

COMMUNITY-LED WATER SERVICES FOR MULTIPLE USES

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A new era: from construction for first-access services to sustainable co-management

Community-led water services for multiple uses respond to three trends in water services delivery in rural South Africa. After decades of rapid construction of new infrastructure many rural communities have obtained first-time access to water. Now the emphasis is shifting to sustainable infrastructure maintenance to overcome what has been called the **maintenance backlog**. Community management *after* hand over of new construction appeared insufficient for sustainable maintenance and repair. New forms of continued support are needed.

Second, more people aspire **higher service levels** than the minimum basic services set at 25 litres per person per day. At the same time, government's constitutional duty to provide for basic services should ensure nobody is left behind. Higher levels require payment. However, rural water users are rarely passively paying customers as in urban facilities. They contribute labour and human, social, technical and physical capitals in many ways. This is clearest in the third trend: **informal self-supply**. In self supply, individuals or small self-organized groups construct, install, operate and sustainably maintain smaller scale storage and piped gravity systems or shallow groundwater wells and lifting technologies. They use water themselves or share or sell this water. Self-supply not only serves as a back up to interrupted or collapsed services, or yet to be delivered government systems, but it also meets people's aspirations for higher service levels. Self-supply is widely used for both domestic uses and irrigation. Communities innovate multi-purpose infrastructure, especially around homesteads. It is a cost- and water-efficient engineering solution. In some remote rural areas, self-supply may become permanent, as it is in some high-income rural settings. Managing multiple water sources to meet multiple needs is obvious for people who depend in many ways on water; it is like 'the blinking of an eye', as a community member commented. Government support to such self-supply is emerging as a complementary water services modality.

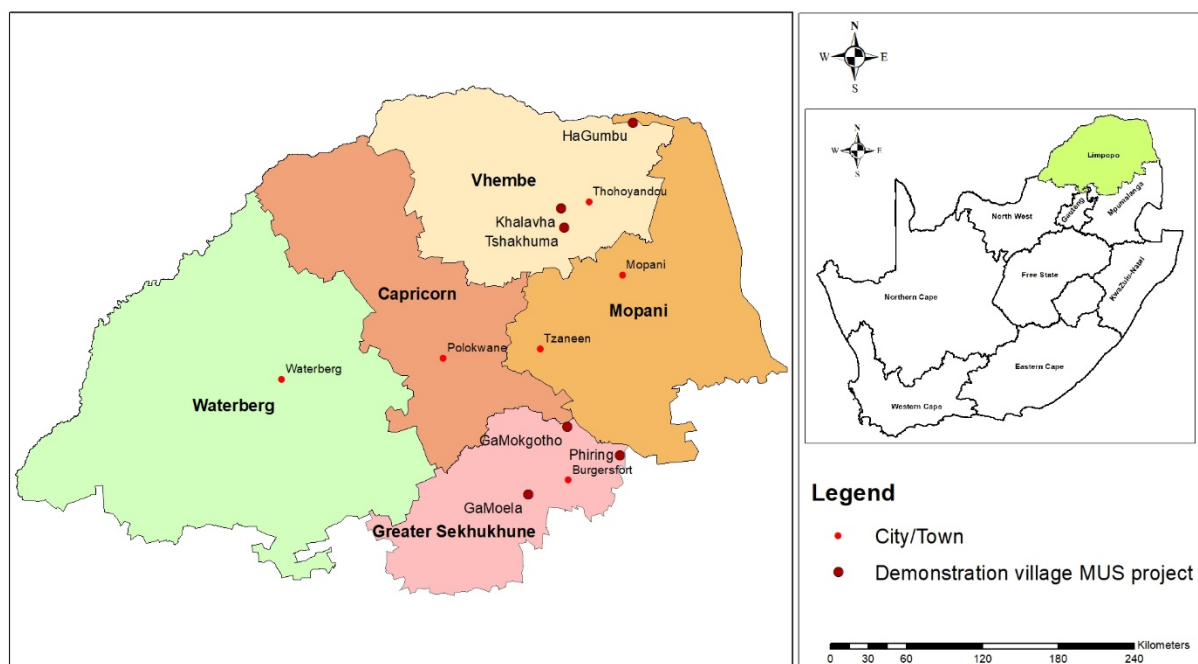
Co-management for incremental improvements

In response to these trends, community-led water services move away from first-time construction to **sustainable incremental improvements in longer-term co-management** between communities and government. Both agree on sustainable complementarity in roles and responsibilities. Communities become innovators and co-investors and government continues, among other, to fulfil its constitutional duty to subsidize basic service levels, leaving no one behind, and to ensure safety of the 3-5 litres per person per day for drinking. In such co-management, communities co-decide **from the first planning phase** of support onwards to ensure that support fits their needs and aspirations in return for labour, money or other contributions. External support by state and/or non-state support agencies continues to include capital costs of materials and construction labour. However, communities co-decide in all phases of the process of planning, diagnosing, surveying, designing, securing storage, training and managing contracts. Support agencies become socio-technical facilitators who advise, develop capacities and supervise communities and who ensure institutional and financial due diligence and technical quality. The costs calculated as percentage of the capital costs are comparable to fees for consultants and contractors in projects in which communities only participate as users *after* construction.

In practice, co-management arrangements are diverse, depending on the type of infrastructure, local geo-hydrological and socio-economic conditions and communities' social, