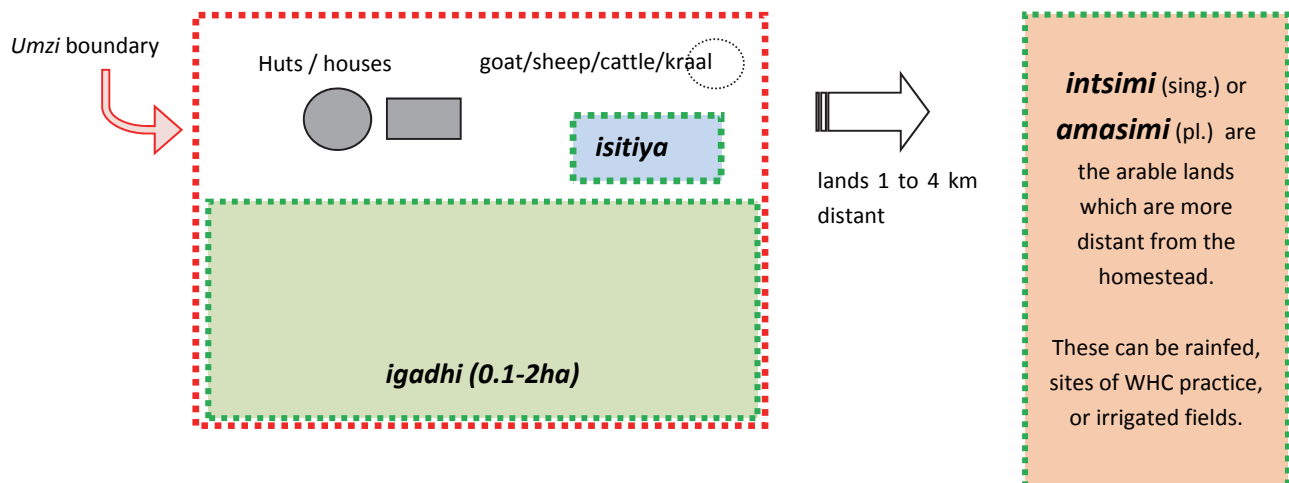


Figure 8.1: Illustration of typical *umzi* layout demarcating settlement, livestock and cropping zones

These spatial elements framed the research process and inform the implementation strategies:

- the *umzi*, which is the boundary of the household and includes the houses and other built infrastructure (kraal, outbuildings etc.) as well as the *isitiya* and *igadhi*;
- the *isitiya*, which is an intensive vegetable garden close to the house that is always watered in some or other way, either by hand or by irrigating carefully by hand or water-efficiently with hosepipes;
- the *igadhi*, which is a larger and typically more extensive rainfed farming area but still within the *umzi* boundary; and
- the *intsimi* or *amasimi* (field or fields), which are generally located away from the homestead boundary itself, and are typically rainfed but may be irrigated.

8.2.2. Crop preferences, nutrition and synergies within the homestead system

The crops most frequently grown in the *isitiya* are cabbage (88%), spinach (78%), onions (47%), carrots (43%), butternut (31%), potatoes (27%), peas, beans and herbs. Where *isitiya* are used (63% who have an *isitiya* use it), it is invariably planted with numerous food crops at one time with related positive nutritional benefits. In the *igadhi* almost everyone plants maize, with about half intercropping with pumpkins and a third intercropping with beans. Less than 20% of people who crop, plant potatoes and spinach in the *igadhi*. The fields are cropped mostly with maize, although intercropping (e.g. with pumpkins and beans) occurs but infrequently. A small percentage of farmers grow winter oats under partial irrigation at Mbekweni for feed during their livestock lambing period. Mixed farming with livestock (chickens, pigs, goats, sheep and cattle) is the norm (Van Auerbeke et al., 2008).

The commonly-found substantial diversity of crops within the homestead is important from a nutritional and a developmental perspective, particularly when compared with proposals for widespread corporate farming, and wage-labour, as a solution to food security (Sender, 2015). The farming of monocrops does not directly translate to increased nutrition as plant breeding, food storage, and processing affect nutritional quality and food benefits. Further, purchasing decisions

using cash obtained from labour, or sale of crops, will less likely be in the hands of women who are largely responsible for food management, and may not favour nutrition particularly where there is a limited variety of fresh food in those shops which are accessible to rural people (Wenhold & Faber, 2008). There are strong motivations that interventions in home gardens promoting mixed cropping and traditional food crops with a highly-diversified crop mix will have the best chance of increasing nutritional security, particularly when underpinned by a nutritional education component (Wenhold & Faber, 2008; Stimie et al., 2010, Oelofse & Van Averbek, 2012). The widely popular traditional maize-beans-pumpkin crop mix has multiple advantages. When maize and beans are cooked (as *mnqusho*) it forms a complete protein and when eaten with pumpkins (both the squash and the leaves are eaten) it is of high food value (Stimie et al., 2010). It also has substantial root development and fertility synergies, both due to the legume-nitrogen interaction, and in drawing on different nutrients at different depths due to different rooting patterns and plant requirements. The intercropping method of farming also reduces weed growth (Azizi et al., 2015; Jansen van Rensburg et al., 2007) and significantly reduces weeding effort which is a heavy labour burden, mostly on women and children who are responsible for this task. Van Averbek et al., (2008) reported highly innovative local modifications to two-bin animal-drawn planters, allowing for simultaneous planting of the mixed crop, along with judicious application of manure and fertiliser. Also important from a nutritional perspective are a range of traditional crops (African leafy vegetables, *imifino*) which are popular, highly nutritious and generally easy to grow though similar to many vegetable crops in that they need a good supply of water for intensive production (Oelofse & Van Averbek, 2012). Increasingly fruit trees are included in the mix of crops, observed at Lutengele in particular, and also highlighted as a markedly increasing trend by Fay (2013) in the Willowvale area.

In rural communities, Wenhold and Faber (2008) point out that the presence and consumption of milk and eggs, and of meat from small and large livestock are important and significant contributors to nutrition, particularly children. Chickens, pigs, ducks, sheep, cattle and goats are part of daily life in the rural Eastern Cape where stock ownership per household is the highest in South Africa. In 2011, 86% of agricultural households owned between 1 and 10 head of cattle, and 67% owned between 11-100 head of sheep (StatsSA, 2013). The proximity to the *igadhi*, of substantial volumes of high-fertility kraal manure combined with the relative ease of haulage to the immediately adjacent *igadhi* was found to result in much higher fertility in the *igadhi* than in the fields (Van Averbek, et al., 2008). In the homesteads participating in the research 70% of those cropping applied manure to their fields, while only 10% applied industrial fertiliser.

Multiple synergies are thus identified and it is logical that interventions aiming to support food security and nutrition can benefit by focussing on the spaces within the homestead and building on endogenous practices and existing preferences. The observed practices in both the *isitiya* and the *igadhi* re-inforce what is found in scientific literature and point to technically advanced systems with multiple benefits in regard to nutrition, saved weeding-labour, improved soil fertility and plant growth, and two-way animal-crop benefits; all having the effect of reducing external dependency, and therefore resilience and cost-effectiveness of production. However, utilisation, intensity and productivity of these systems appears rather lower than what could be achieved. The opportunity then is to re-inforce these highly synergistic systems within the homestead arable portions, and

technically advance them through agronomic, engineering and knowledge interventions. Linking nutritional education to home-food gardening interventions is shown to improve outcomes in regard to nutritional security by stimulating demand for certain kinds of foods and improving the mix of food available (Wenhold and Faber, 2008) and detailed extension and training materials to achieve this, are readily obtainable (Stimie et al., 2010).

8.2.3. Roles and responsibilities of women

The wider socio-economic survey (n=164) showed that between 52-78% (average 61%) of the households are female-headed, but even in these cases other male family members substantially influence decision-making. In the three study areas, culture and tradition still tend to dominate over more contemporary views of marriage and engagement, and the intra-household domain is a variously contested space.

Triple burden: Women bear the triple burden of reproductive work, productive work and community roles and have limited time to expand their agricultural interests. *Time-saving interventions* in agriculture or in any aspect of daily life will have an empowering effect by making time available for other, more enjoyable and/or productive activities.

Secondary aspirations: Women tend to see themselves and their aspirations realised through the well-being of their children. Feminist and *gender-awareness communications* embedded in agricultural information transfer and targeting attitudinal change will help women to recognise and fulfill their own primary aspirations along with their existing priorities.

Generational responsibilities: Roles are dynamic and are constantly being redefined. Democratization, globalization, migrancy and urbanisation have all impacted on local roles such as herding cattle, fetching water, and ploughing, and in addition have impacted on employment opportunities. Ongoing role-changes can be shaped by future interventions.

Marriage and submission: The practice of *lobola* is widely supported by young women as well as their mothers and female elders, yet this arrangement also means a *contract of ownership* involving submission; it is within this arrangement that agricultural decision-making takes place. Violence within the household is common and although it is vocally opposed there is a relative acceptance of subservience.

Voice and decision-making power: Decisions were found to be made at two levels: strategic (e.g. decisions about major investments) and operational (e.g. agricultural decisions). Men, usually with family consultation, make the strategic decisions where they are household heads. At an operational level, decisions are more dynamic and male migrancy, marital status and age play a considerable role. Middle-aged, elder married women and widows have more decision-making autonomy than young single women, makotis, and even divorcees, who must confer with and acquiesce to male in-laws.

Advantages of female-headed households: Female-headed households are an enabling space for women who are single or widows. They have the most control over their household and livelihood

decisions, but also face distinct disadvantages: reduced access to resources, a lower uptake of technologies, a reproductive overload, and increased financial vulnerability – all compounded by the stigma of being a single woman. It is notable that field cropping activity in female-headed case study households is significantly lower than where couples work together.

Assets and empowerment: Assets which are under women's control due to their domestic roles and responsibilities, such as water-tanks, tools, fencing and sheds, have the positive effect of increasing women's bargaining power within the homestead. Saving time and effort to collect water and perform agricultural tasks will have a catalytic effect, and thus provide an important development opportunity.

Implications for intervention strategies: Resistance to change in gender relationships is inevitably strong, given long historical trajectories of entrenched values and norms. As a result the ongoing intra-household empowerment of women is intrinsically linked to wider cultural changes and the acceptance of shifting roles for both women and men. Programme planners intending to facilitate women's agency to increase food production need to focus on asset investments, in this case mainly agricultural water storage and/or water infrastructure. Role-awareness campaigns are also important but only medium- to long-term outcomes (stretching beyond the project timeline) should be anticipated as far as cultural and role changes are concerned.

8.2.4. Conclusions on water resource availability and use

The resource assessment covered the wider resources shared by each entire village community, and the homestead assessment quantified use within the household (*umzi*) using a Multiple Use Services (MUS) framework, which measured domestic, animal and garden water use. Water use (including productive uses) is low in relation to national targets and fractionally small in relation to the available natural resource base, but with high local disparity in access and use.

Village water resources are markedly underutilised.

At both Lutengele and Mbekweni there are major water bodies and rivers that are practically unused (in volumetric terms) by local residents. At Lutengele the adjacent major Umzimvubu River is fractionally used, mainly because of the effort needed to walk and carry or cart water up the 200 metre hill. At Mbekweni the Bushmanskrantz Dam supplied bulk water to the irrigation lands under gravity pressure, but the pipeline was closed by the DWS in late 2014 due to policy confusion. Prior to closure, however, utilisation for cropping was still fractional due to wider agricultural challenges. Total use of available runoff within the wider resource boundaries of the villages is estimated at less than 3% across the three villages.

Water deprivation is widely experienced and local disparity is high.

The typical situation is reflected by the median water use, which is 18 litres/person per day, equal to 2786 litres/month per household (this includes all water for domestic use, for livestock and for watering crops). This is less than half of the required Free Basic Water provision of 6000 litres/month per household. Seventy-one percent of the *individuals* surveyed (n=180 persons) are using less than

25 litres per day and 38% of *individuals* (n=180 persons) are using less than 12 litres per day, including garden and stock watering use. This represents a situation of serious water deprivation.

Productive water use dominates household water consumption patterns.

On average across the 30 case study households, 3224 L/household per month (51%) is used for crop production, 578 L/household per month (9%) is used for animal watering and 2513 L/household per month (40%) is used for domestic purposes. Thus overall average *productive water use* (for crops and animals) totals 3802 L/household per month, which equates to 60% of the total use within the homestead.

People with MUS water infrastructure use much more water for crop production.

The segmented use (domestic, animal, crop) shows the reality of MUS in practice, although not with water supply systems originally designed for MUS, but augmented (tanks) or modified (hose-connections) by locals with substantial (and sometimes unlawful) innovations to supply their dominant agricultural needs. A MUS approach to water supply infrastructure investment, particularly the provision of raw water to homesteads (as modified locally in Mbekweni) and rainwater harvesting through roof and surface water runoff collection (as is the case at Lutengele), is strongly associated with increased crop and animal production benefits.

The cost of water collection is extreme for some people.

At Lutengele, untreated water is typically purchased for building and celebratory events, but also on occasion to ensure seedling survival in food gardens. The cost of water is extremely high and ranges from R 1000/kilolitre to R 2000/kilolitre, although it is purchased in small quantities of 10-300 litres. This is 100 to 200 times the cost of treated municipal water in South Africa, and ironically this cost is incurred by some of the most materially poor people in the country.

Water is but one constraint in fields but catalyses home-food production.

The issue of multiple limiting factors in agriculture is well-established in agricultural systems literature, and was clearly demonstrated at Mbekweni. Here gravity irrigation supply was available in the arable lands at no direct cost to farmers (up to mid-2014, when this was changed by the DWS) but irrigation use was estimated at only 15% of the water available for irrigation of their commanded land. Low water usage was linked to a lack of fencing, financing, profitability, and ploughing services. Yet these agricultural constraints were overcome by the same people within their smaller homestead gardens (*isitiya*), evidenced by high cropping intensities, which lends strong support to the idea that a water investment in agriculturally-active or interested homesteads will by itself result in increased food production within the *umzi*, although this is evidently not the case for field cropping. The same situation of unused high-value irrigable land, right alongside the uMzimvubu River, contrasts sharply with intensive production in water-short households way up the hillside in Lutengele village.

8.2.5. Impact of Water Allocation Reform on women in the project

Disparity in water allocations in South Africa is extremely high and benefits from water are heavily skewed. Water Allocation Reform initiatives had significant positive impact at two of the sites at pilot level, but were never rolled out after piloting.

The DWA Resource Poor Farmers' Subsidy has a positive impact on women and livelihoods at Lutengele. The DWA RPF subsidy funded a water harvesting and food production initiative at Lutengele in 2008. The research documented sustainability of this intervention, vibrant water harvesting and home-food production systems, and significant narratives of benefits to women and their families. However, no cost-benefit or yield assessments have been conducted and are needed to provide additional quantitative evidence of success in addition to the convincing qualitative observations.

DWA support to smallholder WUAs provides a sound platform for intervention at scale.

The situations of smallholder farmers are widely diverse in South Africa in relation to land-size and farming approach, and site-specific opportunities count heavily in converting potential to reality. Sub-catchment agricultural water development plans (as outlined in the DWA WAR Toolkit) that were developed in the DWA WUA support programme that was implemented in Hewu Dalubuzwe achieved coherent strategic planning, with the primary intention of increasing smallholder productive water-uptake (and thus potentially giving effect to WAR). The WUA representatives comprised men and women with interests in home-food and field production for both food and cash. However, uncertainty around WUAs has impacted on the WUA support process and on the smallholder irrigators in Mbekweni (the village research site) in particular.

The case highlights an unfortunate and unintended outcome of the proposed policy review and proposed de-establishment of WUAs. The Hewu Dalubuzwe WUA was a practical, locally accessible institutional vehicle that people invested time and effort into, in the hope that the strategic business plan would lead to agricultural water investments and subsequent local food and economic benefits from smallholder farmers (through irrigation and water-harvesting agricultural interventions). However, momentum and interest was lost with DWA uncertainty at policy level (following the 2013 Policy Review Positions Paper) about their future existence as a WUA.

It is ironic, even politically tragic, that a proposed policy shift to de-establish WUAs to better achieve equity and water redress for HDI South Africans was cause for halting progress on the agricultural and water plans of a WUA comprising only HDI smallholders *that was already empowered and mobilised* to achieve to very transformation the policy shift intended.

8.2.6. Opportunities for Water Allocation Reform emerging from the study

Invest in homestead water storage and MUS infrastructure. Cullis and van Koppen (2007) quantified impact if water was made available at scale at homestead level, looking at a scenario where the allocation for rural households would increase from 225 m³/annum to 610 m³/annum (50 000 litres/month/household). This increase in allocation would reduce the water GINI index from

0.96 to only 0.9. This is a very small shift in water allocation at a regional scale, but would have a major effect at local level by providing all rural households (in the Olifants catchment, which was the boundary of their analysis) with 1000 m² (0.1 ha) of irrigated food plot and sufficient domestic water for homestead use (Cullis & van Koppen, 2007). Such a shift in water access would dramatically alter livelihoods (as can be seen in intensive food production at Lutengele and Mbekweni case households who have augmented supplies), and requires a relatively small reduction equal to 6% of the current entitlements for existing users. In Lutengele, women were empowered through the provision of water infrastructure and tanks, reducing time and hardship collecting water, with resultant increased food production and cash benefits. Innovative local MUS connections bringing untreated bulk water from adjacent irrigation pipelines at Mbekweni village led to similar productive water use outcomes (crop and animal production), but the supply was closed by DWS in late 2014 due to the DWS policy confusion on the aspect of 'user-pays', contrasting directly with WAR objectives.

Water Allocation Reform through water-harvesting intercepting surface runoff to fields. One way of giving effect to WAR is to capture water where people are living and facilitate productive use before the water moves into a downstream reservoir. In the case of Mbekweni Village (and numerous other similar villages in the catchment) this is the Oukraal Dam, which is dedicated to the supply of large-scale commercial farmers. There are various water harvesting techniques that can be used within fields to increase yields where water is a limiting factor and to reduce crop failure from incidence of drought; some of these are considered flow reduction activities by the DWS. These include floodwater harvesting techniques such as saaidamme (likely well-suited to Haytor Manor farm adjacent to Mbekweni), runoff diversion channels to swales infield (Denison et al., 2011), and 'in-field' rainwater harvesting, a well-established method for maize crops in marginal rainfall areas (Botha et al., 2003), amongst others. The other two sites have no such allocations or dams downstream but the same methods would benefit crop production.

These kinds of interventions would cost-effectively intercept water that otherwise would run off into the dam downstream of the village, and capture it in the soil root zone. In doing so, these techniques result in a de-facto re-allocation at source for the benefit of historically disadvantaged farmers – an outcome in line with water allocation reform objectives. Over the last decade there have been numerous cases where existing licensed users have voluntarily agreed to curtailments in their entitlements to facilitate uptake by HDI farmers, through negotiations facilitated by DWS (Enright, 2012). This has attractive practical and administrative advantages in that HDI farmers can benefit immediately through such re-allocations, which are not delayed by extended compulsory licensing processes (5 years or more) in areas where catchments are stressed.

8.2.7. Land availability and tenure

There is a widespread preference for cropping within the boundary of the *umzi* rather than in the more distant fields, a finding which concurs with numerous other studies (Andrew & Fox, 2003; Fay, 2013; Walker, 2011 and Van Averbeké et al., 2008). When viewed in light of the socio-economic findings of high levels of poverty, food shortages and hunger, the findings on land utilisation provide clear direction as to local preferences and opportunities for future increased food production.

Most have access to land. The initial representative socio-economic scoping survey (n=164) identified access to arable portions, an indication of interest in agriculture, and frequency of use. It was recorded that 87% of respondents had access to a small garden (*isitiya*), 51% had access to a large garden (*igadhi*) and 69% had access to an *intsimi* (distant field).

Incidence of use of land within the *umzi* is higher than the fields. The survey also showed that of those households with access to arable land, 63% had cropped within their homestead, while 49 homesteads (44%) had planted in their fields in the previous year (2012-13 cropping season).

Cropping intensity is high within the homestead and low in the fields. Cropping intensity reflects the level of utilisation of arable portions, and is calculated by measurement of the total area cropped in one year, divided by the entire area of the arable portion (e.g. 150% = 1½ crops per year). This data was obtained from the case study households and while indicative, was corroborated by wider field observations and narrative enquiry over the study duration. High cropping intensity (173%) was recorded in the *isitiya* (average size 680 m²), moderate cropping intensity (90%) was recorded in the larger *igadhi* (average size 0.38 ha) but low cropping intensity (44%) was found in the more distant fields (average size 1.32 ha).

Land is a family entitlement. The entrenched and robust perception of land as a family entitlement, and not an individual entitlement, was shared by all. The main limitations of the land institutions appear to apply to both women and men, though it is important that any intervention actions are built on a gendered analysis of intervention scenarios and their likely implications.

Institutional impediments have limited gender bias. Despite wider narratives on the topic, this work could not find evidence that institutions of land administration constrain women's aspirations to use productive land at the three study sites. There are both policies and acts of law that not only encourage women to use land, but encourage local leadership structures to give land to women as a constitutional imperative. Specific caution was taken to identify undercurrent gendered power contestations that might impede women's aspirations but all of the women interviewed said that they do not aspire to having more land, and also stated that having land registered in their names would not make a difference to them. In a context of high land demand however, contestation may prove to be different.

Control rights are uncertain but use rights are not. Property rights are uncertain due to the significant misalignment between policy and practice (by the State) and the varied local evolutions of traditional institutions and practices that have arisen. The continued extension of old-order rights with the 1996 Interim Protection of Informal Land Rights Act has both weakened and rendered uncertain tenure security among land holders. However, this uncertainty relates not to their own rights of use, but to the consequences of leasing out their land, or other transactions in relation to their pieces of land. They fear that there is no guarantee that borrowers will be compelled to return the land when a verbal or written agreement expires, because there is no institutional order that provides certainty in the land-exchange market. The deficient land institutions dis-incentivise exchange and investment.

Implications for the intervention strategies

Focus on the homestead: The low utilisation and low cropping intensity in the *intsimi* (fields) compared with higher utilisation and intensity of arable portions within the *umzi*, confirms the familiar story of widespread withdrawal from field production and intensification in the *isitiya* and the *igadhi*. What is important, however, is the corollary. There is strong evidence from these findings, and from the wider body of literature, that interventions targeting increased food production must focus on the arable land within the *umzi* (homestead) as a first priority, driving an agenda of intensification. Not least is the indication of significantly higher fertility within the homestead portions due to proximity to kraal manure (Van Averbeke et al., 2008), and the developmental sensibility of building on what people are already doing most widely and relatively well. Similarly, the work on aspirations shows that most people want to farm within the homestead boundary, though in different ways, and that the challenges of doing so are far fewer and more easily overcome than farming in the fields.

Institutional re-alignment through local land institutions: Institutional order in the land market can only be brought about by realigning traditional and modern institutions so that they articulate a common position regarding rights in land. At a national level this is a long-standing and likely extended challenge, and provides little hope for achieving the envisaged massive agricultural intensification and expansion by 2030 which is dependent, as emphasised in the NDP, on a thriving land market, amongst other things. Land administration systems, tailored locally and which formalise tenure arrangements and administration, are the only available alternative to change the status quo within the prevailing legal and socio-cultural framework. Local land administration interventions are thus centrally important to achieving greater utilisation of fields. These will have sole application in the domain of the *intsimi* (fields), as leasing of home-gardens is viewed as untenable.

8.2.8. Agricultural Skills

Agricultural decision-makers age and sex: There is widespread albeit often nostalgic interest in farming, with 87% of 164 respondents indicating a general interest in future cropping activity. However, only 63% and 44% of these, with access to arable plots within the homestead and the fields respectively, made an investment in cropping in the 2012-13 agricultural year. The same survey showed that 61% of households are female-headed and it is women who make the majority of agricultural decisions. The ages of the household heads (both men and women) of agriculturally active households averaged 56.6 years, although ages ranged from 16 to 90 years old (n=164). This is important for the design of intervention responses, as energy levels, technology, literacy and various other related factors are diverse. Household sizes are large (averaging 5.9 persons) with high numbers of dependents (children or unemployed = 5.4 persons), so even though some of the household heads who make agricultural decisions are old, there is a sizeable family workforce that can be mobilised.

Knowledge and skills: The knowledge and skills which are lacking relate to many of the technical aspects of water-management, small-farm equipment (i.e. calibrating and operating sprayers,

maintaining watering systems, operating tractors or pumps), financial management, knowledge of marketing contracts, pricing, and the determination of produce costs in different seasons. The results show that the majority of respondents rate their knowledge as competent in basic skills such as determining seed depth (63%), and determining inter- and intra-row spacing (93%). Respondents have knowledge about when to irrigate, including what times of the day and how often, although more training on agricultural water management is wanted.

Preferred learning approach: Most respondents want more hands-on and practical learning-training, and communicated a strong preference for informal knowledge-exchange systems which are locally based, rather than external courses. Media that is thought to be particularly useful includes DVD's, whereas books, manuals, pamphlets and workshops are considered much less helpful.

8.2.9. Farming typologies and related aspirations

A typology of food farmers requiring different strategic responses was developed based on in-depth engagement with research participants. The farming typologies were informed by the location and scale of the food production activities that take place (i.e. the *isitiya*, *igadhi* or *intsimi*), the purpose of production, reliance on family labour, types of mechanisation and levels of external dependency. The latter considers the risks in relation to loose and tight value chains, reflecting market integration and farmer exposure to risk and external vagaries. Crop production aspirations are reflected by preferences for farming in a particular way and location, and can thus be associated with a chosen typology (Table 8.1).

Aspirations of case study households

All of the case study households (30 in total) have a real interest in deriving benefits from their agricultural land in future, although aspirations are varied. A total of 23 out of 30 want to be directly involved in agriculture, with seven keen to lease out their land or engage in farming partnerships of some sort. This must be seen in context, where the 30 participants were selected from agriculturally-active households identified in the initial survey (n=164), comprising some 30-55% of the overall population (who presently have access to *and* use their fields and/or home-gardens for cropping).

The majority of respondents (17) have primary aspirations that are modest in scale but of high importance for households, aspiring to the High Production Food-Grower typology (i.e. to produce intensively, primarily for their own consumption but with ad-hoc surplus being sold for cash). This food production takes place in the *isitiya* and *ighadi*, both of which are within the boundary of the *umzi*.

Four of the thirty respondents aspire to producing significant quantities for their own food supply as well as for cash sale. Only two of the 30 participants are interested in a future as a Business Farmer.

Table 8.1: Farming typologies and characteristics informing the intervention responses

Farmer Typology	Key characteristics: Purpose / labour / risk appetite / external dependence	Approximate scale and location	Crop mix
A: Food grower – low productivity	People who grow <u>primarily for home consumption</u> (and social exchange) but with <i>low productivity and minimal surplus for cash sale. Low-investment low-risk farming approaches.</i>	< 200 m ² <i>isitiya and igadhi</i>	vegetables greens maize pumpkins beans tree crops
B: Food grower – high productivity	People who grow <u>primarily for home consumption</u> , with <i>high productivity and sale of surplus. Low external dependency. Hand-watered.</i>	0.1-1 ha <i>isitiya and igadhi</i>	
C: Food and cash farmer	Farming with intention of <u>significant cash sale requiring external markets</u> . Land preparation is mechanised but family labour predominates. Significant external dependency, moderate risk. Loose value chains predominate.	0.5 ha to 2 ha <i>igadhi and intsimi</i>	food and high-value cash crops
D: Business farmer	Farming for <u>cash sale to external markets</u> and where the farming enterprise makes a <u>dominant contribution to livelihoods</u> . Employed labour. Mechanised. High external dependency and high risk. Marketing through loose and tight value chains.	2 ha to 20 ha <i>intsimi</i>	intensive veg green maize field crops
E: Equity labourer in a contract arrangement	Residents who have rights to land and water but no intention of farming actively, but instead lease or sharecrop. Low financial risk-high contract risk.	Field scale with consolidation of multiple plots and leased out	commodity crops

Seven of the 30 respondents aspire to the Equity-Labourer typology. These are people who recognise the economic value of their fields but don't want to farm themselves, for various reasons including age, life-interests focussed elsewhere, or being resident in the village part-time only.

This typology only applies to the more distant fields, as no-one would consider leasing their *isitiya* or *igadhi* that lie within the boundary of their *umzi*.

Age and gender in relation to aspirations

The gendered findings in relation to aspirations are particularly interesting (Figure 8.2), although gender stereotyping, which can be limiting to women's aspirations, is specifically cautioned against. Of the 17 individuals who aspire to the High Productivity Food-Grower typology (i.e. focused on the *isitiya* and *igadhi*), 14 are women. Somewhat differently, of those with interest in cash-generation as a priority (i.e. both Food-Cash and Business typologies), only one of the six is a woman. Of the 7 people who want to use their land resource but not farm themselves (i.e. Equity-Labourer), the spread is roughly equal (3 women, 4 men).

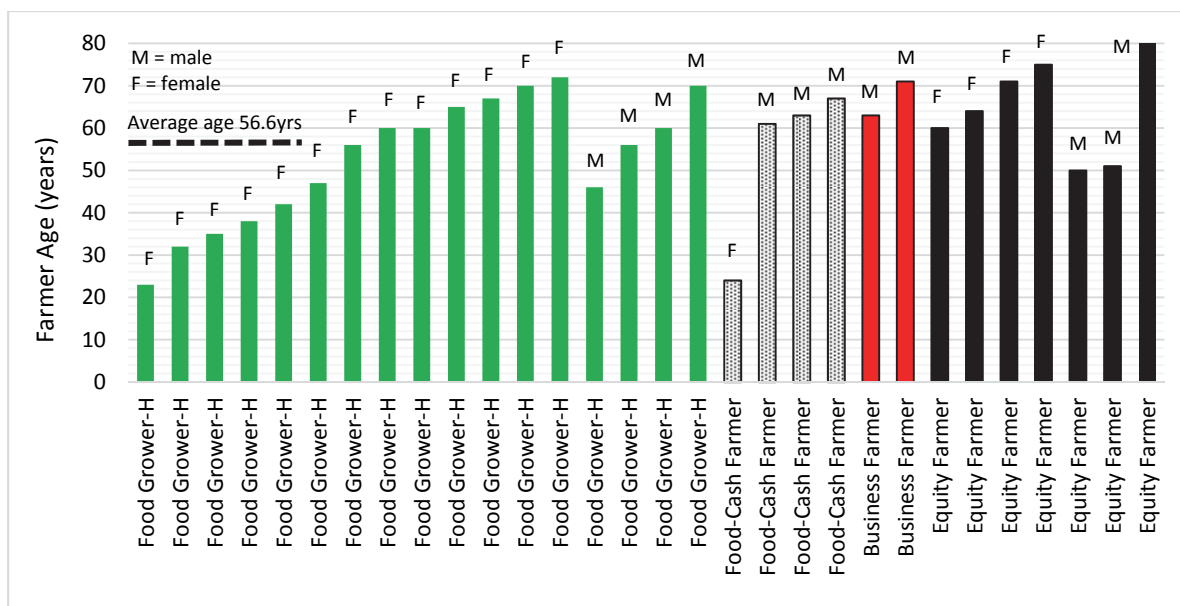


Figure 8.2: Age and sex of farming decision-makers and type of farming aspiration

There is diversity in age across the Food Grower and Food-Cash Farmer categories, but the business farmers and the equity-labourer groups do not contain any people younger than 50. The relatively small data set does not allow definitive conclusions on age-related preference, though it is apparent that five of the six farmers who aspire to the more risky categories of Food-Cash Farmers and Business Farmers are all over 60 years of age. Detailed discussion with farmers on this point indicates that both farming and market experience are essential for successful cash-income generation from farming; this explains to some degree the age-related findings in these two categories.

8.2.10. Overcoming constraints - priority pathways to fulfil aspirations

Ranking of challenges and implications for intervention

The constraints to aspirations were identified and qualitatively ranked by farmers in relation to a systems view of the farming enterprise, and linked to the different typologies (Table 8.2). The schematic lists key elements of the farming system, and ranks the difficulty of the challenge in relation to each element, as ranked by the farmers. The lowest ranking elements (1) can be managed themselves with their own resources or are presently not limiting. Moderate challenges requiring some external support were ranked as level (2), serious problems as level (3) or critical challenges as level (4). In this way the difficulty and risks that they perceive in relation the farming system are reflected in colours from green (manageable) to red (critically limiting).

Table 8.2: Qualitative ranking of farming system constraints by aspirant farmers

Constraints	High Production Food Grower	Food-Cash Farmer	Business Farmer	Equity Labourer
Farming knowledge and skills	2	2	4	0
Land use rights	1	1	3	4
Land control rights	1	1	4	4
Water resource availability	1	2	2	0
Water infrastructure	4	4	4	0
Fencing	2	3	4	2
Mechanisation	1	3	3	0
Labour	1	2	2	0
Access to inputs	2	2	2	0
Ability to self finance	1	3	4	0
Access to markets	1	2	4	0
Score (indicative ranking only)	17	25	36	12

Critical challenge	4
Serious challenge	3
Moderate challenge	2
Manageable challenge	1
Not a landholder issue (leasing)	0

This farmer-led qualitative analysis indicates that on the less complex end of the intervention scale are interventions to support the Equity Labourer, and the High Production Food Grower typology. The latter requires essential support in small-scale water storage or other MUS water infrastructure within the boundary of the homestead, and for support interventions in relation to knowledge and organisational development, mainly to overcome challenges of access to inputs. Fencing and input-access were ranked as moderate challenges given the small scale of farming.

On the other end of the difficulty scale in relation to intervention design, the Business Farmers face a raft of critical challenges reflecting what is widely known and observed – smallholder business farming is complex, marginal and risky, requiring multiple parallel responses to support those who are keen to engage.

Priority pathways for intervention support

The assessment of constraints, of aspirations, and the incidence of use and intensity of use of arable portions, shows that **the production zone of the isitiya, and the typology of High Productivity Food Grower is the priority arena for engagement to achieve increased food production as this typology is a key point of convergence**. It is the kind of farming where support is wanted by most, the one where both incidence of use (63%) and cropping intensity (173%) are the highest, and has the greatest chance of success given the relatively few and more-manageable constraints. Investment in water infrastructure in a MUS framework is critical for support to this aspirant group, with anticipated returns on investment based on de-facto high cropping intensities. However, impact is somewhat limited by the relatively small area and scale of cropped areas that would result, but still significant.

Interventions that support the **Food-Cash farmers** are a next priority; these being farmers likely best supported by water-harvesting, small irrigation and related agricultural support elements but still having the advantage of economies of small-scale (Kirsten & Van Zyl, 1998; Christen & Anderson, 2013). Due to their larger scale than the previous typology, they would require some support across the wider production system, but similarly offer greater food production output. Both the High Productivity Food Growers, and the Food-Cash farmers share a characteristic diverse crop mix, with distinct nutritional benefits, along with livestock-cropping and production synergies related to mixed-cropping in close proximity to the household (higher fertility, time-saving, additional family labour, kraal manure access, ease of watering etc.).

In parallel with the above, an intervention that supports the **Equity-Labourer** by creating enabling land-exchange institutions to facilitate land leasing over timelines that are attractive to farming investment, evidently also has significant advantages in the relative simplicity and narrow focus for programmatic intervention at scale. This approach would target land-leasing of fields and leave the suite of more complex farming challenges up to the lessees; existing resourceful local farmers, often operating local businesses, or successful farmers from outside of the village. Given the social dimension of change involving communities and traditional leadership, and the need for local organisational development and building of trust in a new (local) land-institutional order, timelines for wider uptake are likely to extend into years. Yet this is essential for consolidation and production at scale to catalyse the very low utilisation of available arable fields (*intsimi*).

From the constraints analysis it appears that investment in these three pathways are likely to be the most cost effective and seem likely to give the greatest returns on investment while responding to the aspirations of the majority (28 of 30 case study households).

Finally, It is not suggested that intensive support to **business farmers** should be avoided due to its many challenges; however, in terms of prioritising the application of limited budgets in the pursuance of food production, it seems that this group is likely to be the most costly to support and will present the highest risks given the multiple difficult challenges they face. Yet this group remains important as they are likely to engage in utilisation of the largest portions of land, compete most

effectively in a hostile market place, as well as progress an important part of the political agenda – development of larger scale black commercial farmers.

It is therefore concluded that no single pathway will respond to the diverse aspirations, or use the available set of livelihoods resources to their full potential. The opportunity suggested by the constraints analysis, combined with the aspirational analysis, is that increased food production must be targeted through multiple parallel interventions prioritised with local participation and be tailored to locally resource opportunities, capabilities and predominant aspirations.

8.3 Proposed Intervention Strategies

A number of strategic interventions have been identified from the research process and the focus-group planning sessions. The intention here is to describe the strategies which have potential to catalyse crop-farming, with an emphasis on the empowerment of women. These strategies are linked to the farming typologies which form the basis for a coherent intervention plan that responds to individual aspirations, based on people's capabilities and their available resources. The strategies are not necessarily new in their individual technical form and relevant publications are referred to for greater detail, but when combined strategically and aligned to the farmer typologies, it is proposed that new avenues of intervention design and meaningful action will emerge.

8.3.1 Strategy 1 : Agricultural learning through knowledge networks

The focus of Strategy 1 is to facilitate agricultural knowledge exchange and information access for crop farmers at all scales through linked networks. The establishment or consolidation of innovative knowledge communities (farmer groups) to go beyond their current agricultural practices is shown in the literature review to hold significant chance of success. This approach also conforms with the intentions of the Draft Extension Policy. The innovation revolves around fostering networked expertise, rather than dependence on an individual (i.e. the extension officer) for agricultural knowledge and support in all aspects of farming, which is an unrealistic task. This leads to advances in farming practice by promoting farmer-to-farmer learning as well as links to outside sources of information through a 'facilitator' or farming-knowledge broker. Part of this intervention includes activating and supporting essential links with vibrant information sources, including input suppliers, nearby agricultural learning organisations (colleges, universities) and possibly NGOs, to promote information and knowledge flow – both within the group of farmers in the locality, and to external sources of information.

Consolidate or develop knowledge communities and networks

The aim is to facilitate the establishment or consolidation of innovative knowledge communities which empower participant farmers to develop their current agricultural practices. The innovation revolves around fostering interventions that support networked rather than individual expertise, as well as the advancement of agricultural knowledge in practice by promoting learning and inquiry as a process of creating or articulating knowledge and transforming social practices, rather than just assimilating existing knowledge. One form of networks is 'communities of practice', which are

constituted by people who engage in a process of collective learning in a shared domain of human endeavour. “Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly” (Wenger, 2006). In the context of this project, women farmers, for instance, who are involved in food production, identify themselves as belonging to such group. Communities of practice encompass a joint agricultural enterprise as understood and continually renegotiated by its members (through mutual engagement that bind members together, where they can identify with and learn from each other), as well as a shared repertoire of communal resources that members have developed over time, thus bringing together traditional and specialist knowledge so that members collectively work towards improved practices.

Mediate agricultural learning and improved practice

Agricultural training and development practitioners would need to themselves be trained to form a cadre of *mediators and organizers of learning* who then enable communities to creatively work towards a more resilient and responsive systems. Learning takes place in relationship with others in context and within deliberative and reflexive processes. These learning interactions can be facilitated by agricultural development and training organisations in ‘workshops’ and ‘work-place support visits’. Learning materials to support this are readily available and would include Stevens (2012) with a focus on irrigation, and Stimie et al. (2010) with a home-food production emphasis, Denison et.al (2011) with a focus on water harvesting and conservation among others.

A proposed learning process or cycle of activities to guide the design of agricultural training and learning programmes is described below. The process is based on an interpretation of social learning ‘sequential moments’ (adapted from Wals, 2007):

- i. **Orientation and exploration:** Identify key actors/farmers in a community who share an interest in agricultural activity. Identify their key challenges or issues of concern, so that these can be addressed in a way that connects with their own prior experiences and background, thereby increasing their motivation and sense of purpose and fostering the formation of a knowledge network or community of practice.
- ii. **Raising self-awareness:** Help individuals to elicit their own responses which are relevant to the issues or challenges identified.
- iii. **De-framing or deconstructing:** Help individuals articulate and challenge their own and each other’s frames through a process of clarification and exposure to conflicting or alternative frames.
- iv. **Co-creating:** Facilitate a joint (re)construction of ideas, prompted by discomfort with one’s own deconstructed frames and inspired by alternative ideas provided by others (including those of ‘experts’).
- v. **Applying/experimenting:** Help translate emerging ideas into collaborative actions based on the newly co-created frames, and test them in an attempt to meet the challenges identified.
- vi. **Reviewing:** Facilitate a reflective and evaluative process to help assess the degree to which the self-determined issues or challenges have been addressed, and to review the changes that have occurred.

Adopt principles of human capacity-development processes

Meaningful agricultural and development training programmes should be guided by capacity-development principles to support the learning orientations and approaches described above (Lotz-Sisitka, 2005). This means that programmes should:

- Be relevant and appropriate to the situation and context of the participants.
- Be aware of, and seek to connect with the context in which the learning is situated and the topics under consideration. Nutritional education is an important component, and can mobilise interest in crop diversification when specific health benefits for people and their families are appreciated.
- Mobilise, wherever possible, the prior knowledge or understanding that people have so that it can be engaged with, and, where appropriate, challenged so as to support an enabling 'learning for change' environment. Long established and resilient mixed cropping practices, innovations in planting using modified ox-drawn planters, are two of many examples of high-value local knowledge and insight.
- Support, where appropriate, workplace-based learning. The learning needs to relate to the work environment of the individual, rather than be removed and hypothetical.
- Offer participants the opportunity to engage in task or practice-based learning so as to strengthen the learning experience. Participants and organisations should undertake 'learning' tasks that are related to his/her work context.
- Build on existing strengths and opportunities.
- Support part-distance learning where appropriate. This means establishing an appropriate mix of tasks which involve both working together (in workshops or training sessions) and working away (i.e. in the work-place).
- Support rich dialogue opportunities (discussion by, with and amongst participants).
- Support practical field-work experiences, as well as reporting on experiences and sharing ideas and 'action-taking' related to the learning. The appropriate interlinking of such processes will strengthen meaningful learning.
- Encourage the sharing of learning tools or the 'tools of science' so that participants become confident in using them to explore and solve problems. For example, simple soil quality kits can provide a meaningful research experience that enables people to investigate and deal with soil quality issues.

Empowerment dimension for women

We live in a world where discontinuities are all around us – the degradation of our life support systems, such as land use, is one example. Learning processes that enable these discontinuities to surface and become apparent to a wider circle of participants through well-designed agriculture development and training programmes are proving highly effective. Such dawning realisations from within the participants' frame of reference (particularly women's) are more effective in empowering women than externally derived and communicated messages.

8.3.2 Strategy 2: Homestead water-storage and supply systems

Locations of practice: *isitiya* and *igadhi*

Typologies supported: A, B and C

The Government's policies and strategies emphasise smallholder farmers, food security, and the need to support women farmers in particular. One of the key limitations to home-food production in backyard gardens is water-supply. The empirical findings on water demand and use from the current research project demonstrates the need for additional water-supply at homestead level to increase food production. Present consumption in the 30 homesteads shows that 71% of people are using less than the minimum 'Free Basic Water' supply of 25 L per person per day, and 38% are using less than half this minimum, demonstrating serious water deprivation in the homestead (let alone water needed for food production). Water policy and strategies aim for redress through WAR, and numerous demonstrated strategies that aim to achieve increased food production target home-food production, nutrition, and agricultural development – all of which are congruent with water investments in the homestead.

Within the homestead, water-infrastructure investments can be done in various ways, through roof-water storage, yard-tap connections, or small ponds that collect surface runoff. Yard-tap connections remain highly contentious for productive use due to the costs of purifying domestic water, and their use for food production is typically banned by the local Water Services Authorities. In practice then, increased water provision in the homestead requires a collection surface and storage. Roof-water collection is ideal, but where this is not possible (e.g. where roofs are insufficient in size) then tank-inlet arrangements can be made that draw water from compacted surfaces around the homestead such as nearby roads or runoff ditches. This runoff-and-storage strategy is distinct from on-farm water harvesting methods, where water is captured directly in the soil and root zone. The installation of tanks requires substantial capital investment (approximately R 1000/kilolitre installed) whereas on-farm WHC methods such as tied-ridges and mulching generally require no capital. These latter methods are described separately in Strategy 3.

Pilot programmes for homestead tank installations under the DWA RPF subsidy have demonstrated positive impacts at Lutengele. An expanded programme using this approach at scale, along with parallel agricultural-support efforts, seems likely to have the most widespread positive impact on food production in the homestead, as intended by policy. Whichever WHC methods are found to be suitable to the site, water storage within the homestead of at least 20 000 litres, but preferably 30 000 litres, is essential to support a productive garden and increase food availability. Alternative infrastructure investments would include innovations which exploit local opportunities, such as connecting homesteads at Mbekweni to the irrigation gravity main (an underutilised source of untreated water) which runs alongside the village, as some residents have already done on their own initiative, resulting in the very high water-use measurements found in Mbekweni. These are the farmers who irrigate winter oats to support lambing ewes at critical times (i.e. during spring when natural grazing is depleted). Institutional impediments to this would, however, be significant and

would require bold action by the DWS, underpinned by its own urgent and long-delayed WAR agenda.

Empowerment dimension for women

An investment in mobilising women's agency at the intra-household level (in this case through water infrastructure and tanks) has shown to result in empowerment, and makes sense as it impacts not only on economic development outcomes but also human development outcomes for future generations (World Bank, 2012). Any intervention strategy that seeks to improve food production within the *umzi* is likely to have far-reaching positive implications for women and the villages widely. The contemporary patterns of crop production at the three sites expose a number of realities. Firstly, women provide the principal labour force in crop farming for various reasons, including a widespread absence of male family members due to migrant labour practices. Secondly, the increasing withdrawal of youth from farming in favour of paid-piece jobs would be mitigated to a degree by providing an immediately available job option. Thirdly, crop production is shifting from extensive farming in the often distant fields to intensive farming on plots within the *umzi* boundary, so investments to improve food production within the *umzi* follow trends and undeniable forces already in practice. Fourthly, women do not feel secure and are fearful when working alone in arable fields away from home, which is an important safety issue that needs to be considered. The *umzi* is the place where women are free to work, and where they can balance the triple work burden that characterises their lives more easily. Finally, the management of water for use within the *umzi* is largely the domain of women. Increasing water resources infrastructure (such as installing tanks) enhances the material power of women within the household and thus strengthens their bargaining power in relation to their male counterparts.

8.3.3 Strategy 3: Application of water harvesting and conservation methods

Locations of practice: *isitiya, igadhi and intsimi*

Typologies supported: A, B, C and D

Water harvesting and conservation techniques and their contextual application are documented extensively in WRC and various international publications (Botha et al., 2003; Denison et al., 2011; FAO, 1991). Their applicability to each local situation, involving considerations of soils, slope, runoff areas, crop-type, farming practices and costs must be explored as part of a wider set of intervention responses. These all increase water availability to the root-zone, reduce plant-water stress and improve resilience to drought, contribute to significantly increased yields, and reduce soil erosion. It was found in the research that there is widespread interest in maize, beans and pumpkins, particularly in the rainfed space of the *igadhi*, but in Sirhosheni the rainfall is marginal and in Mbekweni sub-marginal for maize. The most applicable intervention needed to support increased food production in this context (and in line with identified aspirations) is the 'in-field' method developed for South Africa by Botha et.al (2003). While technical expertise is needed in some water-harvesting methods for effective returns from labour and finances invested, many are simple and affordable in their application, and as was evident at Lutengele, where uptake by neighbours and others in the village without formal training as such had taken place. Training manuals with detailed step-by-step illustrations are available for larger implementation programmes to quickly and

effectively train facilitators (along the lines of training of trainers) who can then be deployed at village level to make impact at scale (Denison et al., 2011). Other water-harvesting methods described in this and many similar manuals will also have relevance and the potential to increase food production in the various farming spaces, linked to the different typologies, and in response to local resource opportunities.

Empowerment dimension for women

Given the encroaching climate-change phenomenon of which one consequence is increased hydrological uncertainty, water harvesting and conservation are part of the future of farming and resource management. It is a sign of the future that the 2014 Stockholm Prize winner (the Nobel Prize for Water) was awarded to a rural development practitioner in India for his decades of rainwater-harvesting and watershed conservation work. These are generally low-cost technologies that can be incrementally developed on-farm and beyond, that resource poor and low-literacy farmers can significantly benefit from, especially women, who form the majority of farmers. Techniques such as infield rainwater harvesting have an advantage of allowing farmers to operate independently of their neighbours and even the village at large. Different opportunities are presented by other larger-scale water resource management practices such as watershed management, communal ponds, and irrigation from shared and sometimes limited resources, where larger groups of players bargain for and protect personal and community interests. In situations like these, the interests of the marginalised (who are most often women) are more easily ignored, so these types of technologies need to be introduced through training and infield demonstrations which emphasise women's training, thus placing women at the forefront of smallholder farming technology.

8.3.4 Strategy 4: Linkage to commercial or local nursery

Locations: *isitiya, igadhi and intsimi*

Typologies supported: A, B, C and D

The availability of a variety of robust and disease-free seedlings is centrally important to fresh vegetable production. While theoretically it is possible to grow one's own seedlings, it is neither practical nor is there interest from participant farmers in doing so. Farmers unanimously stated that access to a ready supply of seedlings is necessary for vibrant production. The successful farmers at Lutengele obtain seedlings from an NGO-supported commercial seedling nursery in Port St John's and noted that when this fails to provide the necessary variety, or when seedlings are not robust and healthy, a decline in food production is triggered. At Mbekweni and Sirhosheni, people who are growing fresh vegetables have access to and confirmed availability of commercial seedling suppliers in Queenstown and Butterworth (respectively) despite these sources being distant. Thus, any intervention that aims to increase fresh vegetable food production in the identified production spaces (most commonly the *isitiya* and the *igadhi*) needs to ensure that farmers have regular (bi-weekly) and cost-effective access to a seedling supply. If such a supply is not available locally, the intervention plan must include for seedling supply, either by establishing a small, commercially-

viable seedling supply business, or developing effective and efficient linkages with more distant seedling suppliers.

Empowerment dimension for women: Small food production and other farming enterprises are likely to be unsustainable if they are overly dependent on vagaries of an external market, and such forces impact hardest on those struggling for survival, or loaded with excessive demands on their time and finances. Market shocks such as hikes in input prices and sudden changes of input varieties are likely to hit resource poor farmers hardest. Strengthening linkages for a critical input such as seedlings, reduces vulnerability and stress, increases the chance of success of food production initiatives and alleviating hunger in the homestead – with food supply to the family being a primary responsibility of women.

8.3.5 Strategy 5: Institutional responses to land access and control

Locations: *intsimi*

Typologies supported: C and D

The issue of communal land tenure in South Africa presents a complex conundrum, as expanded on in Chapter 6 of this report. Demands for more land by rural communities often co-exist with large patches of arable lands lying idle in the same communities. Cases where large portions of irrigation schemes lie idle because the plot holders have stopped farming were reported in Limpopo (Perret, 2002 cited in Manona et al., 2010); in their study of Dzindi Irrigation Scheme in Limpopo, Van Averbeké and Mahomed (2006) found that land idleness co-exists with the demand for additional land by some members on the same scheme, as well as by people in the surrounding communities. In addition, Baiphethi et al. (2012) found that in some villages of Thaba Nchu, including Gladstone, Feloane and Postane, most arable plots that have not been used for years, while some people in the same villages need access to arable land for farming. The findings of the present study confirmed the extensive fallowing reported elsewhere (Andrew & Fox, 2003; Porter and Phillips-Howard, 1997; Perret et al., 2000; McAllister, 2000; Fay, 2013; Walker, 2011). The widespread prevalence of low cropping intensity found in the fields (*intsimi*) tells of the ailing story of South Africa's smallholder agrarian economy.

Very little attention, however, has been directed to investigating the contribution of land administration systems and land exchange mechanisms to cropping intensity and productivity amongst smallholder farmers, and there are just a few bodies of work dedicated to investigating the land exchange beyond concepts of ownership and access (Denison & Manona, 2007; Manona et al., 2010 and Baiphethi et al., 2012). There is a clear interest, and willingness of plot holders of small agricultural lands to enter into land exchange arrangements that include leasing, selling, sharecropping and free loan through the facilitation of local land administration structures. Democratisation and shifting attitudes in relation to change are slow but inexorable. The interest is reflected by 7 of the 30 case study households being interested in pursuing this option as their first priority. Similarly Chiefs and Headmen at the sites are receptive to the concept, though that remains to be tested in practice. Strategies for agricultural development that include a local land

administration system which complements interventions by supporting land transactions seem highly likely to contribute to increased land utilisation for cropping – supporting land consolidation to achieve economies of large-scale, business farming, corporate farming uptake, and related wage-labour and land-rental benefits.

The proposed intervention on local land administration also responds to the analysis and proposals of the NDP, which notes that flexible systems of land use for different kinds of farming need to be implemented using a legal framework that is different from existing communal tenure systems. In acknowledging the above two points – that flexibility is necessary and that solutions lie in a different legal framework – the National Planning Commission’s analysis aligns closely with authors promoting local land administration systems and with international thinking (Green, 2008 and de Soto, 2000). The approach will address to varying degrees institutional inadequacies in relation to the access, exclusion, transfer and enforcement of land rights. While greater tenure security in relation to control rights (sale or use as collateral) would provide full tenure security, this requires fundamental legislative change which is politically complex, and highly unlikely to occur in the short to medium term. The demonstrated methods of developing explicit local land-exchange institutions (rules) with active involvement and formal approval by Traditional Authorities, government representatives and farmers’ organisations are well established and can be implemented immediately (Denison and Manona, 2007; Manona et al., 2010 and Baipethi et al., 2012). A local land-exchange intervention, supported by Chiefs, regional government departments and local farmers, has the best and perhaps the only chance in the short-term, of liberating land that remains perpetually locked up and unproductive in the absence of enabling land institutions.

Empowerment dimension for women: By virtue of the explicit institutions, this proposed intervention reduces uncertainties and minimises or eliminates social forces of gender exclusion where they exist. Local land administration interventions can explicitly embed mechanisms that are tailored to respond to women’s aspirations and needs around leasing out or accessing land for crop production. This is likely to reduce marginalisation and/or conflict in relation to agreements which are otherwise socially difficult to enforce, given gendered power imbalances within village society. Strengthened land institutions (through local administration) will improve women’s opportunities to secure greater benefits from agricultural pursuits with lower transaction costs and increased chances of successful land-exchange – either as a lessee or lessor.

8.3.6 Strategy 6: Financed and trained mechanisation contractors

Locations: *intsimi and igadhi*

Typologies supported: B, C and D

The reality of poor mechanisation services is ubiquitous at the research sites. As a result, some people have to wait so long to hire one that it is too late to plant effectively, and many do not obtain access to a tractor at all. Discussions with farmers on their willingness to pay for tractor use, as well as on the actual availability of tractors showed that in most cases, farmers had the available financial means and were willing to pay (approximately R 3400 for ploughing, disking and harrowing), but still

faced the problem of tractor availability. Government has initiated numerous responses to the mechanisation and land-preparation challenge; for example in the Sirhosheni area the Provincial Department of Rural Development and Agrarian Reform advertised government tractor services, with fuel being paid for by the farmers. Community members however had no success in obtaining services despite repeated visits to Idutya offices to procure these. At Mbekweni, commercial contractors are distant and cannot cover a fraction of the demand. Government donations of tractors to disparate groups in the area have not been underpinned by local-ownership processes, or sustainable operational plans. Dependency for diesel and repairs is high making these approaches short-term solutions at best. It is logical that any intervention aiming to increase food production where mechanisation is needed (typically in the locations of the larger-sized *igadhi's* and *amasimi*) addresses this critical constraint as part of an overall intervention plan, or land-preparation and planting will not take place on time, if at all.

The strategic intervention is needed to establish local mechanisation contractors through structured, practical skills-development and business training. In concept, these would be no different to local taxi-operators, and all of the focus groups were able to identify individuals in their vicinity who would likely be keen and capable of pursuing such an option if partial financial support in the form of smart subsidies, and training in running a tractor-business, was provided. One way of providing financing is through co-contributions by the farmer, and Government underwriting of loans from commercial banks, conditional on a certificate of competency from a tractor training course. A development facilitator would have to support the development of a coherent business plan based on local demand and affordability survey. There are simple routine exercises where data can be collected as part of wider watershed planning processes (as discussed in Strategy 8). The business plan would be developed as part of the tractor training course, and would identify ploughing targets (total ha/month) for each active farming month of the year, operating costs (driver, fuel), maintenance costs and replacement costs, as well as monthly loan repayments. Sustainability of the mechanisation contractors would call for systematic monitoring in an intervention-rollout of tractor servicing, financial recordkeeping, and loan repayment. The practicability of this tractor-business approach is supported by the existence of local tractor operators at the various sites, who are in short supply and high demand. These are not complicated development interventions, but require systematic and rigorous support in the field over timelines of years to promote sustainable small mechanisation operations.

Empowerment dimension for women: Priority demands like these must be gender sensitive and in fact can be structured to explicitly promote women's empowerment. Women farmers need to be part of the population targeted to run such mechanisation businesses. In all three villages there are women that are already engaged in entrepreneurial activities such as running spaza shops, evidence (should it be needed) to support the fact that women can run businesses and secure financial benefits in support of their livelihoods. Knowledge is power, and by placing women farmers at the centre of business skills-transfer programmes, they can become empowered in multiple ways.

8.3.7 Strategy 7: Value-chain mapping and optimisation for smallholders

Locations: *intsimi* and *igadhi*

Typologies supported: B, C and D

The value-chain strategy requires the assessment of existing and possible forward-and backward-linkages along value chains, for the predominant cropping systems. This involves identifying and developing market opportunities by mapping and assessing potential off-takers (agribusiness firms, key traders, major urban outlets, etc.), and developing a simple market information system for crops of interest – which in its simplest form would be a register of suppliers and buyers. This would be followed by a value chain analyses to identify and assess major constraints to be addressed (e.g. quality, affordability, availability of improved inputs, technologies and techniques, standards and grading, packaging, storage, transportation and pricing).

Further support could include negotiating technical and commercial partnerships with off-takers, suppliers and service providers, including financial services, underpinned by smart-subsidies from Government, thereby bridging system weaknesses. Other supporting programs at District and Provincial levels (e.g. extension services, DWA RPF initiatives or NGO programs) would need to be identified and where possible, interrogated for market or value-chain synergies. Linking farmers with the Land Bank, with provincial funding to access financing would have to be pursued. These initiatives would underpin parallel strategies in the suite such as seedling supply, tractor business operators, input financing, and possibly micro-credit options. Support and training in the preparation of crop budgets, a simple process that is readily embraced by smallholder farmers, would need to be established. These are all simple and routine activities that do not require complex theoretical underpinnings, but do require a level of senior agricultural economics experience, though at a high level and stretching across a program being implemented at scale.

The approach to value-chain analysis would best likely follow the *filière* approach, illustrated in Figure 8.2, which can be used to develop detailed knowledge on the way agricultural commodities are produced, stored, transformed, transacted and consumed in a particular locality or region.

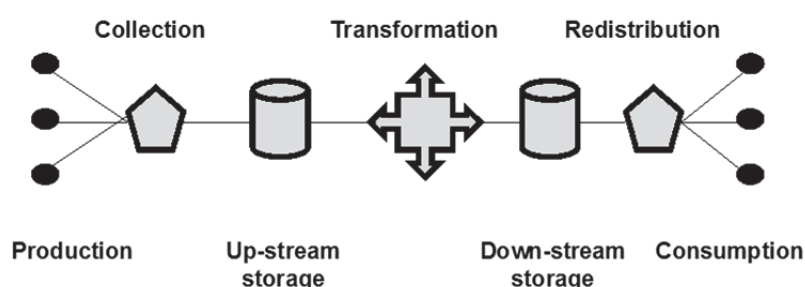


Figure 8.2: Analytical framework used in the study of a *filière* (van Averbek et al., 2007)

A Triple-A framework (referring to Actors, Activities and Artifacts) for use in the analysis of commodity chains arising from smallholder farming is a practical starting point. In this approach, **actors** refer to the people or agencies involved in smallholder commodity chains, **activities** to what

they do, and **artifacts** to what they use in the conducting of their activities. Programme facilitators will assess value chains and identify, establish and support production and marketing linkages with the private sector.

Empowerment dimension for women: Women, who form the largest group of crop growers and farmers, would be empowered through the knowledge-exchange and training process, and their increased control over financial aspects of their lives. Engaging with market forces in an informed way will increase their bargaining power, help them achieve better financial results, and strengthen their sense of self as they engage with external markets for the benefit of themselves and their families.

8.3.8 Strategy 8: Participative implementation planning at watershed scale

“A watershed is an area that supplies water by surface or sub-surface flow to a given drainage system or body of water” (World Bank, 2008:11). The area can be of any size, ranging from a hectare or smaller to millions of square kilometres, but in this case the concept of watershed planning is intended to include one or two quaternary catchments of roughly 30 000 to 50 000 ha each. Boundaries of watersheds rarely correspond with social, economic or political administrative units such as villages, districts or provinces, and while macro-WSM programmes (such as Catchment Management Agency initiatives) typically straddle different provinces or regions, micro-programmes that focus on single or collections of villages have been widely adopted across the world, especially in India (World Bank, 2008). The main advantage of the smaller scale is that the area of engagement is small enough to allow for participatory processes to be used and for consultative processes to align programme interests with those of local stakeholders and Government officials.

Hope (2007) defines WSM as a strategy to increase agricultural productivity, conserve natural resources and reduce poverty in semi-arid regions, especially those which experience highly seasonal hydrologic climates. The Indian government implements WSM programmes as strategies of reducing poverty by using various rainwater harvesting techniques to capture rainfall and runoff and using it to water rain-fed agriculture. Water captured in the rainy season may be used in dry seasons for multiple purposes including recharging ground moisture for crop irrigation, and domestic and livestock water supply.

The situations of smallholder farmers are widely diverse in South Africa in relation to land-size, farming approach, aspirations and the contribution of farming to livelihoods. Site-specific opportunities and preferences count heavily and these need to be systematically identified so as to properly inform the intervention plan which must be locally appropriate, and therefore nuanced. However, a highly localised (micro-WSM) approach poses the danger that interventions are planned as isolated patchworks and are disconnected from the broader context and objectives of protecting the hydrologic system and managing negative downstream and groundwater effects.

Agricultural water interventions at the scales envisaged in the National Development Plan and other key strategies highlighted in this report (be they irrigation or rainwater harvesting methods) require substantial volumes of agricultural water. Some RWH methods will be regarded as a ‘flow-reduction

activity' by DWA, while irrigation (excepting for small kitchen gardens) will require either a General Authorisation or a license. In cases where interventions are conducted at scale (as intended by policy) the upstream-downstream implications must be assessed. Increased national water-stress, the capping of national agricultural abstraction volumes (in the NWRS-2), increased urban demands and climate change realities mean that new interventions, particularly those at scale, must optimise and focus on the areas of highest return (assessed in financial, food and/or socio-economic terms as the case may be). Embracement of a watershed or sub-catchment approach to implementation planning is therefore not only practically necessary for water-supply security, but also highly advantageous developmentally to participatively identify high-priority resources, poverty nodes, degraded areas, etc. International best practice presents a convincing case for a watershed implementation approach to respond to the typologies of farmers identified in the study sites of this project, and the scale of the physical resources at the disposal of the farmers.

South African precedent for larger-scale watershed management is notable (e.g. the establishment of CMAs) and while not well-known, smaller-scale watershed approaches for rural development are also established within the DWA. Sub-catchment agricultural water development plans are outlined in the DWA WAR Toolkit (Empowerment Strategy) and more recently were developed in the DWA WUA support programme conducted in 2011-12. The participative scoping of potential agricultural water development sites has already been completed by numerous emerging WUAs (e.g. Hewu Dalibuzwe, as reported in this study, as well as Edikeni WUA around Alice, amongst others) but without any financial support from Government, these have not progressed to implementation.

Empowerment dimension for women: For those WUAs which are comprised almost exclusively of smallholder farmers and involve the equal participation of women (for example, the Hewu Dalibuzwe WUA), the legally required business plan is a well-suited instrument to engage with watershed planning and identify specific sites for farm-level interventions that meet individual women's priorities. For other groups, the watershed approach similarly ensures connectedness across scales (micro, macro catchments) and the inclusion of key stakeholders. Through participatory planning this is shown to be an inclusive way of identifying priority opportunities, specific locations, technical content and define the scope of locally suitable interventions needed in any area. The DWA smallholder WUA strategic planning process documented in this work shows exactly how. Women were directly involved and their individual and collective voice steered the direction of the plan to achieve the outcomes they wanted.

8.4 Diverse needs and parallel pathways

The performance of the smallholder sector has been weak and in decline over the last six decades and more, but policy direction for the sector is clear. Given the widespread social challenges of hunger, unemployment and lack of alternatives in rural areas with high population densities, there is urgency to provide practical, cost-effective support to smallholders that can be implemented at scale.

Future trajectories of smallholder agriculture include intensive irrigated cropping with high-value agricultural water, as well as rainfed farming, and are mapped out in the NDP with acute awareness of major systemic impediments. Global trends, national institutional deficiencies, lack of economies of scale and market access challenges are generally agreed to dislocate smallholders from profitable value-chains, and widen capability gaps. Replicating large-scale commercial farming in a smallholder context requires structural market interventions that appear politically remote, though numerous calls are made from different philosophical quarters (Sender, 2015; Cousins, 2013; NPC, 2011).

The alternative avenue is to respond to diversity in the smallholder sector, maximizing the cumulative effect of small gains that could be made by many. This repeated theme (Van Auerbeke et al., 2011; Backeberg & Sanewe, 2010; Cousins, 2013; Aliber & Hart, 2009; Kirsten & Van Zyl, 1998; NDP, 2011) is well articulated by Aliber and Hall (2012:548) *“...the emphasis of a new national initiative to support small-scale farmers should be on achieving scale and impact, enabling ‘accumulation from below’ for a substantial portion of the existing population of small-scale farmers. Between the agendas of welfare and food security for the poor on the one hand, and narrow empowerment and commercialisation on the other, this must make possible an alternative path of widespread sustainable growth and improvement in the small-scale farming sector.”*

While there is widespread agreement on the challenge, practical solutions are scarce. The study identified significant land and water resources at the three sites and parallel opportunities in the spaces of the *isitiya*, the *igadhi* and the *intsimi*. An important question posed by the research team during this study was: Do those smallholders with land and water resources really want to farm? It was identified that most people in the three villages have interest in crop production in the future (86%), but are acutely aware of their farming-resource inadequacies, of marginal profitability, and of the multiple risks involved. Between 69% and 87% of people have access to fields and home-gardens (n=164), and when combined with data on incidence of use, an estimated 30-55% of the village population are cropping in fields and home-gardens respectively, which concurs with the literature. While the findings indicate low land utilisation, they provide strong evidence of significant agricultural commitment with more than a third of the rural population investing some time and money in cropping, if not with the desired intensity and productivity. Agricultural decision-makers from the 30 case study households comprised women and men aged between 23 and 80 years old, with ten of these being younger than 55. All of these farming decision-makers demonstrated clear intent to derive agricultural benefits from their land, but had widely differing aspirations. Thirteen aspire to home-food production, 5 to small-scale farming for food and supplementary cash, 2 to business farming and 7 to leasing out their land or entering into crop-sharing arrangements. It is significant that women and youth are well represented, though not in all groups.

The interventions strategies developed from the research, and with participating farmers, are not revolutionary in their individual form, but present an alternative approach to engagement that facilitates multiple parallel avenues of smallholder development. This is expected to initiate synergies within the village resource and social systems and exploit the niches of smallholder opportunity that have thus far remained largely un-activated in South Africa. The authors thus propose that when the combined set of strategies which are outlined in this report are implemented

with intent, they will contribute to an agricultural transformation process that is practical, can be implemented incrementally as funds allow, and is programmatically scalable. These multiple strategies open an 'alternative path' for diversified smallholder development.

Finally, the expansion of the concept of irrigation development to one of agricultural water development, which includes water-harvesting in its many forms, is centrally important to achieving the desired impact at scale. It is a sign of the future that the 2015 Stockholm Water Prize was awarded to Rajendra Singh for his decades of work in rainwater-harvesting and watershed conservation work in India to support increased agricultural and environmental water productivity. These technologies allow for opportunities to be supported by both intensive irrigation, as well as rainwater harvesting in fields, from roads and ditches, and from roofs and together, as options, will be more responsive agricultural water solutions for the smallholders who are farming differently in different spaces.

When supported with Government investment that is concomitant with stated national rural development targets, meaningful progress towards WAR targets, home food security, and the massive agricultural water expansion intended in the National Development Plan, seems not only theoretically possible but also practically achievable. It is motivated that the tools and justifications are well-established and on the table; what is needed is courage and commitment to drive the clearly stated vision into action for the benefit of rural land-holders, and particularly women.

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Appendices

- Appendix 1** General notes on 30 participating case-study households
- Appendix 2** Water Allocation Reform Empowerment Strategy Overview and Productive Water Use Pathways
- Appendix 3** Smallholder WUA Training and Strategic Planning Programme
- Appendix 4** Strategic planning extract from Hewu Dalubuzwe WUA Business Plan
- Appendix 5** Capacity Building Report and Suggestions for Improved Student Research Management

List of workshops and capacity building interactions with research participants
- Appendix 6** A note on the application of theoretical frameworks used in the study
- Appendix 7** Questionnaire use for socio-economic scoping survey

Appendix 1

**Selected field notes taken during surveys
in Lutengele, Sirhosheni and Mbekweni Villages**

Case Study Field Notes

Lutengele/Qhoboshendlini and Tyityane – PSJ

Compiled by Project Team

**UCG 115 - Water Research Commission Research Project
Women Land and Water**



1. Mambuyiswa Zinyusi

Homestead code: 20

Section: Qhoboshendlini

Elevation: 242 metres

Mrs Zinyusi cares for two children, and during the interview on 24 October she was also caring for another child (many of the elderly woman care for neighbouring children). Although she is in the agricultural group involving WESSA, she did not receive a JoJo rainwater tank. Mrs Zinyusi is not working but collects a government pension of R 1200 per month.

Mrs Zinyusi obtains most of her water from the Khukhupi river, which is below the school and fairly close by. She has recently purchased a small JoJo tank (as of last December). She complains the tank is too small, but because she has little children it has helped. She is also using the tank for irrigation, but she is not using pipes or hoses to direct water to her gardens; instead, she is putting the water in a 20 L bucket and using this to water her plants (*ganganshela*). If she had a bigger tank she would irrigate better and use it on her bigger garden (*igadhi*) as well as on her *isitiya*. The rain this year has been good and has helped a lot, she attests.



2. Mabonisile Zinyosi

Homestead code: 15

Section: Qobo

Elevation 222 metres

There are many people living in Mrs Zinyosi's family, twelve in total. She has four tanks from the local agricultural project run by WESSA. The family lives on two pensions and four child grants. Nobody directly in the family is working; some other family members send money home, but very infrequently. She sells vegetables in the village to survive.

The four tanks are able to satisfy all of Mrs Zinyosi's needs. She does not have a field, but has access to one (at the *ahlathini*). She desires to use her field but does not have the money to buy fencing; if she did, she would consider farming on it. The WESSA tanks have substantially assisted her in getting ahead and she does not suffer as she did before. She attests that others in the village suffer without tanks, and she is grateful for the project assistance she received from WESSA.

The rain has been heavy this time of year and her tanks are full. She is going to try and conserve this water and she has learned to use it sparingly. She puts water on her garden with a cup and takes care to watch how much she uses. She does not have any irrigation pipes or hoses that she uses for irrigation. She says that in the winter it is difficult, but people generally are struggling with issues of water because of the distance to collect it from clean sources.



3. Noyolile Mngcetywa

Homestead code: 17

Section: Qoboshendenlini

Elevation: 265 metres

There are eight people living in Mrs Mngcetywa's homestead, including her husband who is 65 years old. Nobody in the homestead is employed, and the family survives on one pension and three child grants. Mrs Mngcetywa also sells produce from the garden, but mainly in the village area.

She has four JoJo tanks from the project that were given to her by WESSA. These tanks have helped in her production, but because her garden is small and lacks fencing it has still been difficult to grow anything substantial. The water is used for general family purposes: bathing, drinking and washing clothes, and not for irrigation. Mrs Mngcetywa finds that people are not getting sick as much as they did before receiving the water tank. The benefits of the tanks are obvious by the family's improved lifestyle.



4. Mama Mcingelwa Sitwa

Homestead code: 25

Section: Qoboshendenlini

Elevation: 279 metres

Mrs Sitwa's husband has left her and married another woman. However, she still resides at her husband's homestead, with her three sons. Her eldest son, Linditemba, works in Rustenburg in the mines (Betricks), and his wife lives with Mrs Sitwa. Linditemba plans to care for his mother and take over the homestead. He comes home during holidays, and had come back for an additional two weeks in 2012 during the mineworkers strikes; he returned after the Marikana massacre, during which 44 striking mineworkers were killed and at least 78 injured.

Linditemba's wife, a recent *makoti*, stays at the homestead, and she and Linditemba have three children. Pasika, their second son (born in 1985) is building what he calls "an American-styled" home on the homestead. Pasika works as a plasterer and builder in the area. Nzuzo, the last born, is 18 and also helps Pasika in the construction industry. The sons were home when many of the initial interviews took place. The family aspires to develop the homestead and to have a much larger garden in the future.



The house consists of two sheds with a veranda. Linditemba helped the research team map out the measurements of the *igadhi*, which is still in early production phases. The holes (*imilindi*) were recently dug and the poles (*izibonda*) had yet to be put in the ground. The *isitiya* is in the centre of their future garden, and is smaller than those on other homesteads where interviews took place (approximately 198 m²). The size of their *igadhi* is approximately 340 m².

Most people work in their own gardens, but *ilima* (work parties) do take place, mostly to help with garden weeding, which happens earlier than in the other villages (Mbekweni and Sirhosheni) because Lutengele is comparatively fertile. Harvesting maize also occurs a few months ahead of the other villages. The months of weeding (*siyahlakula*) are October-December. Other work parties happen in August to plant beans (*bayatyala imbotyi*) or to plough. In exchange for joining a work party, one usually gets *umqombuti* or *amerhreu*. According to Mama Sitwa, "*Masihlakula senzailima lomqombuti ne le imbila amerheru ne tea ne sonke (for) abanga se li tywala*", meaning "Tea must have milk. You must take care of your people. Sometimes you buy a pig and people will come in good numbers to work the gardens".

5. Olwethu Kenya

Homestead code: 51

Section: Tyityane

Elevation: missing

Mrs Kenya, a recently-married *makoti*, lives with her three children on her in-law's homestead. At the time of the interview, Mrs Kenya was again pregnant. Her husband, who works in Natal in construction, is away most of the time but he sends money back frequently and is the sole breadwinner for this young family. Mrs Kenya travels to Port St John's to collect the money; the distance is far and the trip arduous. The family also collects one child grant as an additional source of income. There are five people who live on the homestead and four others who reside there on a regular basis.



At the time of the interview there were lots of geese and ducks in the yard. There is a small *isitiya*, and at the time of the interview, maize was drying in the house. Mrs Kenya explained the prices for *eskwaba* (cobs), which can be sold in bundles of ten for R 30, or for R 3 each. She also gave the costs of dried grain and other vegetables.

Mrs Kenya does not go to the river often as she collects most of her water from rainwater tanks. She frequently hand-waters her garden, rather than using connections such as hosepipes connected to the tanks. When she does collect water, she uses 20 L buckets to collect from the springs nearby or the river. She gives 20 L to the animals every day to drink. The larger garden is not in use and only the smaller *isitiya* is in production.

Mrs Kenya reports that the tank water is not dirty but good to drink. When the tank runs empty she goes to the *emthonjeni*, taking her children, who carry small pails, with her to collect water. Water has to be collected most often from May to July, because during the winter months there is a shortage of rain and the tanks run dry. She also uses barrels to collect rainwater from the gutters of various roofs.

Mrs Kenya has one very old tank that was made with concrete, as well as a new plastic JoJo tank of 2500 L. She explains that she tries to conserve as much water as possible when she can. She is proud of the family's accomplishments and desires to develop the property.



6. Nomava Nogwada

Homestead code: 49

Section: Tyityane

Elevation: 322 metres



Mrs Nogwada's husband used to be a local taxi driver and then went to work constructing roads, but that job ended in September 2012. He has been out of work since then and has travelled as far as Rustenburg (where he was offered assistance by other family and friends living there) to look for employment. He has found some piece-jobs in the area, but the family hopes that he will find more secure work to help them to get ahead. They would like to invest more into purchasing animals, as a form of security. Mr Nogwada also wants to buy a truck for a local taxi and hauling business. Currently, R 500 a month is collected from child grants.

Mr Nogwada was at home during the initial interviews; at the time, he was busy ploughing the gardens and planting maize, squash and beans. He also had sections of his gardens cordoned off for other types of vegetables.

Water is collected in a rainwater tank, but when this dries up Mrs Nogwada collects it from the Umzimvubu River, which is far away. She carries 20 litres of water each trip, and reports that it takes 3 hours of her day (1.5 hours/trip), as she goes to the river as often as twice a day. She collects water more frequently and regularly in the winter months when there is no alternative and the local river springs run dry. Lately, it has been raining heavily so she hasn't collected from the river that much, but she has still gone a few times. When her children are back from school they help her to collect water. Their son, aged seven, is the most help. Their young girl, aged three, is still too young to help much, but as soon as she is able she will also collect small amounts of water.

Mama Nogwada takes 5 litres to the garden and then, with a cup, disperses water sparingly, giving a half a cup to each one of her plants. The level of precision and care for her plants is well noted, as is her determination to collect water at such a distance in order to ensure the success of her farming activities. She waters her gardens in the morning and late at night, going to the river when necessary.

7. Nolundi Noceba Zibandayo

Homestead code: 11

Section: Tyityane

Elevation: 376 metres

Mrs Zibandayo is a widow with five children; her deceased husband used to be a taxi driver. She has a large, thriving garden that wraps around her house, and even her small sons have their own sections of garden (50 m²), of which they are proud. They aspire to sell some of their produce when it is ready, particularly beans.



Mrs Zibandayo collects water from the *emthonjeni*, but when this dries up she has to get water from the river. She does not have a donkey, so when she needs water she hires someone as the distance from her homestead to the river is extreme (see photo below). She has two tanks but uses these for home-use only. Her old tanks were zinc, plastered with a cement mixture. These were reportedly installed in 2002 through an NGO project in the area. These were replaced with JoJo tanks in 2008, and while she says that the water is clean, the new tanks incur mud and film inside and “there is a difference in the taste” between the tank types. Mrs Zibandayo puts water from the *emthonjeni* on the garden, as well as water collected in many ad hoc containers around her homestead (there are many small and large buckets surrounding the yard). Mrs Zibandayo attests that these help her to garden. The children are responsible for collecting water and allocating it to plants. She explains that livestock also drink water from the *emthonjeni*.

Mrs Zibandayo also sells extra maize) from her garden in sacks, charging R 150 for sack of 50 kg of kernels. She has never sold *izikhwebu* (maize cobs) as she says that local residents are accustomed to buying maize in kernels, but might consider this in the future.

She would like to sell more produce in the urban centres where people buy maize by the cob but transport is difficult because of distance and costs. She also explains that she can sell squash in bags for around R40 for a sack, similarly for potatoes. Her garden boasts many varieties of plants and some aloe, eggplant, peppers. There seems to be much more variety in terms of veg compared to Sirhosheni and Mbekweni. Mr Makeleni’s analysis accounts for the differences in variety (described in this final report).



Concerns expressed by Mrs Zibandayo include the stress of paying expensive transport costs to and from town, as this is limiting her ability to market her surplus produce in town.

8. Gertrude Ndabeni

Homestead code: 5

Section: Qhoboshendlini

Elevation: 253 M

Mrs Ndabeni is an energetic development 'dynamizer' in the village. She is a widow whose husband passed away in 2011. She has one daughter, and her daughter's son (and her only grandchild) lives with her. Mrs Ndabeni has also adopted three daughters (ages 14, 17 and 18), siblings whose father has passed away; the eldest of these no longer lives with her.

Mrs Ndabeni has recently started collecting a pension, and all three children receive a child grant. She also derives some income from her project involvement with WESSA, but this is inconsistent and generally consists of gifts and money for hosting volunteers on various projects, who are often hosted at her *umzi*. She sells garden produce to people in the village and sometimes outside the area, particularly at Ngxongweni. People sometimes travel to her to buy cabbage and spinach. Mrs Ndabeni also sells animals when she needs money to pay for feed and medicines for her livestock (goats, cattle, sheep, chickens and pigs).

Mrs Ndabeni mostly collects water from her concrete rainwater tank for use on her *isitiya*. She rarely goes to the Umzimvubu River, as it is too far. Her grandson goes to the river sometimes to fetch water with the donkey, but he is scared to fall into the river and does not like to go. Mrs Ndabeni finds that there is ample water in the tanks, so going to the river is rarely a necessity.

Mrs Ndabeni said that it is difficult to get water at certain times of the year. One of her adopted daughters collects water every day after school from an *emlangeni* which is deep in the forest, but says that there are lots of snakes there. Sometimes Mrs Ndabeni pays for water to be delivered to the homestead. She pays transport costs of R 10 for 20 L. She and her grandson give approximately 25 L to the animals each day, and all animals drink at the same place.



9. Mbizelwa Sadina (Tityane)

Homestead code: 43

Section: Tyityane

Elevation: 247 metres

Mr Sadina lives with his wife and their four grandchildren. He used to work in Durban on a sugar cane farm and has some knowledge of farming, but because he is getting older he finds such work difficult. As a result of his unemployment, he says that his family is suffering. They grow food for subsistence. As income, the family receives R 280 from a child grant.

Mr Sadina belongs to the WESSA group as the only male participant. He says his involvement has benefitted his family, and he considers himself to be very successful this year in his farming activities. His family's gardens boast many fruits and vegetables, including some produce which others do not grow, such as yams (*madumbe*), pineapples, bananas and oranges. In addition, they grow spinach, carrots, beetroot, maize and beans. Gardens are heavily intercropped and the family uses mulch to ensure better soils. Mr Murata noted, however, that mulching does not necessarily lead to good crops and harvest.

The family feels that 'success' is defined by their ability to grow food and support their children, so their farming interests are less about generating income than growing food for consumption, although any surplus sales are welcomed and some extra income is derived from selling fruit in particular. The household has a big garden and the potential to produce additional surplus to sell.

There is a JoJo water tank from the municipality which is cared for by the family, but this is a community asset that Mr Sadina takes care of but does not own, and the family cannot use it for their personal needs. The family usually obtains water from the *emthonjeni*. When this dries up they have to go to the *Umzimvubu* River, often renting a donkey at R 40 per trip. The donkey is able to carry 40 L, but because of its cost the family is usually only able to use it for one trip. It is cheaper to hire a car (at R 10 per 20 L), but there are often no cars available as drivers make more money taking people to town than hauling water.

Mr Sardina fetches water for the garden, and Mrs Sardina fetches water for domestic purposes (washing clothes, cooking, drinking, etc). Mr Sardina usually fetches water twice a day, either from the *emthonjeni* or the river. Mrs Sardina also goes twice a day to collect 40 L of water for household use, sometimes assisted by one of her older children if she has to go to the river (a trip that takes 3 hours by foot). The burden of collecting water is expressed by Mr and Mrs Sardina as a concern and one reason many of the tasks in the gardens (such as weeding) are neglected.

All garden watering is done with buckets or by hand. Similar to other households, hand-watering with cups is done meticulously in order to conserve water, especially after the effort of hauling it up steep slopes.



10. Lindiswa Madolwani

Homestead code: 36

Section: Tyityane

Elevation: 293 metres

Miss Madolwani works part-time for the Apostolic Faith Mission in the area and attends meetings for her church and for WESSA. She has never been married but has one young child; her sister has one child and another baby who passed away recently. The umzi belongs to Lindiswa's mother, but Lindiswa is in control of the household as acting head, and her older mother enjoys her daughter's maturing into the role of managing the family's affairs. The family has a little shop selling drinks, but this is not very successful by their own evaluation.



Their gardens boast an excellent array of produce and are more elaborate than many other house-holds, with wild insecticide, apple, guava, peach, granadilla, and mango trees, as well as spinach, beetroot, and other vegetables. Miss Madolwani experiments growing what she can for home consumption and some sales.

The homestead has three tanks. Two are buried in the garden and collect from ground- water sources; the third collects rain from the gutters. These are makeshift and old, but are currently being improved. Large containers are used to collect additional water. Miss Madolwani waters her gardens by hand with water from the two tanks that collect run-off. She also uses a lot of water for her animals.



Miss Madolwani attributes her success in the garden to the tanks, which are from WESSA; she sees these as an integral asset to the household's daily operation, even though the water is sometimes dirty. Since the tanks have been installed, she has not needed to go the river.

The family has a field for cultivation but it is not being utilised, due to a lack of time. The family is also unable to afford fencing. Miss Madolwani desires to increase her agricultural endeavours and her production. She would like to start selling surplus produce on a more permanent basis if she can generate substantial yields.



Case-Study Field Notes: Interviews and narratives from research trips to Sirhosheni

Compiled by Project Team

UCG 115 - Water Research Commission Research Project

Women Land and Water



1. Nodazini Qalani

Female-headed household

Mrs Qalani is a widow and a grandmother. She cares for three of her grandchildren and her eldest daughter, who lives in Butterworth, comes home regularly. The approximate sizes of Mrs Qalani's gardens are 503 m² (isitiya) and 6035 m² (igadhi).. Mrs Qalani and her grandson complained that the fencing needs work and they rated its effectiveness as poor. She also has access to a field but, it is unused.

Mrs Qalani stressed the importance of the work parties (*ilima*) that take place between neighbours, saying that the practice is part of the social fabric of the community, particularly for those who are elderly and require help in their gardens at certain times. She spoke of the importance of work-party exchanges (*ilima*), saying that if people help you in your gardens or fields, you are obliged to help those same people in return. Most work parties take place from March to April when weeding must be done. Another common practice is to hire work parties by brewing beer, or slaughtering a goat.

Mrs Qalani desires a larger garden to help support her for several months of the year with extra food, and so that she is able to brew *umqhombhuti* from the maize grown and provide feed for her chickens. Despite her age and declining physical ability she maintains her garden through reciprocation, helping others in their gardens and receiving help in return.



2. Nombini Umhlaba

Female-headed household

The Umhlaba family consists of six members. Nombini is 47 years old and widowed. She cares for her older daughter Amanda and her younger child Thulisile, as well as Amanda's two children. Her nephew, aged 30, also resides within the homestead but because of his work obligations as a truck driver he is often away; however, he considers the homestead as his home base and frequently comes back. The family subsists predominately on remittance wages from him, as well as on two child support grants.

Nombini's mother passed away recently, in 2011. According to Nombini, she was the driving force behind the homestead's cultivation and had extensive knowledge and interest in crop cultivation. However, since she died the garden and *isitiya* have been left fallow.

Both Nombini and her daughter want to start planting again, but are still recovering from the financial burden of the funeral costs of their (grand)mother. They hoped to begin again in 2014. The large sizes of both the *isitiya* (573 m²) and the *igadhi* (3292 m²) indicate that there was once productivity at a fairly large scale, and the desire to continue cultivating in the future is strong.



3. Manelisi Mqotlolwana

Male-headed household

There were four family members living at the Mqotholowana homestead at the time of the interviews. Two of Mr and Mrs Mqotlolwana's children are married and have moved to Cape Town. Their daughter, who has a child but is estranged from her partner, has also moved there to look for work.

Mr and Mrs Mqotholowana look after their daughter's child; their daughter remits R 150 to them each week, sometimes more. The family also takes care of the child of Mrs Mqotholoqana's sister, who works in Willowvale. Both children receive a child support grant of R 280, amounting to an income of R 560/month, which helps support the family. Mr Mqotholowana is a Zionist Bishop and supports a local church; funds from the congregation enable some financial support to host events and feed the family when the Church has gatherings, which are hosted at his homestead, but he derives no salary. The older male siblings of the family rarely remit wages, as they are trying to make their own way in Cape Town.

Mr Mqotholoqana says that work parties still take place, particularly from January to February, and while they are not as frequent as before they are still a highly valued activity. The farming equipment around the homestead is roughshod, rusted and worn. However, Mr Mqotholoqana owns a trailer that is pulled by oxen, and this is used throughout the community. They also have a sled with a 220 L container strapped onto it. This is pulled by oxen or cattle and used to carry water to the homestead, and for community events. The family collects water almost daily from the natural springs nearby, and when it is hot and the garden is in production they collect twice a day.

The homestead is located in a depression where water often pools, even in the summer months so the garden has good access to water, but Mr Mqotholoqana only plants a summer crop as he likes to keep his land fertile by not over-working it. Manure collected from the kraal is added to the garden as a natural fertilizer. The homestead does not have an *isitiya*.



4. Macebo Nqumba

Male-headed household

The Nqumba homestead currently has three members, Macebo and Nolindile (elderly and active grandparents) and their granddaughter Yonela, aged 8. Macebo collects a pension from Eskom, so their financial security is somewhat more secure than most in the village. Nolindile also sells *utywala* (alcohol) from the homestead as well as airtime, and makes a small amount of



money charging people's phones off a battery. Money is often reinvested into agricultural inputs such as buying seed, or for animal inoculations.

Macebo is fond of agrarian activities and has 3 horses, 27 cattle, 12 sheep and 9 goats. The homestead garden is very large (approximately half a hectare). Nolindile manages the *isitiya* and grows an abundance of cabbage, chillies, beans and potatoes. She does not plant a winter crop because she and her husband prefer to cultivate intensively in the summer and buy what is needed the rest of the year. At the time of the study, the family had kept and stored approximately 60 kg of seed to plant the following season. Most planting begins in December after heavy rains. Ploughing is done with oxen and extended family members help with the planting. Additional labour is hired if necessary.

5. Razor Qiyo

Male-headed household

Tata Qiyo is married with several children. He has a business as a taxi driver, but at the time of the interviews his vehicles had problems which he could not afford to repair so he had been more active in agriculture and had been working on a winter crop of cabbages in the *igadhi*. He has two large gardens of 5190 m² and 5070 m², and both are used for larger summer crops.

The practice of work parties (*ilima*) is common and important for getting laborious tasks complete. Often help comes with the expectation of food or beer, so it is common to slaughter or brew beer for this type of assistance, and it is courteous to extend to others the same help one receives.

Qiyo's wife explained that it is difficult not having water, but said that the new water reticulation system about to be put in place would make her domestic duties easier.



6. Mhlophe Nohaya

Male-headed household

The Nohaya family is large, consisting of between 8 and 12 people at any given time. Mr Mhlophe and his wife Nonest take care of his brother's three children and receive almost no financial assistance for doing so.

Mr Nohaya is the *usibonda* (headman) of sub-section *Komkhulu*. He also has a taxi business and his wife runs a small spaza shop from their homestead. They receive child grants (R 280/month) for four of their own children and for a child of their eldest daughter, totalling R 1400/month. Their second eldest daughter (age 23) lives with them and is one of the primary caregivers, next to Mrs Mhlophe.



There is no *isitiya* on the homestead, and the igadi is 3420 m². They also have access to a field, which they use. According to Mrs Mhlope they have enough water throughout the year because her rainwater tank provides extra support, but she would like another tank solely for garden use. She hasn't considered irrigating from the rainwater tank to the garden, but would consider it and thinks it to be a good idea. Her main purpose for harvesting rainwater is for home use, and she shares her supply with close kin and neighbours who do not have a tank. She explains that they sometimes have to take a car to the river to fetch water, filling a 200 L container as well as containers of around 80 L. When it rains, the family places all of their buckets, basins, and containers outside to collect water.

The women wash clothing at the river instead of using water from the tanks, as tank water is important for domestic uses such as drinking, cooking, and bathing. Many of the children from the homestead wash in the river when it is warm enough.

7. Nomasomi Sibakabaka

Female-headed household

Mama Sibakabaka is the only adult on her homestead, and she has two children she cares for who live with her. One is a child of her niece, who is deceased, and the other is a child of her husband's brother. Mama Sibakabaka does not have any children of her own, and until recently her niece was living with her. Mama relates that the passing away of her niece is likely due to some kind of affliction or possession, and as she was "beaten by *tikoloshe*" – she awoke with swelling and bruising in her left eye and around her head. The youngest child of her niece was taken away by its father after Mama Sibakabaka's niece passed away.

Mama Sibakabaka is supported by her pension as well as the child grants she receives.

Her isitiya is a fair size (164 m²) and her igadhi is quite large, at just over a half a hectare (5264 m²). She has access to a field, but does not use it.

At the time of the interviews she was planning to utilize her garden the following year, but would do so sooner if she could obtain some support in terms of labour or cash. She would be interested in share-cropping if the right person were to offer their help.



8. Mama Ntombozi Mpeta

Female-headed household

Mrs Mpeta is a widow who lives with her first-born son Akhona in the house she and her husband had built some time ago. Mrs Mpeta's husband had managed to acquire a substantial amount of wealth before his passing, and the family is fairly affluent, as is apparent by their DSTV.

Mrs Mpeta's husband had been married previously, and had children from his previous marriage. The family's decision to cede the land to Akhona when his mother passes was aided by a will his father had made prior to passing away.

Mrs Mpeta and her son have a small isitiya (120 m²) and a relatively large igadhi (9894 m²). They also have access to a field, which they utilize.

There are many water tanks on their property, so they do not have to struggle to collect water. It is typical that those with water tanks share with others (particularly in a case such as this, where there is an abundance of water for a small family of two), and it was noted that other family members and neighbours frequent the household and take water.



9. Vayisi Fuzeka

Female-headed household

Miss Fuzeka is unmarried and has two children. She lives in one of the farthest homesteads, which backs on to the Qora River. Her garden is more than half a hectare (5645 m²).

Miss Fuzeka does not have an *isitiya* and grows her produce in the garden, which she inter-crops. She has access to a field, but says she never uses it, saying that “it is sleeping”.



Sisi Fuzeka is in need of more financial security to improve upon her situation and livelihood. When she was first interviewed she had two dwellings, and although one was falling apart its roof was still useable and the shelter provided storage for harvests from the garden such as maize, as well as for farming implements. Animals such as the chickens and goats often took refuge there as well. The next time Sisi Fuzeka was interviewed (23 October 2012) the dwelling had completely collapsed and the utilitarian use of it was negligible.

Fuzeka's main round house is the sole dwelling on the property. She also lacks an animal enclosure and keep her (5) cattle at a homestead of family relations, where her male kin tend to the animals.

One of the problems Sisi Fuzeka encounters is watering the higher slope of her field, as she finds that the maize there is not getting enough water run-off. The maize on the higher slope is yellowish compared with that on the lower sections of the garden, which is much greener and takes on more runoff. She also thinks the soils are better on the lower sections of her slope, compared with the rocky ridgeline bordering the upper section of her garden and homestead. Sisi Fuzeka would like to explore alternative options to help increase her agricultural production for home consumption and potentially to sell. Her major limiting factor, however, is money, and to a lesser degree her lack of help in doing the work. She says that asking for help when one is of good health, younger and strong is thought to be disrespectful. However, she also articulates that she prefers doing the work herself, and does not have too much interest in share-cropping.

10. Michael Fetman

Male-headed household

Mr Fetman lives with his wife and family. He is 71 years old and is energetic and agriculturally one of the most active in the village. His garden is by far the largest that was encountered, at roughly 18 000 m². In addition, he has an *isitiya* which is 551 m². He also has access to a field that he does not use. Tata Fetman says that he learned many of his farming skills from his parents and grandparents. His *isitiya* is quite elaborate and includes carrots, garlic, cabbage and spinach.



During the first interview, Mr Fetman explained his plans to improve upon a dam he had started to build on the property. His goal was to trap and move water from the dam (on the lower section of his property) up to his garden, possibly using pipes and a gas-powered pump. A few months later, his dam project was observed to in place. Mr Fetman now wants to hire a digger to make his dam larger, and he would also like to have a few sprinklers in his garden.

Half the garden is ploughed by tractor, and the other half, which has large boulders that tractors have difficulty navigating around, is prepared by hand. Mr Fetman rarely uses work groups because he has family in Lamla (the sub-section) who help him when necessary. Children also help to haul water, using a trailer and oxen.

Mr Fetman's many years working outside the village, and his desire to retire there, affords him the time and some money to risk a venture into larger-scale farming projects, which he desires to do. He has small fruit tree seedlings which he wants to plant, particularly for the use of his children and grandchildren. One of his major constraints is the cost of new fencing. Mr Fetman is also involved with his brothers in a larger agricultural across the ridge in Centane and he has gained additional skills from this venture. At an even later visit, the garden was found to be vibrant and healthy and Mr Fetman had finished his dam, although he had not yet been able to afford a pump. Instead, he was hauling water to his garden in a 220 L barrel, using oxen and a home-made trailer. The family is now using much more water on their garden than they did before. Mr Fetman purchases seedlings in Butter-worth. These are stored in plastic bags and kept safe and in shade to protect them from the sun and goats.



Case Studies Field Notes: Mbekweni (Hewu administrative area)

District Chris Hani –Local Municipality Lukhanji –Ward 5

**Compiled by Project Team
UCG 115 - Water Research Commission Research Project
Women Land and Water**



1 Mama NC Tukushe

Male-headed household

The village is divided into four sub-sections which are Stopini, Injini, Siqingqini and Mthini and the homestead is located in the last section. Mama Tukushe lives with her husband, Tata Sam the head of the household, but he is old and his health is failing. Although he is mentally alert and somewhat active, Mrs Tukushe runs the homestead. They are the only two living on the property and have five children who live in Cape Town. They come home on holidays and other family members in Whittlesea, closer by, visit more frequently.

Mr Tukushe worked in steel manufacturing and collects a pension from this company. Mrs Tukushe also collects an old age pension and money is sent from the children, but she attests, “not much, sometimes, but not enough”. Both of her daughters and her sons send money and she uses most of that money to pay for visits to the doctor and to invest in her funeral plan. She ascribes to “Nomzamo Funeral Plan” where she pays R70.00 (a kind of stokvel) per month. She is not purchasing animals with the money anymore and invests some of her money in maintaining her garden activities.

They struggle with water scarcity and sometimes there are periods of the month when they go without water. The family therefore tries to store water in containers whenever it can. There are a few fruit trees (wild peach, *ipesika yasemakhaya*) amidst the maize that grows in the garden. Inside the yard there are a few other fruit trees of different varieties, in addition to larger cactus plants and an aloe plant that is sometimes used medicinally. Mrs Tukushe irrigates her gardens with her yard tap, even though she is not really supposed to do this, she relates. Certain restrictions limit water for domestic purposes only although the social norms around this seem to be debatable within the community and there were many differing opinions on this. Some subscribed to the adage that the elderly should be “afforded some forgiveness” to water their gardens.

Mrs Tukushe tends her yard well and is proud of her wood pile or *igoqo*. She has a field (*instimi*) but no longer uses it because of her age and energy levels. She is not loaning it out but would consider this if the right person where to approach her to do so. Their field is far away on the road.



2 Mama Tshoniswa

Female headed household

Mama Tshoniswa's husband recently passed away in September 2012. Her gardens are unproductive now and she did not plant this year because there is a problem of too little rain. In addition, the costs of the funeral have limited what she is able to finance.

She complains of the high cost of inputs required to plant, seed, fertilizer, and/or buy seedlings, as some examples of what she desires but cannot afford. Many of her neighbours had agreed that they will not use communal taps to irrigate due to overall piped water shortages, and thus waited for the rains to plant. While the community is in agreement on this matter, some are not abiding by the decision. The penalty for using communal taps to irrigate one's gardens (usually at night) has never really been established. She said it may be getting to the point whereby the local *isibonda* (headman) would take measures if he catches people abusing the rule, as the municipal technician will close off the pipeline supplying that tap, making everyone suffer.

The challenge, she explained, is that there is a large diesel pump, pumping water to the homesteads from a river/bore-hole. The pump runs 24/7-but it breaks down sometimes. For example, today and yesterday the water has not been running and only started up again mid-way through the day. Residents old and young lined up to the taps with wheelbarrows and plastic containers to fill containers. The municipality pays for the diesel and 'they are good about paying to keep it running'.

As a result of water shortages and financial constraints, Mrs Tshoniswa's garden ceases to be used presently. The Kraal is stone stack and equal in size to the *igadi* (*isitiya*). Again, the gardens here are mostly considered as *igadhi* and people do not make such an issue to distinguish between these names. The word in this village is used interchangeably – though is defined in the overall study as an *isitiya* due its small size and general tendency to be watered.



3 Ncumeke Mnymbolo

Female headed household (under 30)

Ncumeke's parents passed away early on in their lives (1994-1995) leaving four children. She has just returned from Cape Town visiting family members. She is not employed and has one child of her own. Similarly she has not planted annual crops in her garden but is planting fruit as she thinks these are a better alternative for her to have than growing maize.

She says that if substantial rains come she is keen to plant maize at her homestead. She has a field and lends it out (share-cropping) to get benefit (2x80kg bags of maize) (*isahlulo*). She explains, "I have no time to go to the fields because of my small child and I have household duties to attend to. When I lend out my land I get two bags of maize; the man farming will take the rest". Here is a case where a sharecropping relationship seems to be on-going for some time. Her isitiya size is very small at 290m². There is a small cactus like plant in the corner of her house, and *Mbongeni* says it is used to help with stomach ailments similar to drinking aloe.

She does not have a rainwater tank but her two 'flats' are roofed with zinc sheets. There are many *imiphanda* or (*imbombozi those containers that have handles*) 220L; 160L, 80L, 60L 20L, 10L, 5L, etc.). These water barrels used for collecting rainwater and also for brewing *umqhombhoti*. The guttering is poor quality and makeshift. Corrugated iron is hung by metal loops, which is attached haphazardly to what gutters do exist. Nevertheless when attached to the weather-worn the gutters aid the family in collecting what they can when it rains.

Ncumeke explains to us that she collects water from the communal tap and sometimes uses the wheelbarrow to collect around 35 to 40 litres by using two buckets. Because the communal tap is somewhat far and laborious from her homestead, she attempts to go two times per day when the water is running. Her trees continue grow well but there is not much in the way of garden produce other than these trees.



4. Mama Nontembiso Minembi

Female headed household

The homestead is better established with a new gable home and a few flats off the main house with shed roofs, ideal for rainwater harvesting. There is no water tank at this homestead.

Mrs Minembi's garden is larger than the others interviewed and more developed 23 x 30 = 690m². Here garden has a large flourishing plum tree (*feya*), 9 large prickly pear bush (*itolitolojiya*), one large pear tree (*umthi wamapere*), and one large guava tree (*umthi weguwava*).



A large stone was in the garden and was a marker for a buried relative. Intercropping was said to take place of maize, potatoes, cabbage but the ground was hard and barren. Old stalks still remained from the last year and sheep dung was spread throughout; the researchers are told that sheep dung is natural fertilizer, mostly sheep dung but some still use cow dung if accessible. A large tree is in the front yard for shade and stones encircle spinach in the front yard. The entire yard is well fenced. An elaborate chicken pen in the backyard is made of mud and mesh. T

he communal tap adjacent to the homestead is often shut off. The water has been shut off as often as two or three times per day throughout this month, for example. During our meeting, today, the tap is off. Mrs Minembi takes water from a communal tap and the same infrastructure is used when water is supplied from either Notiki dam or the municipal water, when it is pumped from there. Mrs Minembi explains when the water is dirty or becomes bad that the municipality puts purifying tablets (chlorine tablets) in the storage dam to purify water for drinking. She explains that the municipal water supply is pumped and somewhat far away so when it fails the municipality will bring in trucks from elsewhere to alleviate a crisis. Water issues remain quite critical in this area as the demand and desire for more water for domestic and commercial agriculture is apparent. The topic of better (lack of) access to water remains a topic of great concern at each meeting and discussion. Many have complained that the water is dirty. Our informant tells us that 20L is used per day for her animals but she struggles to get them clean water.

5. Noandile Kibido

Female headed household

Mrs Kibido has a gable house and a flat in her yard. A larger water tank is here which has drastically contributed to her family's wellbeing, she explains.

A flat is rented to someone who is looking after the livestock (+/- R500) for this young couple (man and wife) to live and tend to the animals near the back of her property; we will not consider the domestic uses of water for the renters and only for the permanent household members. The renters collect their own water and do not share their tank supply.

The garden is excellent looking and healthy, small, but well managed. The garden size is 250m². The entire smaller garden is fenced and the yard is also fenced. She takes water from the stream next to her place sometimes, but mostly from the untreated water which is piped from Notiki Dam for irrigation.

The house has guttering on portions of the house feeding the water tank. Mrs Kibido also owns a field and it is in production compared to the others. The research team initially reveals that at Mbekweni there is more reception to sharecropping practices.

The taps can be seen and are used for a few hours or until the water runs dry in the gardens (there are two, and the in the dry season used to grow oats). Mrs Kibido's son is not working formally and shows some interest in agricultural production. He explains that they irrigate two times, once early and the other time late. He explains that water coming from the dam has a much stronger pressure than water from the municipal source.



6. Lili Nonduna

Male headed household

Mr Nonduna owns a 'step-up' flat (gable-type house) and somewhat unusually given wider observations, lives there alone. He has a relatively large garden (1100 m²).

His main interest is planting oats (what the locals call "Lucerne") which are irrigated by hose-pipe irrigation attached to a sprinkler nozzle. This is for his sheep in the dry season; at the time of interview (November 2012) the plot was fallow. When the garden is ready in winter with fodder, Mr Nonduna will allow his sheep in to graze (around July).

Mr Nonduna does not use his arable field outside of the village but would consider share-cropping or a lease-agreement if this could be arranged. He has a flock of sheep, but as is the custom doesn't say exactly how many (this, he explains, is a bit like asking someone how much is in your bank account).

There is no roof-water tank but he has a tap in his yard with which he waters his plot, and numerous plastic barrels to catch rainwater – he relies on both piped and rainwater to survive.

There is also a communal-tap on the outside of his yard as a domestic water source. There are no fruit trees within his yard or other sources of produce, although he is growing a pot of spinach in an old zinc tank. At the time of the interview there was no planting taking place. Mr Nonduna explains that he is waiting for rainfall to plant oats. His entire homestead yard is fenced and there is no other internal fencing present to isolate the *igadi* as distinct from his yard more generally. Mr Nonduna is mainly interested in fodder for his animals, than food crops, which he buys from shops in Whittlesea.



7. B. Maqalikana

Male headed household

Mr Maqalikana lives with seven other people and receives a pension from the state. He is active in his fields since 2009 now that he resides more permanently at home since retirement and has a love of farming. Other family members are not employed. At the time of the interview there are four grandchildren living at the homestead supported by him and his wife (grandparents) using both pension and child-support grants. His farming is an important contributor to their food requirements.

Similar stories are shared in relation to the concerns and issues of water shortages at this household as in others that have been described. We are told that some days there is not water – *“the bore hole has a strong foundation and deep, but at times we cannot predict when the water will be scarce and it is random to know when it will be shut off. It is just too unpredictable either in times of winter or in times of summer-there are differences-but summer is much worse”*. He relates that the water committee tries to solve the challenges, with many explaining that water shortages are “killing” them in the homesteads. *“In winter the engines pump ground water-yet during the summer times we just pump air, waiting for the ground-water to come back”* These perceptions are indeed interesting though the scientific veracity was not confirmed by the team.

The household has a garden but it is not used to its full potential, with water stated as the main reason for not doing so. They plant oats in winter as in summer water is short, it is too hot, and a waste of money to plant as things die easily without irrigation. He says many homesteads do the same, as the ground moisture is better versus in the summer (noting this is a perspective that is not well understood by the research team given the extremely dry winters, but may be due to better access to piped water from the municipal RDP borehole system, due to groundwater recharge cycles).

The issue with his field is quite different where he plants every year under irrigation from Notiki (Bushmankrantz) Dam, though maintenance of the bulk supply line is a major issue affecting reliability of the gravity pressure supply. Mr Maqalikana explains how the ageing irrigation system works ...*“the fields are sub-divided into two blocks or sub-sections: Block A and Block B –There are two main pipes that feed water to these blocks and at times of water shortage both blocks can be affected but if switched to one block water is usually accessible”*.

He relates that many meetings have been held with local leadership and the municipality where promises have been made to give everyone a water tank to deal with water shortages in the area. However no tanks have transpired.



8. Zuziwe Bizwaphi

Male headed household

Mr Bizwaphi is away working from the village. Mrs Bizwaphi is home more often and in charge of day to day affairs of the homestead. Her garden size is around 1100 m² and is utilised to grow maize intercropped with beans and pumpkins. Her house is comprised of three flats co-joined together.



There is no rainwater tank and she catches water with larger blue barrels. She has a stone walled animal enclosure and her yard is fenced. She does not irrigate her garden and relies only on rain. Some others along the road where she lives, close to the pipeline from Notiki Dam irrigate their yard crops using pipes connected to the bulk supply line. Mrs Bizwaphi suggests that she wants to develop her gardens in a similar fashion to those homesteads along the road. She needs better access to water.

She is angry that some are irrigating with the communal taps given that the domestic system water pressure where she lives is low. She attributes the low flow rate to others overwatering their gardens. She suggests that the piping network and system first delivers water to the lower village sections before moving to her homestead location as water passes her homestead last. It was noted that the structures of her house could be used to collect rainwater if better guttering was attached. She collects water directly running off roof.

This year they haven't planted maize in the garden because of the lack of good rains. He explains that others in the community are also upset. The family is particularly frustrated as some in the village get high volumes of water by connecting to the domestic system, while others suffer. Because the Bizwaphi home is closest to the main road her homestead is easily monitored than those who live tucked deeper away from public view.

There is a distinction made in the grievance discussion, in relation to sources of water. When the water supply is that from the Notiki dam (untreated and intended for field irrigation) there is less concern that water is wasted. Also, there is a view that the elderly villagers should be allowed to irrigate their gardens regardless of whether it is the Notiki system or the treated municipal water (RDP) supply to tapstands. Her general strategy to ensure she fills her water tanks adjacent to her house by hose connection to the RDP village taps when it is working. In this way she secures water, albeit less than she wants, when the taps are not functioning.

Male headed household

Mrs Jada lives at this household with her brother and five other family members. Mr Jada, is working outside of the village.

At the time of the discussion, the family is using a lot of water to brew *umqombothi*, and are fetching by hand from the distant tap. The water was off for the previous three days but today is back in the system so members of the household are filling barrels and stockpiling water in all possible containers (20-220L). The young girls of this homestead are responsible for water collection. Water is stored in 220L drums. Mrs Jada explains that “If one where to fill the green tank it would just take too much time and there would be a fight if one was to try and fill it”.

This household, unusually for the village, has a flush toilet, because Mrs Jada’s brother is disabled from a mine-working accident, and needs it. It operates by filling the back of the toilet which requires 10L to fill the toilet, discharging into a septic tank which was established as part of a settlement package from the mine.

The household plants maize and beans in the garden in the rainy season, but is not active in the fields. Water is the main limitation to them using their garden more as rains are unreliable, it is too dry in winter, and they cannot access water from the piped water systems.



10. Nomcwangele Makeleni

Female Headed household

Mrs Makeleni is a widow who lives with her two grandsons, aged 6 and 17. Her daughter, the children's mother, works in Joburg.

She explains to us that “the water has been scarce all the time—on and off for a week, off and on for days—but there is a difference between winter and summer”. For Mrs Makeleni, the “months of December-February are difficult ones...water shortages are getting much worse than before but it is much better in winter”. When asked what she does in times of serious shortage she explains that she hires a truck to bring untreated water from Oxkraal dam on a private basis for R10 per 20L.

When water is available in the municipal supply, Mrs Makeleni often uses this water to irrigate her gardens. Her older son doesn't seem to mind to break the community rule about irrigation of one's crops with municipals water as the rules are quite relaxed in her case. She had a car accident and she broke her shoulder in a bad fall so the community do not object to taking water from the communal tapstand to the garden most of the times.

They have planted only a portion of their field this year because her grandson is now staying with them and provides extra help and labour around the household. Both the grandmother and the older boy go to the field regularly; during the weeding months they go every day. Their main reason they did not use the whole field was that they did not have sufficient cash to buy inputs and don't have enough family labour. She holds the view that the younger generation does not have “a taste for locally produced maize and for drinking *umqhombhuti*”. She noted that times are changing and that even in her case, she uses maize more now for animal fodder than before, when it was mainly used for family consumption.

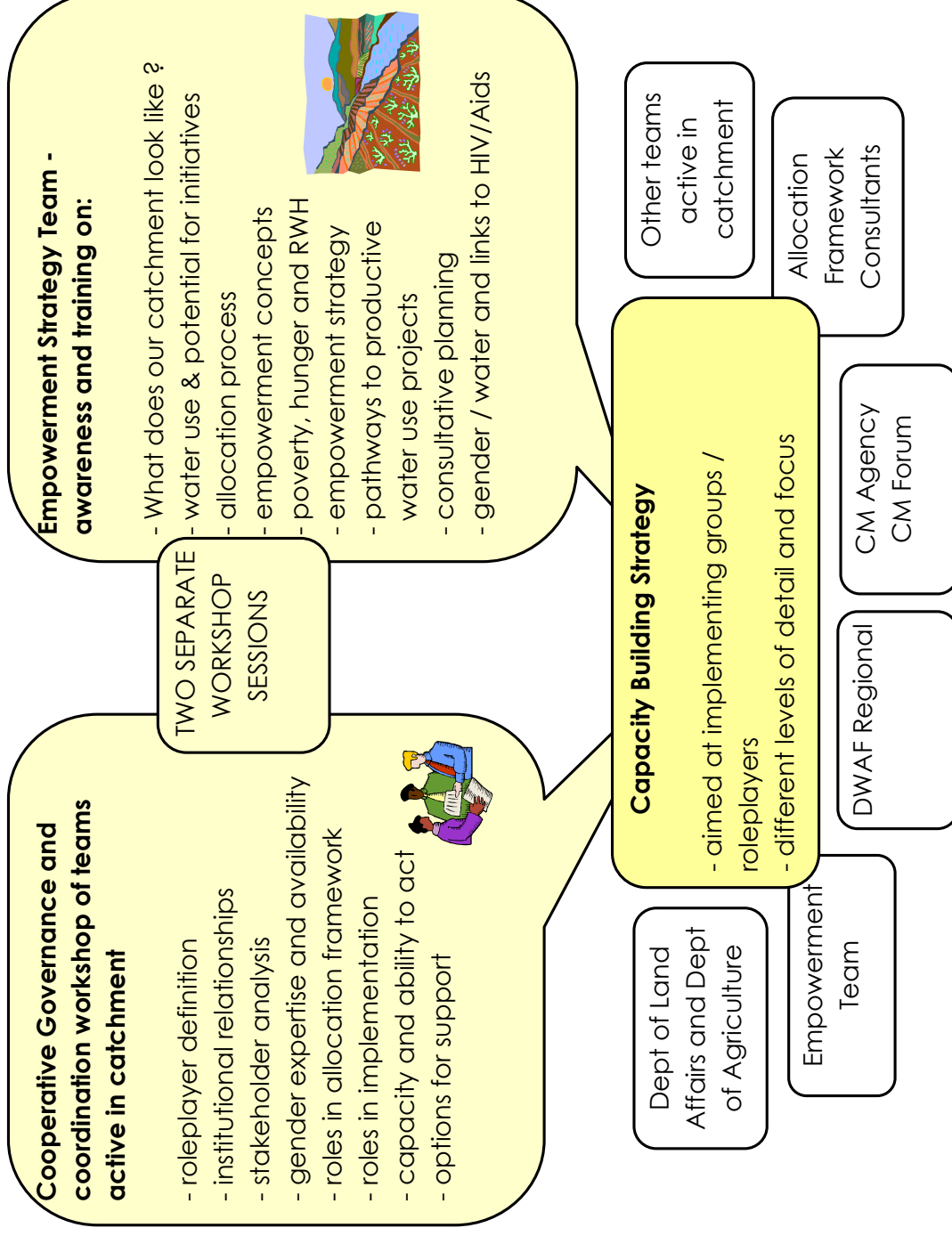


Appendix 2

Water Allocation Reform Draft Empowerment Strategy Overview and Productive Water Use Pathways

Activity 1

Team capacity building



Activity 2

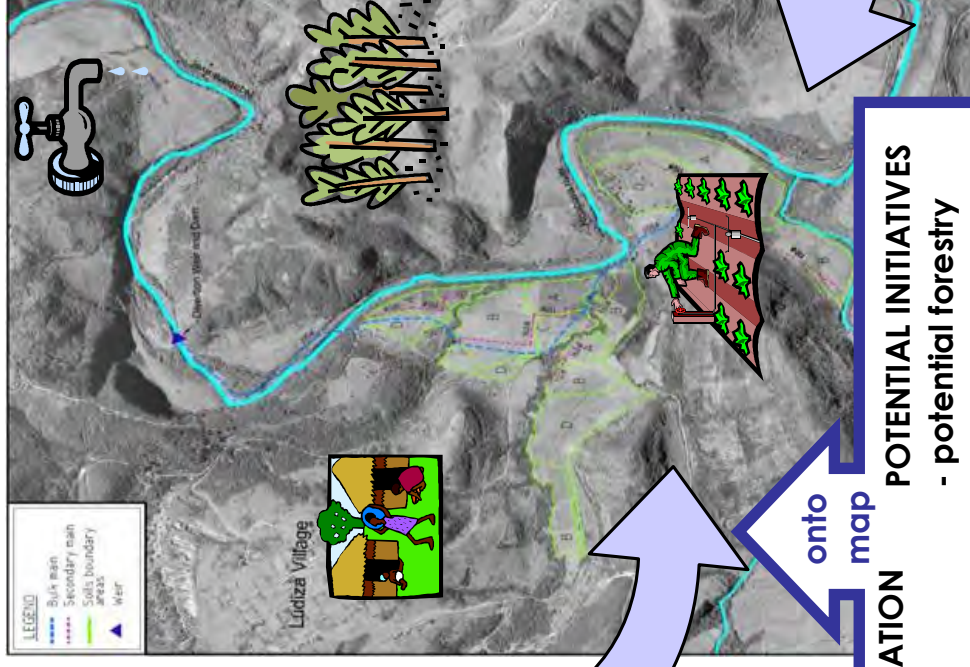
Resource potential and existing project mapping

desktop evaluation

- resource potential overview and CM strategy
 - > agricultural dev. plans
 - > soils at 1:250,000
 - > slope assessment
 - > pumping height
 - > agro-climatic
- sugar potential
- forestry potential
- irrigated med value crops
- home-based econ. activity

identify overlap with other initiatives

- land reform
- irrigation revitalisation
- DoA initiatives
- NGO initiatives
- LED initiatives
- RWH initiatives
- IDP's



EXISTING SITUATION

- villages
- forests
- rivers
- wetlands
- demographics
- irrigation schemes

POTENTIAL INITIATIVES

- potential forestry
- potential irrigation
- potential sugar
- potential home-based initiatives to fight

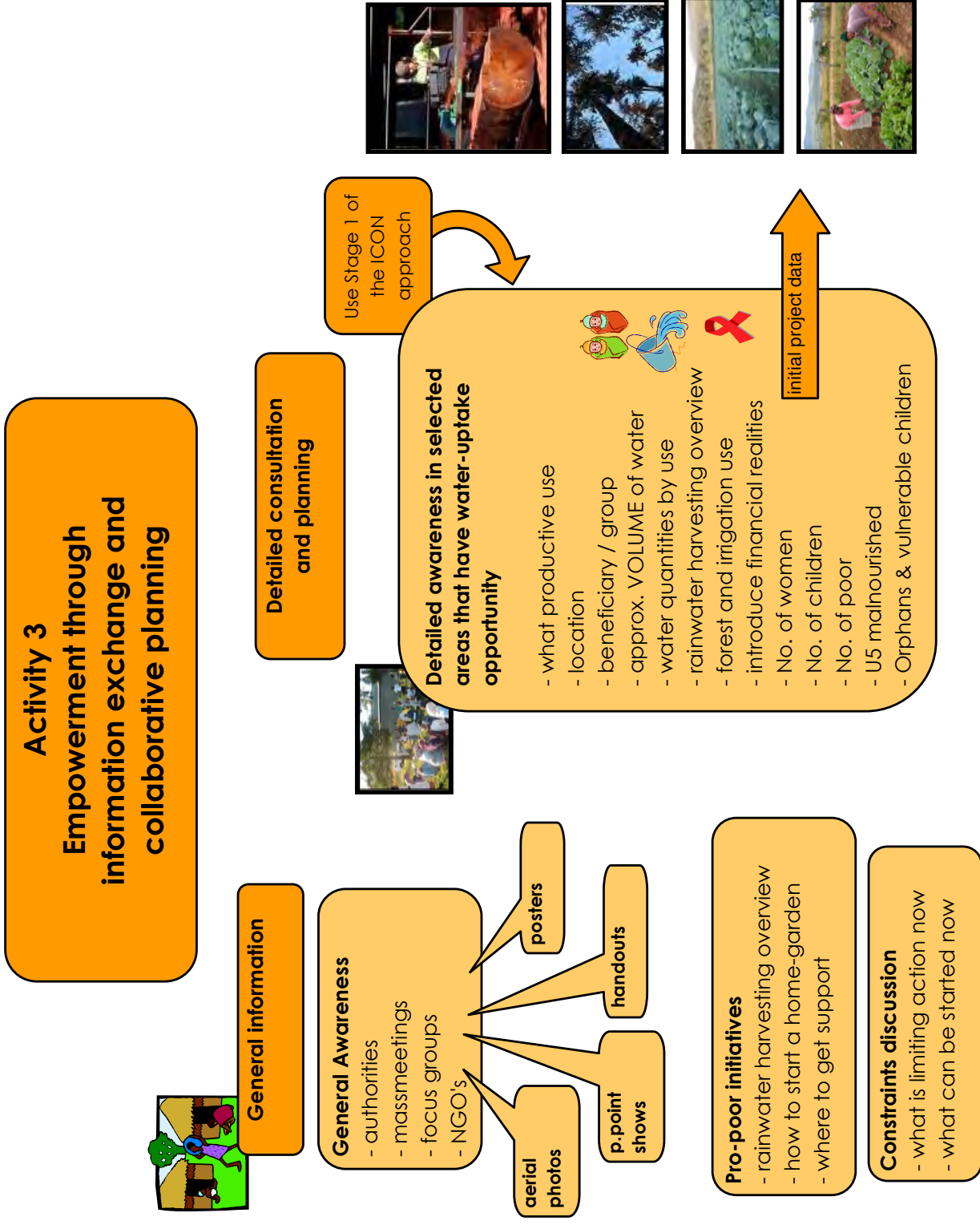
links to
Activity 3

maps showing
desktop
information

IMPORTANT TOOL
in information
transfer sessions in
villages

SOCIO-ECONOMIC DATA – DESKTOP SOURCES

- Prevalence of HIV
- Percentage of households which access social grants
- Levels of poverty/economic vulnerability
- Number and location of female headed households
- Number of and location of child headed households
- Number of OVCs
- Prevalence of under 5 malnutrition
- Under 5 mortality rate
- Maternal mortality rate
- Prevalence of gender-based violence
- Illness/disease profile
- Primary causes of illness and disease
- Employment rate
- Main income generation activities
- Access to capital, land and labour
- Water and sanitation requirements
- Water utilisation patterns (domestic, productive, agricultural, economic etc)
- Mapping of health and social services
- Number and nature of civil society organisations

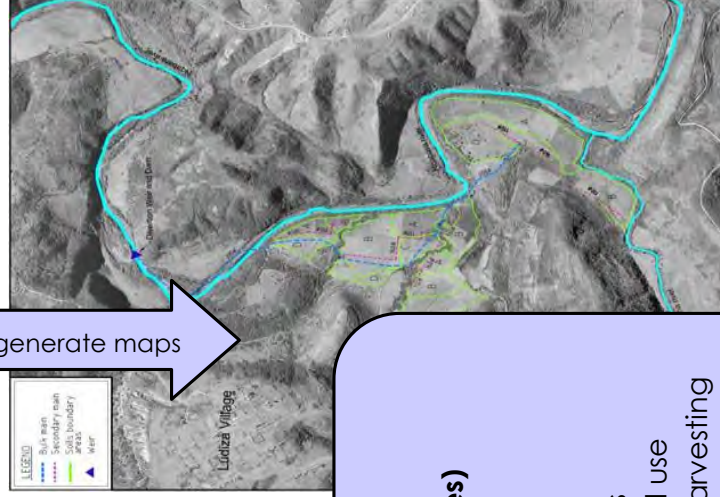


Activity 4 water-use initiatives into allocation plan

develop **DRAFT** allocation plan

- new initiatives and water demands
- allocation options
- constraints to productive water use, especially by the poor and women
- curtailments that may be necessary

generate maps



show details of initiatives (incl. timelines)

- irrigation
- forestry
- sugar
- partnerships
- commercial use
- rainwater harvesting
- food production

Second round of meetings with identified opportunities

- authorities
- focus groups
- identification of pathway
- identification of lead agency
- outline action plan

pathways

constraints

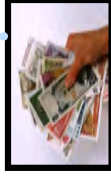
implementation
roleplayers

revised productive water
use initiatives for PDI's

final allocation plan

- general authorisations
- compulsory licensing
- schedule 1 use
- curtailments

implementation



step 5
implementation of defined water-use initiatives

Poverty initiatives: RWH and home food production

Mobilisation

- funding approval of approx R20,000 per homestead
- Consult with village leadership and hold village meetings
- mobilise / media through existing groups and house to house
- agree criteria for involvement in RWH project
- cross visits to old RWH pilot project villages
- photos, videos, stories and helicopter plan examples

Gardens

- introduce intensive food gardening
- trench beds, seedlings and fertility
- greywater re-use and fruit trees
- learning groups

Tanks

- train local builders
- dig 30,000 litre underground tank
- construct tank and RWH catchment



Poverty / Entrepreneurial : sugar outgrowers

Detailed Planning

- identify cane grower or respond to request
- establish if irrigation or dryland
- develop initial business plan (size, investment, likely returns)
- discuss and finalise expectations with cane grower
- apply to closest mill for permission to supply
- apply for loan from mill

Implementation

- land preparation by hand if small (low cost)
- plant seed cane if small (plant out Year 2)
- mechanised land prep only if hand impossible
- purchase seed cane only if large ha.
- install irrigation system if entrepreneurial approach
- cultivate and irrigate
- burn, harvest and truck to mill



Poverty / Entrepreneurial : forestry outgrowers

Detailed Planning

- confirm potential on forestry development maps
- meet with land-rights holders -> detailed implications
- soils / cultivar matching / seedling supply and storage plan
- approach forestry company or consider support alternatives
- finalise land-rights / holding implications for individuals
- finalise land and institutional arrangements for groups
- develop financing plan for planting / establishment

Implementation

- expert support to layout, firebreaks and pitting
- transplant, fertilise and initial watering
- blanking (replace dead trees after 1 - 2 months)
- clean fire-breaks before dry season annually
- brash and clear annually
- fell and short-haul with contractor or company
- long-haul to mill



Entrepreneurial : smallholder irrigation agri-business ventures

Detailed Planning

- identify organisational stakeholders and clarify objectives
- ICON planning approach for smallholder irrigation planning
- Community mobilisation and market information gathering
- detailed project formulation based on farming styles approach
- explore land-register and land consolidation
- identify leasing links with RWH and home-food production
- develop agri-business plan and whole enterprise analysis

Implementation

- consolidate and finalise land tenure arrangements
- avoid groups but if no option, set-up institutions
- design and construct irrigation infrastructure
- finalise rules of operation / financing of system
- mobilise production support (see Rough Guide)
- undertake training and mentorship
- set up conflict resolution mechanisms



Entrepreneurial : agri-business partnerships and other business water-use initiatives (small-scale mining etc.)

Partnership Types

- contract or outgrower schemes (linked to agro-processing)
- share equity schemes (typical in export fruit and wine)
- municipal commonage (land provided by DLA)
- share produce or share cropping (tenant pays landowner)
- production / marketing mentorship (NGO model)
- support through research (academic institutional involvement)

Implementation

- employ agri-business specialist consultant
- advertise and explore networks for partners
- develop concept partnership plans
- evaluate preliminary cost / benefits for all parties
- refine partnership option and negotiate details
- ensure contract implications fully understood
- ensure benefits to PDI's are realistic / appreciated



Appendix 3

Smallholder WUA Training and Strategic Planning Programme

Business Planning and WUA Capacitation Process – FINAL

- Facilitation of 8 to 10 sessions by DWA facilitators and where necessary, professional support team
- Documenting of existing knowledge, and skills development is embedded in all sessions.
- Sessions lead to information to be included in the Business Plan. BP document compilation takes place progressively, in stages, starting at Step 3.
- Sessions of 3 hours are planned, but longer sessions, or even repeat sessions may be needed depending on each group's progress and circumstances.

Session 1. Intro meeting

Purpose: is to meet the committee or the leadership, and discuss current status and upcoming project-related process. Minimise or avoid presentations and too much information from DWA/team, and provide opportunity for people to talk primarily about WUA history, understanding and wider water issues.

Discussion of:

- WUA evolution and status (DWA and WUA members)
- Project intentions and quick overview of BP (Team / ie. a status, operations and planning doc).
- Also note the increasing water competition between agric-use and metro/urban use and WUA is a key organisation to secure, administer, manage available water resources, for local benefit. Highlight facilitation of productive water use is the main WUA interest, ie. profitable enterprise (team).
- Open discussion on local water-related issues (WUA members)
- Note on the limited nature of WUA mandate and need to identify, prioritise issues within mandate
- Outline of the process that will be followed (5 to 6 sessions x 3hrs over next 6 months) (team)
- Set date for next session in 2 to 3 weeks.

Session 2. WUA Resource Mapping (2 days)

Purpose: To facilitate the WUA committee to identify their main water resources, productive users and to start the discussion on WUA related issues and opportunities for future action.

A **PRA resource mapping** approach is used:

- Groups of 5 to 6 people
- 2 or 3 sheets of blank flipchart paper / 4 colour pens per group
- Give someone the challenge in each group of starting to map one thing and then go from there (can be village, dam, fields, scheme building, river, road, town).
- Emphasise range of water resources for productive use include dams, rivers, groundwater, springs, and roofwater runoff and storage tanks. (MUS framework as guidance on scope)
- Remind that productive uses include livestock water, irrigated crop and pasture production.
- Give 30-45 minutes or more for people to discuss and map.
- Observe groups and ask questions to prompt discussion or to include people who are quiet Where is your village ? Are there boreholes there ? Are there alien vegetation, erosion, sanitation and siltation issues ?
- Reportback from each group doing the mapping, and comments and discussion from all.
- Document the main issues facing WUA members and appropriateness of WUA in responding to these issues.

- Separate out water-services issues from those in the WUA mandate.
- Constantly make the link between WUA formation and functions and issues, to separate out spurious or non-WUA issues emerging out of the resource mapping exercise. This will help people clarify the role of the WUA given their wider concerns and needs (some covered by WUA mandate others not).



Resource mapping at Shiloh WUA (incl. irri scheme, adjacent villages, upper catchment villages)

- Before the session prepare a Google-Earth annotated map of the area of operation. Using a data projector show the WUA committee the key elements that were identified by the groups (meeting place, dams, rivers, area of operation, villages, fields with potential, degraded parts of catchment etc.). Note that these need ongoing amendment through their input (local expertise) and DWA/Team input (outside experts). This will help with spatial understanding of their area of operation and interests / responsibilities and introduce them to a useful planning tool (Google Earth).

Session 3. Brainstorm on Main Functions (2 days)

Purpose: Identify the priority water-related functions and actions that the WUA will need to address in the next 3 years. The institution building, capacitation and financing will necessarily follow from this definition of what the WUA will actually do. Business planning without clarity on activities is pointless.

DWA / Pegasys Team input to start session

- Summarise last session – show photos / maps from previous session / updated Google Map
- Revision of WUA mandate and legal functions
- Revisit list of WUA members and stakeholders
- Revisit area of operation - mapped
- Break into small groups – or plenary – as appropriate to group size, context, willingness.

Day 1 – Brainstorm session around current water-use activities

- Listing of water-management activities related to current water-use in the WUA area of operation
- Prioritisation of current water-use actions that the WUA must address
- Listing of specific actions that the WUA needs to take to administer current water-use

Day 2 and 3 – Brainstorm session around future water-use activities

- Listing of potential water-use initiatives that give effect to Presidential Outcomes / WAR / WfGD.
- Separate out those where the WUA is not a key contributor or a driver
- Prioritise those where the WUA is a driver of the initiative
- Assess which of the priorities the WUA will address in the next 3 years
- Break these initiatives down into specific steps/activities that are needed (basic process diagram)

Session 4. Outline of the Strategic Plan (part 1)

Purpose: To facilitate open discussion with the WUA members, and thereby deepen understanding, and expand on the priority activities outlined in Meeting 3. These are summarised into 5 or 6 clear strategic objectives which are a framework for action for the 3 year BP. This will cover operational and resource-use planning functions.

DWA / Pegasys Team start session

- Summarise last session
 - WUA responses and ideas in relation to current water-use activities
 - WUA responses and ideas around future WUA initiatives
 - show updated Google Map with activities / areas of priority interventions identified on map

Current water-use activities

Explore and deepen understanding about irrigation scheme operations and how WUA administration, maintenance, billings, fee-collections, financial management etc. can be done. Discuss the operational functions that the WUA envisages taking responsibility for in the longer-term, and then collaboratively expand what short-term actions might be needed to move forward on that trajectory.

Future water-use planning (more or less as above)

Revisit agricultural water management interventions that might have relevance. Use videos on Water Harvesting, food-gardening, flood-water harvesting etc., and role of WUA in supporting the water and water-related planning components. Identify areas of high-opportunity (deep soils, soils close to river-course, old irrigation schemes etc.) and introduce different agricultural water management approaches that have relevance.

At the end of Meeting 4, and with the information compiled during the process and from other available documents (Constitution, planning reports etc.), an initial rough draft of the BP can be compiled by the project team.

Session 5. Outline of the Strategic Plan (part 2)

Purpose: To expand the 5 or 6 strategic objectives from Meeting 4 into detailed step-wise implementation stages. Then to identify the human resource and financial resource requirements to implement these. Finally to consider immediately available resources (time, financing) and prioritise future activities set out in the BP.

DWA / Pegasys Team start session

- Summarise last session
 - priority list of WUA responses to current water-use activities
 - priority list of future WUA initiatives
 - show updated Google Map with activities / areas of priority interventions identified on map

Current water-use activities

- Use list from Meeting 4 and in workshop session with WUA members, generate a detailed breakdown of tasks in interactive workshop session
(these could include for example, canal maintenance, pump maintenance, water measurement for billings, water conflict resolution, water bailiff responsibilities etc.)
- identify capacity needed to undertake tasks and capacity gap analysis of current WUA committee
- identify what tasks can realistically be done in Year 1, 2 and 3 with current capacity.
- identify what capacity building must be done to address gaps, and include logically in Year 1, 2 and 3 and reprioritise to bring back to realistically achievable goals.

Future water-use planning (more or less as above)

- generate detailed breakdown of tasks in interactive workshop session (these could include for example, canal maintenance, pump maintenance, water measurement for billings, water conflict resolution, water bailiff responsibilities etc.)
- identify capacity needed to undertake tasks and capacity gap analysis of current WUA committee
- identify what tasks can realistically be done in Year 1, 2 and 3 with current capacity.
- identify what capacity building must be done to address gaps, and include logically in Year 1, 2 and 3.
- re-prioritise lists of potential water-use initiatives and bring in line with available capacity and planned capacity building

At the end of Meeting 5, and with the information compiled during the process and from other available documents (Constitution, planning reports etc.), an initial rough draft of the BP can be compiled by the project team.

Session 6. Business Plan Review - 1

Purpose: To present and familiarise the WUA committee with Working Draft 1 of the BP document which was compiled by the project team based on previous sessions. Gaps in the document will be assessed and addressed. In this process, activities and priorities will also be revised – as the reality of available financing, local skills and capabilities becomes clearer.

DWA / Pegasys Team start session

- Summarise last session
 - priority list of WUA actions to administer/manage current water-use activities
 - priority list of future WUA initiatives

Session 1 - Organisational Structure and administration practicalities

- Given range of activities over Year 1, 2 and 3 investigate the current WUA structure and modus operandi. Develop an organogram.
- Explore practicalities and solutions for meeting space, record-keeping etc.
- Contemplate current and upgraded functioning of the WUA in relation to Year 1, 2 and 3 activities that it has prioritised; and what is needed to strengthen the WUA administration, and how this can be done. Include these organisational capacity building initiatives in Year 1 activities.

Session 2 – Financial realities and cost-recovery (team can prep with initial list of activities/cost estimates and prelim budget)

- List out operational costs linked to planned activities
- List out likely sources of revenue for anticipated functions
- Contemplate implications for functioning with available / likely financial resources
- Reconsider action plans Year 1, 2 and 3 in light of financial realities

After Meeting 6, Working Draft 2 of the BP can be compiled by the project team.

Session 7. Business Plan Review - 2

Purpose: To review Working Draft 2 of the BP address outstanding issues and move to a final draft of the BP.

DWA / Pegasys Team start session

- Present draft BP and identified main gaps (DWA / Team)
- List out main gaps and prioritise those which can be addressed in the session, and those which must necessarily be incorporated into future actions (capacity building etc. in Year 1, 2, 3).
- Explore and expand responses to main gaps in the document
- Define the actions that will be followed by WUA committee, and DWA/Team, to address questions arising and gaps identified, for inclusion into the Final Draft BP.

It will be necessary to visit at least once or twice after these 7 sessions to provide feedback to the WUA Committee, and to address gaps that are identified through consultation and review with the Pegasys Internal Review team and the DWA review team.

Annotated Google Maps for Smallholder WUAs

Use Google maps every session to increase spatial understanding and planning !

(print at A0 size and laminate – leave at WUA meeting venue)

WATER RESOURCES

1. Dams (water bodies)
 - name
 - capacity
 - yield (million cu.m / annum)
 - breakdown to primary users (reserve, domestic, agric, industry, forestry) – WARMS Craddock
 - utilisation / allocation information
2. Rivers (names)
3. Boreholes
 - functioning
4. Springs
5. Quaternaries

LARGE AGRIC WATER USERS

6. Smallholder irrigation scheme boundary
 - allocation (cu.m)
 - hectarage
7. Large-scale commercial
 - allocations (cu.m)
 - hectarages

STANDARD INFO

8. Area of operation
9. Towns
10. Villages / towns (using and impacting the resources)
11. Roads

ISSUES WITH SPATIAL MAPPING DIMENSION

12. degraded catchment
13. alien vegetation (black wattle)
14. irrigation opportunities – fields/collapsed scheme areas
15. other resource opportunities – wetlands, floodwater harvesting (granite domes, rocky or other high runoff areas etc.), rainwater harvesting etc.
16. other other other

Proposed knowledge development programme for new and interested WUA members

Jonathan Denison (UmhlabaGroup) with acknowledgement of valued input from Isabelle van der Stoep of SABI.

This program outline provides a framework for the WUA to arrange and support a series of training sessions and cross visits. The intended outcomes are that the new WUA members better understand how the WUA operates and what they need to do to get water on time at their farms, as well as provide technically and agriculturally relevant information that they can put into practice on their own farms.

Topic	Brief description	Proposed structure
WUA Facilitated sessions	WUA organises discussion sessions and coordinates presenters	
Introduction to the Water User Association	Overview of the WUA area of operations, membership, monthly, weekly and daily activities and billings.	Facilitated sessions by SAAWUA or similar. DWA funding is available for this.
Lawful water use	Explain the NWA, water allocations, water transfers and IWRM to farmers. Importance of sharing the resource, responsibilities of different role players.	Follow the above with a visit to the WUA office; meet the officials. Present the Business Plan.
Dams – legal and technical aspects	For farm dams: Legislation, dam safety, basic structures and construction, maintenance requirements.	Engineer/technician from WUA, Dept Agric or DWA?
Soils	Basic soil science – soil structure, texture, water holding capacity, infiltration, drainage and soil chemistry. What to ask for in a soil survey / analysis, how to interpret it.	Lecture (soil scientist / extension officer) followed by practical Dig profile holes on a commercial farm, show soil horizons, roots, water distribution, etc. (link to farm visits)
Water quality	Basic chemical characteristics – pH, EC, TDS, etc. Interpreting water analysis results for the possible negative effects of water quality of soils, crops or irrigation equipment. Using borehole water.	Specialist lecturer from Nelson Mandela University in PE or DWA water quality people.
Contours, drainage and soil conservation	Run-off control, earth channels, grassed waterways, erosion protection, subsurface drainage.	Engineer/technician from WUA, Dept Agric, DWA or ARC?

Farm visits	Information presented by volunteer farmers with additional input from invited technical specialists (WUA coordinates)	
Irrigation systems, uniformity and efficiency	Types of irrigation systems, advantages/disadvantages. Application and distribution uniformity (and the effect thereof on crop uniformity and fertiliser application), and irrigation efficiency (managing water losses)	Irrigation designer or experienced farmer to present – farmer level of expertise is required and not unnecessarily technical.
Cropping patterns and irrigation requirements	Understanding growing seasons, planting dates (cash crops) and the effect thereof on irrigation requirements and market prices (harvesting dates).	Commercial farmer should be able to cover this; region and crop specific.
Irrigation scheduling planning	Calculating irrigation requirements using different methods for the season ahead. Weather stations and obtaining historical weather data.	Extension officer or scheduling consultant to present?
Irrigation scheduling equipment and methods	Tensionmeters, capacitance probes, Wetting Front Detectors, etc. Data collection (including real-time weather data) and interpretation.	Extension officer or scheduling consultant to present?
Flow measurement in pipes and channels	Importance of flow measurement for water management and legal compliance. Different types of flow meters and measuring devices.	Engineer/technician from WUA or DWA?
Installation of and repairs to PVC and PE pipes	Characteristics and application of PVC and PE pipes, sizes and classes. Trenching, bedding material, pipe handling and laying, joining methods, coupling and fittings.	Pipe manufacturer to present / sponsor?
Operation and maintenance of control and air valves	Different types of valves for water control (hydraulic, mechanical, etc.) and air valves (air release, anti-vacuum, etc). Purpose and correct applications, troubleshooting.	Commercial farmer or valve supplier to present?

Operation and maintenance of pump stations	Basics of centrifugal and borehole pumps, and electrical motors. Correct start-up and shut down procedures, pressure measurement, routine maintenance.	Commercial farmer or co-op representative?
Operation and maintenance of centre pivots	Components of centre pivots, their function and routine maintenance requirements. Understanding speed settings, and measuring application rates and uniformity.	Pivot manufacturer to present / sponsor?
Operation and maintenance of sprinkler systems	Different types of sprinkler systems, their components and routing maintenance requirements. Performance evaluation of sprinkler systems – nozzle wear, pressure measurement, wind drift and application efficiency.	Commercial farmer or local irrigation designer?
Lay-out and management of flood irrigation systems	Principles of flood irrigation; importance of accurate lay-out; irrigation scheduling for flood systems.	Specialist presenter or experienced farmer to demonstrate. Visit the saaidam system at RooikransHoogte.
Subsurface drip irrigation for lucern	Introduction to subsurface drip systems; advantages / disadvantages, management requirements, filtration and water quality.	Commercial farmer or local irrigation designer?
Micro irrigation for tree crops (nuts) and vegetables	Introduction to micro sprinklers and drip irrigation; advantages / disadvantages, management requirements, irrigation scheduling for micro irrigation.	Commercial farmer or local irrigation designer?
Pasture management	Irrigation management on pastures to ensure soil health and optimum production.	Commercial farmer or local scheduling consultant?
Fertigation methods and equipment	Applying fertilisers through the irrigation system – system requirements, equipment, principles of fertigation.	Commercial farmer or local fertiliser agent?

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This program outline provides a framework for the WUA to arrange and support a series of training sessions and cross visits. The intended outcomes are that the new WUA members better understand how the WUA operates and what they need to do to get water on time at their farms, as well as provide technically and agriculturally relevant information that they can put into practice on their own farms.

Topic	Brief description	Proposed structure
WUA Facilitated sessions	WUA organises discussion sessions and coordinates presenters	
Introduction to the Water User Association	Overview of the WUA area of operations, membership, monthly, weekly and daily activities and billings.	Facilitated sessions by SAAWUA or similar. DWA funding is available for this.
Lawful water use	Explain the NWA, water allocations, water transfers and IWRM to farmers. Importance of sharing the resource, responsibilities of different role players.	Follow the above with a visit to the WUA office; meet the officials. Present the Business Plan.
Dams – legal and technical aspects	For farm dams: Legislation, dam safety, basic structures and construction, maintenance requirements.	Engineer/technician from WUA, Dept Agric or DWA?
Soils	Basic soil science – soil structure, texture, water holding capacity, infiltration, drainage and soil chemistry. What to ask for in a soil survey / analysis, how to interpret it.	Lecture (soil scientist / extension officer) followed by practical Dig profile holes on a commercial farm, show soil horizons, roots, water distribution, etc. (link to farm visits)
Water quality	Basic chemical characteristics – pH, EC, TDS, etc. Interpreting water analysis results for the possible negative effects of water quality of soils, crops or irrigation equipment. Using borehole water.	Specialist lecturer from Nelson Mandela University in PE or DWA water quality people.
Contours, drainage and soil conservation	Run-off control, earth channels, grassed waterways, erosion protection, subsurface drainage.	Engineer/technician from WUA, Dept Agric, DWA or ARC?

Farm visits	Information presented by volunteer farmers with additional input from invited technical specialists (WUA coordinates)	
Irrigation systems, uniformity and efficiency	Types of irrigation systems, advantages/disadvantages. Application and distribution uniformity (and the effect thereof on crop uniformity and fertiliser application), and irrigation efficiency (managing water losses)	Irrigation designer or experienced farmer to present – farmer level of expertise is required and not unnecessarily technical.
Cropping patterns and irrigation requirements	Understanding growing seasons, planting dates (cash crops) and the effect thereof on irrigation requirements and market prices (harvesting dates).	Commercial farmer should be able to cover this; region and crop specific.
Irrigation scheduling planning	Calculating irrigation requirements using different methods for the season ahead. Weather stations and obtaining historical weather data.	Extension officer or scheduling consultant to present?
Irrigation scheduling equipment and methods	Tensiometers, capacitance probes, Wetting Front Detectors, etc. Data collection (including real-time weather data) and interpretation.	Extension officer or scheduling consultant to present?
Flow measurement in pipes and channels	Importance of flow measurement for water management and legal compliance. Different types of flow meters and measuring devices.	Engineer/technician from WUA or DWA?
Installation of and repairs to PVC and PE pipes	Characteristics and application of PVC and PE pipes, sizes and classes. Trenching, bedding material, pipe handling and laying, joining methods, coupling and fittings.	Pipe manufacturer to present / sponsor?
Operation and maintenance of control and air valves	Different types of valves for water control (hydraulic, mechanical, etc.) and air valves (air release, anti-vacuum, etc). Purpose and correct applications, troubleshooting.	Commercial farmer or valve supplier to present?

Operation and maintenance of pump stations	Basics of centrifugal and borehole pumps, and electrical motors. Correct start-up and shut down procedures, pressure measurement, routine maintenance.	Commercial farmer or co-op representative?
Operation and maintenance of centre pivots	Components of centre pivots, their function and routine maintenance requirements. Understanding speed settings, and measuring application rates and uniformity.	Pivot manufacturer to present / sponsor?
Operation and maintenance of sprinkler systems	Different types of sprinkler systems, their components and routing maintenance requirements. Performance evaluation of sprinkler systems – nozzle wear, pressure measurement, wind drift and application efficiency.	Commercial farmer or local irrigation designer?
Lay-out and management of flood irrigation systems	Principles of flood irrigation; importance of accurate lay-out; irrigation scheduling for flood systems.	Specialist presenter or experienced farmer to demonstrate. Visit the saaidam system at RooikransHoogte.
Subsurface drip irrigation for lucern	Introduction to subsurface drip systems; advantages / disadvantages, management requirements, filtration and water quality.	Commercial farmer or local irrigation designer?
Micro irrigation for tree crops (nuts) and vegetables	Introduction to micro sprinklers and drip irrigation; advantages / disadvantages, management requirements, irrigation scheduling for micro irrigation.	Commercial farmer or local irrigation designer?
Pasture management	Irrigation management on pastures to ensure soil health and optimum production.	Commercial farmer or local scheduling consultant?
Fertigation methods and equipment	Applying fertilisers through the irrigation system – system requirements, equipment, principles of fertigation.	Commercial farmer or local fertiliser agent?

Appendix 4

Strategic planning extract from Hewu Dalubuzwe

WUA Business Plan

2. Summary Profile

Emerging WUA

The WUA is in an initial stage of development in terms of defining its purpose and capabilities to carry out its intended functions. The WUA does not have an office, assets or any employees. Members of the Management Committee are in a learning process; both to understand their legal responsibilities and the details of how to give effect to these. All of the WUA Management Committee (MANCO) members are Xhosa-speaking and some members have limited English language capability. Importantly, agricultural water-use dominates members interest.

The WUA area of operation is located mainly in the former Ciskei, with characteristic settlement patterns of 'betterment villagisation'. Importantly, there are **significant old commercial irrigation farms** which were incorporated into the Ciskei, now held under Tribal Trust, adjacent to some villages. These are administered by the Chief but are not allocated for individual use. Water and land is available and largely underutilised on these farms.

Table 1 : Summary information on the Hewu Dalubuzwe Water Users Association

Water management area	WMA 12
Quaternary Catchments	Overlaps with S32E S32F S32G
Area of operations	See Map 1 and the Constitution (in Appendix A)

Table 2: Profile of WUA Members

Scheme: Shiloh smallholder irrigation scheme (451 ha) Shiloh Cooperative: The plotters at Shiloh Scheme have formed a cooperative and engage in all agricultural activities in a collective manner. The major part of this is the dairy joint-venture. Amadlelo Agric: A key stakeholder in the irrigation scheme is a commercial dairy partner, Amadlelo Agric, who operate 439ha of the scheme in partnership with the plotters co-operative, supported by the Eastern Cape Department of Agriculture.
Villages: 13 villages are in the upper catchments of the WATERDOWN, OXKRAAL and BUSHMANSKRANTZ dams: people in these villages are practicing rainfed crop-farming and livestock farming. There is some smallholder irrigation farming, though small (less than 30ha).
Water Service Provider: The Lukhanji Municipality is the Water Service Provider to Whittlesea and Queenstown supplied by the 3 dams in the WUA area of operation.
Large-scale farmers: There are three irrigated commercial farms which use water from the catchments. They are <i>indirectly</i> impacted by water-related activities on the communal land upstream of the dams; mainly related to risks of catchment degradation and resultant reduced water quality and quantity. These 3 commercial farmers were included in the WUA membership initially, but because DWA is responsible for day to day dam releases into the rivers from which these farmers abstract (by run-of-river pumping arrangements), they do not see any overlapping interest with the WUA.

3. Strategic Plan

The strategic plan outlines the ambitions of the WUA into the medium term looking 3-5 years ahead from now.

Vision

The water resources within the WUA area of operations are used productively and sustainably for the prosperity of the WUA members and future generations.

Mission

To maximise local benefit from productive use of water in the Dalubuzwe WUA area of operations through coordinated water-related planning, knowledge sharing and promotion of development initiatives; and
to operate and maintain relevant parts of the Shiloh Irrigation Scheme on a cost recovery basis.

Strategic Objectives

- 1. Develop capacity to operate parts of Shiloh Irrigation Scheme in future:** Obtain relevant information and develop capacity to operate appropriate parts of the Shiloh irrigation scheme where cost recovery is practical.
- 2. Build capacity to administer water use:** to progressively develop skills, institutions and systems for to administer water-use within the WUA area of operation.
- 3. Identify agricultural water potential** and develop project concept plans to facilitate funding: Facilitate rural development through the collaborative planning and implementation of water use initiatives by identifying potential irrigation and water harvesting projects, and concept plans to facilitate the funding of new initiatives.
- 4. Knowledge networking:** to actively pursue sources of information and training and make linkages with key support institutions in the area.

EXPANDED TASKS FOR OBJECTIVE 1 :

Develop capacity to operate parts of Shiloh irrigation scheme in future

Activities	Target date
1. Get maps and layout drawings of the scheme and other main irrigation infrastructure. The first step is to arrange a meeting with DWA Infrastructure Branch who is operating the scheme at present. The WUA will organise a series of sessions with DWA and consolidate scheme related documents needed for future operational activities (drawings of pumpstations, pipelines, canals, etc.). - Dirk de Villiers (CHDM Agriculture – Komani) - Mr Kanana (DWA Infrastructure Branch Waterdown Dam) - Mr Koos Viljoen (DWA Infrastructure Branch PE office) - Mr Zwelitsha Masoka (DWA WUA Institutional Support)	Dec 2012
2. Document current operational practices for water releases to Shiloh scheme and other water users. This can be achieved in the above workshop sessions with DWA personnel.	Dec 2012
3. Identify initial operational responsibilities that the WUA could take on. Work with DWA to identify suitable initial roles and activities that the WUA could start to take on (pump start/stop; minor repairs etc.) These must be considered in the light of possible income that can be generated for these initial operational services, and also against the reality of available skills within the WUA (eg. for water bailiff, pipeline maintenance, etc.). A mentorship type of arrangement would be needed initially. - series of 3 to 5 workshops with SAAWUA - funding available from DWA National for SAAWUA support	Mar 2013
4. Assess operational costs and sources of financing for initial WUA operational functions The WUA has limited opportunity to generate income from water-users for services provided. It will be essential that DWA or other 'seed funding' is made available during a 'capacitation phase' for this objective to be realised.	Mar 2013
5. Define job descriptions for initial operational responsibilities and recruit people Getting this to be effective will depend on other institutional development processes being adequately established including: - financial systems (bank account, admin, labour agreements etc.) - income stream for operations identified and timelines re-assessed - agreements with paying users in place for services provided (if no services provided by WUA then no payment can be expected)	Mar 2013

EXPANDED TASKS FOR OBJECTIVE NO. 2

Develop skills and information base to administer water-usage within WUA area

Activities	Target date
ORGANISATIONAL SETUP AND INITIAL DEVELOPMENT - Establish basic office facilities and conduct functional training - Coordinate basic administration setup & training with exec committee members. - Setup basic office and communication hub with WUA for their members - Office in local gov buildings if possible - Desktop computer with internet connection - Bulk SMS communication with 3G card - WUA e-mail address and letterhead - Establish knowledge hub: Agwater resources - library with key readings (WRC / FAO / ARC) - WRC and DWA videos, subscribe to Waterwheel - Establish letterhead, bank account, financial systems - Copy useful sections of guides/etc. and sell to members (cost recovery) - Setup internet connection with key websites - LINK UP with regional universities and agric colleges Seed funding application (in BP) to be submitted to DWA National Training possibility with DWA Stakeholder Empowerment Section	May 2013
1. Identify water users and obtain a register of use-rights (DWA EL office)	Jun 2013
2. Identify water–infrastructure (dams, outlets, pumpstations, meters, flow-gauges etc.) that is used and how the water is measured (overlap with tasks in Objective 1)	Dec 2013
3. Document the water abstraction and release schedules (dam releases and leidam levels: who, when, where, which volumes at which times) (overlaps with tasks in Objective 1)	Dec 2013
4. Establish a water monitoring process	To be decided later
5. Determine policy around penalties and fines or other actions	To be decided later
6. Monitor abstractions and apply policy	To be decided later

EXPANDED TASKS FOR OBJECTIVE No 3 :

Identify agricultural water potential and develop project concept plans to facilitate funding

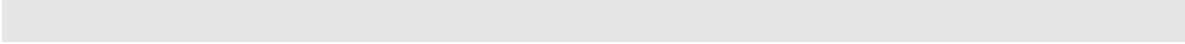
Steps	Target date
1. GET INFORMATION ON IRRIGATION AND WATER-HARVESTING FOR CROPS (see Appendix B for examples) - Establish links with Universities and Agricultural Colleges (Fort Cox, Dohne, University of Fort Hare, Agricultural Research Council, Water Research Commission). - Get information on types of agricultural water use (irrigation, rainwater harvesting, floodwater harvesting etc.) - books, videos, presentations, visits to other sites - Get information from the Dept of Agriculture on projects in the area - Identify technical resource people who can assist with concept planning in DoA and DWA, or other organisations and mobilise these.	March 2013
2 IDENTIFY POTENTIAL WATER-USE PROJECTS - Identify areas with agricultural water potential e.g.: - Possibility of dairy at Mtha (200 ha) - eMbekweni old irrigation scheme (possible flood-water harvesting) - Bold Point – small irrigation development - All maize lands – tied ridge method ('amadanyana' or 'in-field' RWH) - others for garden production (trenchbeds, swales)... - Mark these potential areas for future development on a map - Consider feasibility on the basis of common sense (water availability, likely costs for infrastructure, land-tenure realities, who is likely to be a driver of such an initiative) and then attempt to prioritise. - Consider what could be done as a pilot by interested WUA members while waiting for Government funding.	2013 All villages outline plans
3 COORDINATE TECHNICAL STUDIES - Do soils investigations / get available soils information (Dept of Agric) - Do water investigations (DWA, consultants or university involvement) - Decide on system type (irrigation, rainwater harvesting or flood-water harvesting) - Do simple engineering design and initial cost estimate - Decide on likely cropping pattern and sources of inputs and advice - Decide on likely crop outputs or possible markets and likely prices (could include lucerne for local sheep feed, or vegetables for sale locally, or other crops for sale), - Assess costs vs returns and see if viable.	2014 2 projects detailed 2015 Another 2 projects detailed
4 CONSOLIDATE PROJECT PROPOSALS and Motivate for Funding - Identify what can be done NOW with available resources - Take plan to funders	2014

OBJECTIVE NO 4 :

Liaise with water related development activities in WUA area

The WUA will Act as a coordination hub for outside agencies engaging on water-related matters in the area. This will include government departments, universities, consultants, other stakeholders. This objective will be continuous as various water-related initiatives arise.

The intention is that the WUA gets directly involved in water related development activities so as to inform these from a WUA perspective, and guide these for the general benefit of the water users. Activities will also increase capacity around water management and development issues in the WUA area.



Appendix 5

Capacity building report

1. Summary

The perspectives in Appendix 5 reflect those of the Project Team Leader of the Umhlaba Consulting Group Pty (Ltd) who was responsible for the project. These are submitted on request from the Water Research Commission to provide insight which may be useful to other team leaders involved in contracted research assignments where students are to be involved and supported on the project. The experiences of student involvement for a non-academic research institution can be challenging, as academic supervision of students studies is not part of the brief, and therefore requires thematic alignment and close collaboration with the academic institution, or face potential loss of time and money.

The students involved in the research project during 2012-15 included two Masters students who have completed their studies, two PhD students who are still underway with their studies, and three other students (2 MSc and 1 PhD) who failed to progress on the WRC project.

Table 1: Summary of Students involvement and status

Student Name	Degree	Theme	University	Progress
Maliviwe Makeleni	MSc	Agricultural assets and skills	University of Fort Hare – Agric-economics	Graduated
Nkoli Mtwana	MSc	Contemporary roles and responsibilities of women	University of Fort Hare – FHISER	Graduated
Chenai Murata	PhD	Institutions of land access and control	Wageningen (Nrl)	50%
Laura Conde	PhD	Social learning	Rhodes University	50%
Not named	MSc	Measuring Productive Water use	Not named	Terminated studies at literature review stage (2013)
Not named	MSc	Land assets and perceptions of land value	Not named	Terminated studies at data collection stage (2014)
Not named	PhD	Institutions and organisations	Not named	Terminated studies at literature review stage (2013)

2. Risks and challenges of student involvement

One important aspect of the project TOR, and WRC funded projects in general, is the intention to maximise student involvement. The rationale is that students benefit by working on an applied research project where they are supported intellectually, financially and logistically. In return the project is intended to benefit from their academic output. As such they are de-facto team members, incurring management time and cost, and demanding financial resources in return for their agreed delivery targets for the project – both in scope of their work and the timely completion of it. The success of this model is premised on three main assumptions and the experience on this project has shown these to bring considerable risk to successful project completion: i) that students who are selected and supported by the project will conduct their work with commitment, enthusiasm and rigor concomitant with the financial, intellectual and logistical support provided; ii) that they will complete their work on time; and iii) that supervisors of students will embrace the thematic focus and intellectual paradigms and collaborate as ‘sub-consultant’ team members, rather than as satellite independent academic endeavours funded by the project.

The experiences on the project showed that students either struggled, or in cases did not complete their planned work for a mix of reasons. These included lack of interest to continue once some work was done, a sense of entitlement to funding without any strings, supervision challenges, and intellectual competency among others (not in any order). It was also a general challenge to align pre-existing philosophical leanings to the contracted thrust of the research (eg. Commercial agricultural paradigm vs a diverse smallholder paradigm in this case). Differences in focus and approach required by WRC were not always readily embraced leaving gaps in research scope, requiring additional time and financial resources to be expended even while collaboration was being attempted.

Programmatically these realities of working with students and their supervisors are to a large extent outside of control of the project-leader. While contracts can be drawn up that establish funding arrangements, delivery targets and timings, the ability to micro-manage the student’s research process is fraught with complications. Particular dynamics are encountered when the project-leader is not a senior academic as the social hierarchy of academia is not well-disposed to critique of adequacy of work by non-academics, but which has to be contractually aligned to the project to warrant submission of relevant quality work first of all, and to justify payment. These challenges where they arose, had significant implications.

Time and finance were in the case of the one PhD student invested for over 18 months, in the case of two Master’s student more than 12 months, before deficiencies and differences reached a critical point where the final recourse of termination was found to be necessary. At that point in time the historical fact of lost time and money could not be reclaimed, the latter typically including student-fees, monthly stipend, all field-costs, delivery incentives and where academic supervision was found to be mis-aligned to WRC project imperatives, paid contracted supervision support. The fact that the research work must still be done (as per WRC contract) and with time long-elapsing incurs the double-penalty as it were, where (more-costly) competent consultant researchers have to be employed, with short timelines to deliver the outputs needed, and with budget already depleted and irretrievably lost.

The project leader would therefore suggest the following in order to minimise risks, or even overcome the challenges that were experienced:

- a systematic and rigorous approach must be given to selection of suitable students and their supervisors. Students must be competitively selected by wide advertisement (even nationally), rather than through networking which was the approach adopted by the project team. Student qualities to look for would include: those who are enthusiastic about the subject, enjoy fieldwork, who are willing to stay at research-sites and in rural villages; are prepared to wear flat-soled field shoes rather than high-heels or fashion wear on agricultural field trips; who have a sense that funding is a quid-pro-quo arrangement and who read subject matter provided to them. These would be good candidates.
- while some supervisors have not required any remuneration at all as they have supervised their students as usual but not contributed to the report as such (data collected and integrated into more senior student project work), financial incentives need to be more carefully contractually crafted in terms of scope, timing and financial reward. This will assist that students are properly intellectually supported to deliver for the WRC project, not just to achieve their academic goals which are at times evidently different from the project goals in scope and timing despite written student funding agreements being separately put in place;
- it is advantageous to limit collaboration with less rather than more universities and fewer rather than many senior academics to limit transactional and financial costs of the collaborative effort and to facilitate substantive remuneration for effort rather than spreading limited financial resources across many senior personnel.
- The academic and consulting domains appear to be at odds in cases, with challenges in regard to making timeous submissions tied to contract arrangements, and in the way that time-input and value for money is assessed. Consultants are typically used to payment on the basis of rates tied to delivery of a specified product, while there appears to be a tendency for academic work to be linked to research grants with more flexibility – understandable perhaps given the fundamental nature of research work. This can present complications where timelines and budgets are constrained and in order to adequately protect professional working relationships, warrants careful attention at the time of contract preparation and discussion. Delivery can be tied to incentives perhaps or late delivery to disincentives as the case may be. Quality of work output is also difficult to assess at times, as typically the academic would be a specialist, not the consultant; so it may be prudent to allocate budget for formal review of deliverables from an independent, similarly qualified academic to justify payment, and thereby protect the interests of the project overall.

The above statements in regard to academic collaboration are made in full appreciation of the valuable contributions made by respected academics to the research endeavours of this project, and the names of academics where issues were encountered have been specifically omitted. The issues should not be considered to apply broad-brush to a respected profession, but they were factual obstacles to this project and warrant attention and a different approach going forward.

3. Detailed description of student involvement

Team or student	Theme	Involvement	Supervising	Progress
Maliviwe Makeleni – Masters	Agricultural assets and skills	UFH – Agric-economics	Dr Monde and Mr Perry	Submitted and graduated
This MSc commenced in 2011 under the guidance of Dr Monde and with close collaboration from the project team, particularly Mr A Perry (Umhlaba sub-consultant), who was himself concluding his PhD at the Fort Hare Institute for Socio-economic Research (FHISER). The project leader arranged that Mr Perry was registered formally as a co-supervisor with Dr Monde, to support fieldwork, and achieve close collaboration between the academic team and the consultancy team. This was a useful and constructive collaborative arrangement. Fieldwork plans, methodology and Instrument development were conducted across various themes at the same time in the field (land, water, skills), and the methods, materials and logistics were thus closely coordinated. The student therefore had a substantial advantage from the project in that his entire MSc, from start to finish, was fully embedded in the project, in close collaboration with his supervisor. All fieldwork, including interviews, were conducted in the presence of and under the direct supervision of Mr Perry or Mr Murata (both Umhlaba Group). The analysis was concluded under the supervision of Dr Monde and Mr Perry. Mr Makeleni submitted his Masters dissertation in 2014 was awarded his MSc.				

Nkoli Mtwana – Masters	Contemporary roles and responsibilities of women	FHISER	Dr Connor (Conde-Aller in support)	Submitted and graduated
Nkoli is a senior student with a teaching background and was partly funded in pursuit of her half-thesis, which the project required to be focused on roles and responsibilities of women. Nkoli worked closely with Laura Conde from the Umhlaba team in formulating her approach and instruments so that these were integrated with the larger body of work. All fieldwork was conducted under the direct supervision and in the presence of Laura Conde, and this data was integrated with elements of the project under Laura's ongoing research. Nkoli submitted her half-thesis to FHISER in January 2015 and was granted her Masters degree. While the data was found to be useful and has informed the report, the masters thesis took a different thematic direction which was outside of the project control as such, and was not well-aligned to the project objectives. For this reason, Nkoli is not included as an author of any chapters as her written work was not used in the report, but she is acknowledged as a contributor to the data collection process.				

Chenai Murata – Masters (upgrading to PhD)	Institutions of land access and control	PLAAS	Dr Tapela	Masters 90% but upgrade to PhD now 50%
Chenai Murata is a full-time Umhlaba employee who commenced work towards a Masters degree in 2013 (literature review, instrument development etc.) in 2013, but only registered formally at a South African university. His topic is centrally important to the project and forms a stand-alone chapter in the final report. The decision to pursue and academic outcome given the work-in-progress was made in the wake of the failure of the failed PhD student in 2013. Chenai was already well-progressed with the land-related research work (literature review, instrument development and data collection) at the time of his registration in 2014. In the course of 2014, it became clear that the extent of the data collected and the depth of analytical work was beyond a Masters level with an opportunity for a PhD. Thus although the masters work is now largely complete, and an opportunity arose at Wageningen University with Professor Paul Hebinck as a supervisor. It is expected that he will have completed his PhD by the end of 2016. The (academic) work of Chenai is documented in Chapter 6 of the Final Report, though he has contributed to various chapters and the final overall editing/compilation of the body of work.				

Laura Conde-Aller – PhD	Social learning, capabilities and empowerment	Rhodes University	Prof Sisitka	60%
Laura is a senior student and the National Coordinator of the WESSA Water Programme. She has been with the project from the start, but is conducting her PhD part-time, with emphasis on the Lutengele site where WESSA has been working for more than 10 years. There is thus a wealth of historical information that has contributed to the research work undertaken in this project. Laura worked with and closely supervised Nkoli's fieldwork which augment Laura's central theme around learning networks and knowledge transfer, with a focus on women. Laura's work for the project has progressed well, though her academic pursuit will be delayed slightly, beyond the project, due to an expanding family. She continues to work closely with the project team, and is a key contributing author to the final report. It is expected that she will conclude her PhD in 2016.				

Not named	Land assets and perceptions of land value	Not stated	Not stated	30% complete but failed to progress
This student was undertaking a course-work based Masters and was partially funded by the project for his half-thesis. The focus of his work was to quantify the land parcels which people had access to and investigate various forms of value that landholders give to land; the findings of which are integrated with the body of work being undertaken by Chenai Murata. For various reasons he was unable to properly conduct a literature review and this and the instrument development were done mainly by the Umhlaba Team due to time constraints. His fieldwork was undertaken with full daily supervision of the Umhlaba team. Given the financial losses due to the failed PhD student, a different approach was adopted where milestones of achievement were incentivized. The fieldwork was successfully conducted but at the time of data-entry it became clear that this second student had lost interest in the academic pursuit and despite several efforts to support and further incentivize the work, he decided to quit and took up a job in Government. As a result, the full data set which was collected under the direct supervision of Chenai Murata, was entered and analysed by the Umhlaba research team and is embedded in the work of Chenai Murata and Jonathan Denison.				
Not named	Household and MUS water measurements	Not stated	Not stated	15% complete but failed to progress
This student commenced very well and produced a detailed literature review and methods, and had initiated fieldwork. She then disappeared for reasons that were never explained to the team. After 6 months of attempts to pursue the student, the theme was taken on by the Umhlaba team members who completed all of the work on the project independently of academic input.				
Not named	Institutions in relation to land and water	Not stated	Not stated	2% complete but failed to progress
This PhD student was difficult to work with, and showed limited interest to pursue a collaborative approach to his work. The relationship was terminated after 18 months of attempts to align and re-align the literature review, methods and materials to the needs of the project. The provision of very significant financial support concomitant with PhD full funding, was a direct loss to the company as the work had to be commenced from scratch, with shortened timelines.				

Capacity building sessions held with research participants

Date	Village	Activity
7 August 2013	Mbekweni	Feedback meeting on available water and land resources and discussed how they were being used by local farming households
15 August 2013	Sirhosheni	Feedback meeting on available water and land resources and discussed how they were being used by local farming households
19 August 2013	Lutengele	Feedback meeting on available water and land resources and discussed how they were being used by local farming households
30 April 2014	Mbekweni	Participatory institutional mapping with research participants in which we discussed the local leadership structures and rules that were responsible for local land and water administration
23 April 2014	Sirhosheni	Participatory institutional mapping with research participants in which we discussed the local leadership structures and rules that were responsible for local land and water administration
25 April	Lutengele	Participatory institutional mapping with research participants in which we discussed the local leadership structures and rules that were responsible for local land and water administration
10& 11 December 2014	Mbekweni	Discussing research findings on farming typologies, constraints, capabilities and aspirations
27&28 October 2014	Sirhosheni	Discussing research findings on farming typologies, constraints, capabilities and aspirations
21& 22 October 2014	Lutengele	Discussing research findings on farming typologies, constraints, capabilities and aspirations
07 July 2015	Mbekweni	Reporting on overall research findings and confirming typologies and aspirations in order to participatively define intervention strategies
30 June	Lutengele	Reporting on overall research findings and confirming typologies and aspirations in order to participatively define intervention strategies
15 August 2015	Sirhosheni	Reporting on overall research findings and confirming typologies and aspirations in order to participatively define intervention strategies

Appendix 6

A note on the application of theoretical frameworks used in the study

1 New Institutional Economics framework

The NIE framework was used to give theoretical guidance to this research effort especially to the themes of land and water access and utilisation by farmers, women in particular. The framework was useful in several respects especially in its ability to explain men and women's access to and utilisation of economic resources through the presence of organisational order which comes in the form of rules, laws and policies (institutions). By using this framework, this work was able to investigate and explain how men and women experience the processes of land and water access for crop cultivation. Particularly with regards to land access and use, understanding and using the NIE framework was critically important in that the domain of customary (communal) local land administration is one of the misrepresented and badly understood aspect of smallholder agriculture in South Africa and other former colonial states largely. Largely, the causes of this pervasive misunderstanding and consequent misrepresentation is that the institutions, i.e. laws, rules and policies that are used in administering customary land are often not well understood by many including policy makers, academics and development workers partly because different local communities use different sets of institutions, and that they have been modified, adapted and distorted many times by several players including the states and local community leaderships. However, using a case study approach, the research effort was able to expose and document the influence of institutions in accessing and utilisation of customary land especially by women farmers. The research was mainly interested in understanding how informal institutions especially customary rules and codes of conduct are used by local traditional leadership in land administration, mainly land allocation and how rights to land are experienced by women farmers.

Nevertheless, the NIE framework is geared to explain phenomena of resource access and use in which the economic men and women transact commodities for trade with the purpose of generating profit. The framework concerns itself with explaining how economic men and women decide on the market transactions to make in accordance with the sets of guarantees and powers the institutional instruments can offer in order that they maximise on profit-making opportunities. This renders the NIE framework partly unable to explain how economic men and women engage in resource transaction processes where such decisions are not pursued for cash profit. The land market and transactions that take place at these study sites are largely motivated by social rather than by economic reasons. About 90% of studied households were practising farming to feed themselves and sometimes to give the produce to needy neighbours for just Ubuntu. This directly affects the terms of land exchange which unsurprisingly largely assumes the social and Ubuntu line which has nothing to do with profit-making. In light of this observation, it may be suggested that other research works in this domain of land access in communal villages look to other analytical frameworks especially the concept of legal pluralism. At the centre of this theoretical framework is the argument that there is "more than one legal order or mechanism within one socio-political space, based on different sources

of ultimate validity and maintained by forms of organization other than the state” (Benda-Beckmann, 2001: 1). This concept has the potential to explain the organisations and rules that are used in administration of customary land, and more importantly it can demonstrate the sources of the legitimacy of these organisations and institutions.

2 Gender Framework

The work was conducted using a detailed gender framework based on the extensive body of South African and international work that is available and which informed the structuring of surveys, both quantitative and qualitative, the fieldwork engagement and the analysis. The focus on empowerment of women required sex-disaggregated data as an essential starting point, and as importantly, a thorough exploration of the intra-household and wider community dynamics, particularly around the roles and responsibilities of women which looked at how these impact on land, water and agricultural production. The findings in relation to the varied power-dynamics within women-headed households, based on factors of age and status as widow, divorcee, or single women were informative and led to an emphasis on empowerment messaging within the proposed knowledge intervention. Perceptions of persistent forces of ongoing cultural change due mainly to democratisation, globalisation and modernisation, accelerated by migrancy, opened an opportunity for strategically gendered interventions to potentially steer this inevitable trajectory in directions that result in greater benefit for women in agriculture. The absence of any evidence in relation to exclusion or impediments in relation to land access institutions was initially unexpected and perplexing. This forced deeper enquiry, one which was sensitive to the potentially limiting factor of negated women’s aspirations due to wider social forces – also guided by the gender framework. The empowering reality of asset investments that fall within the traditional responsibilities of women was another key insight. The detailed description of the gender framework set out in Chapter 2 was found to be comprehensive and of critical importance to the study and which is reflected in the final analysis and the recommended intervention strategies.

3 Sustainable Livelihoods Framework

The sustainable livelihoods framework was used in a general way in the study, more focussed on capitals than systematic application of an assessment of shocks and resilience to the agricultural practices in question, that if applied rigorously, would following a detailed assessment of capitals. The framework was found to be particularly useful in the discussions of the farming system and typologies, where capitals played a key role, and as such the systems dynamics that de Satge et al, 2000, bring to sustainable livelihoods was found to be useful. The framework was found to be powerful in the integration with capabilities theory which largely informed the knowledge and learning strategy that is one of the most important of the eight strategies that is proposed.

References

VON BENDA-BECKMANN, F. 2002. *Who is afraid of legal pluralism?* Paper presented at the XIIIth Congress of the Commission on Folk Law and Legal Pluralism, 7-10 April, 2002, Chiangmei, Thailand.

Rural Homestead Water/Agriculture Survey 2012

Good day. My name is _____. I am from the University of Fort Hare and Rhodes University. I do not represent any political party. We are studying the views of the people of the rural areas of the Eastern Cape about their experience with agriculture, water and the type of service/options that they would prefer. We would like to discuss these issues with you. All information will be kept confidential. Zonke inkcukacha zoqcinwa zivimfihlo

Ask whether the respondent is willing to answer a few questions about their water and agricultural situation.

FIELD WORKER TO COMPLETE BEFORE ASKING RESPONDENT QUESTIONS

Town/Village/Place:	Metropolitan:	District:
Enumerator NAME:	Interview DATE: [dd/mm/yy]	
Respondent NAME:	Homestead CODE:	

SECTION 1. Homestead Information

NB: 1.1+1.2+1.3 MUST ADD UP TO ANSWER IN 1.4		M / F	
1.1	How many children under 18 normally live in this homestead?	Enter no:	
1.2	How many people between 18 and 65 live in this homestead?	Enter no:	
1.3	How many people over the age of 65 live in this homestead?	Enter no:	
1.4	How many people normally live in this homestead (sleep here 4 or more nights a week, eat together)	Enter no:	
1.5	Does anybody from this homestead currently live elsewhere?	1=Yes 2=No	
1.6	Which of the following best describes your homestead? 1=single adult without children 2=couple without child(ren) under 18 3=couple with child(ren) under 18 4=single adult with child(ren) under 18 5=child(ren) under 18, parent(s) and grandparent(s) 6=child(ren) under 18 and grandparent(s) 7=child(ren) under 18 without adults 8=other, describe: _____	Enter code:	
1.7	Are there any non-relatives in this homestead, i.e. friends, lodgers, employees	1=Yes 2=No	
1.8	Who is considered to be the head of the homestead (main decisionmaker)? 1=female under 18 2=male under 18 3=female between 18 and 45 4=male between 18 and 45 5=female over 45 6=male over 45	Enter code:	
1.8.1	What is your relation with the homestead head? 1=myself 2=husband/wife of (spouse) 3=father/mother of 4=son/daughter of 5=other relative of, which? 6=does not apply	Enter code:	
1.9	Are there any other families/homesteads on this residential site?	1=Yes 2=No	
1.9.1	If yes, how many?	Enter no:	
1.9.2	Are these families/homesteads related to you?	1=Yes 2=No	
1.10	What is the highest level of education attained by respondent? 1=No education 2=Some primary 3=Completed primary 4=Some secondary 5=Completed secondary/matric 6=Post matric	Enter code:	
1.10.1	Level of education of the members of the household? 1=No education 2=Some primary 3=Completed primary 4=Some secondary 5=Completed secondary/matric 6=Post matric	1. 2. 3. 4. 5. 6.	

		7.		
		8.		
		9.		
		10.		
		11.		
		12.		
Space above for notes to describe family dynamics if desirable:				
M / F				
1.12.1	How many people in this homestead are employed full time?	Enter no:		
1.12.2	How many people in this homestead are employed part-time?	Enter no:		
1.12.3	How many people in this homestead are employed informally or casual? (including piece jobs)	Enter no:		
1.12.4	How many people in this homestead are pensioners (old age pension)?	Enter no:		
1.12.5	How many people are on a disability grant?	Enter no:		
1.12.6	What are the numbers of child grants?	Enter no:		
1.12.7	How many people in this homestead are in school?	Enter no:		
1.12.8	How many people in this homestead are unemployed, looking for work?	Enter no:		
1.12.9	How many people in this homestead are unemployed, not looking for work?	Enter no:		
	Does this homestead own the following items (in working order):			
1.13	Vehicle (car, bakkie, other)	1=Yes 2=No		
1.14	Cell phone	1=Yes 2=No		
1.14.1	How many cell phones are used in your homestead?	Enter no:		
1.14.2	What cell phone company is used? 1=CellC 2=Mtn 3=Vodacom 4=8ta 5=other	Enter code:		
1.14.3	How many days a week does the respondent use a cell phone?	Enter no: (1-7)		
1.15	Television	1=Yes 2=No		
1.16	Radio	1=Yes 2=No		
1.17	Solar panels/generator	1=Yes 2=No		
1.18	Electric stove	1=Yes 2=No		
1.19	Fridge/Freezer	1=Yes 2=No		
1.20	Water tank	1=Yes 2=No		
1.20.1	How many water tanks?	Enter no:		
1.21	Guttering	1=Yes 2=No		
1.22	Fencing (stock proof)	1=Yes 2=No		

2.1.5	What is your opinion about the water service in terms of quality/cleanliness? 1=bad quality all of the time 2=bad quality sometimes 3=good quality – no problems 4=does not know the condition of the water	Enter no:	
2.2.1	Have any improvements/extensions been made to the dwelling in the past 5 years related to your water supply?	1=Yes 2=No	
2.2.2	If you have made improvements, what were they? (multiple response allowed) 1=water tank installed 2=additional rainwater containers purchased 3=other, explain	Enter no:	
2.2.3	How were these improvements/extensions paid for? 1=used savings 2=borrowed money from bank 3=borrowed money from other sources 4=bought materials on credit 5=sold livestock 6=migrant remittances 7= Other	Enter no:	
2.3	What is the homestead's system to eliminate human waste? 1=pit latrine 2=open defecation 3=other	Enter no:	
2.4.1	How important do you think is a good water service for the economic development of the region? 1=important 2=moderately important 3=not so important 4=not important	Enter no:	
2.4.2	Would you be willing to pay for improved water services if they were offered to the village?	1=Yes 2=No	

SECTION 3. Agricultural Productivity			
3.1.1 SKIP	Do you have access to a garden (either igadi okanye isitya) on your site?	1 = Yes 2 = No	
	What type of garden crop(s) do you have? 1=small salad garden 2=maize crop 3=herb/medicinal garden 4=other	Enter no(s):	
3.1.2	If yes, how often is this garden used for crop production? 1=bi-annually 2=annually 3=every few years 4=never	Enter no:	
3.1.3	Do you put water on the garden crops? 1=never 2=1-3 times per month 3=1-3 times per week 4=daily 5=other, explain	Enter no:	
3.1.4	What do you do with the produce from your garden? 1=use it in the homestead 2=give it to other people in the village 3=sell it to other people in the village 4=sell it outside the village 5=other, explain	Enter no:	
3.2.1 SKIP	Do you have access to a field?	1 = Yes 2 = No	
3.2.2 SKIP	If yes, how often is this field used? 1=bi-annually 2=annually 3=every few years 4=never	Enter no:	
3.2.3	If you regularly use this field for crop production, do you sell any of the produce from this field?	1 = Yes 2 = No	
3.2.4	What type of crop farming are you involved in? [Do not read out options, record more than one answer]	1 = Maize farming only 2 = specialised crop farming only 3= other crop 4=Other (Specify) _____	
3.2.5	Are you undertaking rain-fed crop production?	1 = Yes 2 = No	
/	Does the homestead own any of the following livestock? <i>Enter number: (if no livestock, enter 0)</i>	Enter no:	Where do these livestock get water to drink? <i>Enter co:</i> 1=river 2=rainwater tank 3=rainwater containers 4=other

3.3.2	Cattle			
3.3.3	Goats			
3.3.4	Donkeys			
3.3.5	Horses			
3.3.6	Sheep			
3.3.7	Pigs			
3.3.8	Chickens			
3.3.9	Ducks, geese			
3.4	What is the main reason for keeping livestock? (note: can have two answers listed) 1=derive an income 4=ritual purposes 2=source of food 5=Other, specify 3=investment for future			Enter code(s):
3.5	Does the homestead own any of the following agricultural equipment?			
3.5.1	Ox plough	1=Yes, 2=No		
3.5.2	Donkey (ox) cart	1=Yes, 2=No		
3.5.3	Hand tools (Hoe /Gaba /Panga /Axe/ Machete/ Slasher/ Pick etc.)	1=Yes, 2=No		
3.5.4	Crop Sheller	1=Yes, 2=No		
3.5.5	Tractor	1=Yes, 2=No		
3.5.6	Trailer	1=Yes, 2=No		
3.5.7	Plough	1=Yes, 2=No		
3.5.8	Planter	1=Yes, 2=No		
3.5.9	Irrigation equipment	1=Yes, 2=No		
3.6	Do you want to increase your agricultural production?	1=Yes 2=No		
3.7	If this homestead is never or sometimes farming, what are the MAIN reasons? Can list three if necessary. Ukuba elikhaya znage okanye ngamazesha athile, ngesiphi esana sizathi? [Do not read out options, record only one answer]		1 = Shortage of land 2 = Infertile land 3 = Shortage of labour 4 = Too expensive 5 = Lack of support services 6 = Not interested Other (Specify) _____ _____	
3.8	What do you think this household needs most? 1=Food 5=Luxury goods (i.e. tv's,furniture) 2=Employment 6=Unsure/don't know 3=Money for school fees 4=Land 7=Other (list)	Enter no(s) or list:		

SECTION 4. Measuring household food security

4.1	What foods do you eat in this household?	In this section we could either ask people to list foods or think about a predetermined list with number codes (i.e. 1=maize 2=meat, etc)?	
4.2	Is it easy to get this type of food in the area? 1=Very often 4=Rarely 2=Often 5=Not at all 3=Sometimes	Enter no:	

4.3	How many times a day do you eat in this household? 1=Once 2=Two times 3=Three times 4=There is always sufficient food 5=There are days when we do not eat	Enter no:	
4.4	In the production of food, certain things are required. Select from the list what things you need most? 1=Land 2=Equipment 3=Manure/fertilizer 4=Seeds 5=Labour or community help 6=Other farming inputs (specify)	Enter no(s):	
4.5	Do you get help in the following ways to farm or to get by? If so by who? 1=Government 2=Local municipality 3=Neighbours 4=Community members 5=Church members 6=Family members 7=Yourself 8=Private organizations (specify below) 9=Other.....(specify)	Enter no(s):	

SECTION 5. Transportation and infrastructure aspects.

5.1	To transport your produce, what transport do you use? 1=Truck 2=Taxi 3=Tractor 3=Personal vehicle or neighbours 4=other	Enter no(s):	
5.2	To buy food (or farm inputs) from the shops what transport do you use? 1=Truck 2=Taxi 3=Tractor 4=Walking to the shop(s) 5=Personal transport 6=Other	Enter no(s):	
5.3	How close is it to get to the nearest food (farm inputs) store?	Enter estimated kilometers:	
5.4	Is the road to the shops/markets in good shape? 1=Very often 2=Often 3=Sometimes 4=Rarely 5=Never	Enter no:	

SECTION 6. Monthly Income and expenditures

6.1	What is your estimated monthly income? 1=0-R 500 2=R 501-R 1500 3=R 1501-R 2500 4=R 2501-R 3500 5=R 3501-R 7000 6=R 7001-R 12000 7=>R 12001	Enter no:	
6.2	How often does the household receive income from anyone who is not part of the household (remittance wages)? 1=Very often 2=Often 3=Sometimes 4=Rarely 5=Not at all	Enter no:	
6.3	How much do you and your household spend on the following items and on average per month?	Expenditure item: 1. Food 2. School fees (for your children) 3. School fees (other than your children) 4. Housing or rent 5. Medical care/aid 6. Transport	Amount on average (list amount below) - - - - - -

SECTION 7. Willingness to Participate in an Additional Study			
7.1	Would you be willing to participate in an activity to look at the use of water in your home for a 7-day period in (list month or follow up date)?	1 = Yes 2 = No	

SECTION 8. After the Interview: Section completed by the interviewer directly after interview.			
8.1	Respondent's population group	1 = Black 3 = Coloured 2 = White 4 = Indian Other (Specify) _____	
8.2	What proportion of the questions do you feel the respondent had difficulty answering?	1 = None 2 = Few 3 = Some 4 = Most 5 = All	

INTERVIEWER: Do you have any other comments on the interview? For example, did anything else significant happen during the interview?	
No (enter code 2)	
Yes: <i>[Explain]</i>	

ENUMERATOR DECLARATION

I declare that I have asked this entire Questionnaire as it is laid out and as I have been briefed. I declare that all the responses and answers recorded by me in this Questionnaire were given to me by the correct respondent. This questionnaire has been fully checked by me.

PLEASE PRINT:

First & Surname	
Signature	
Date	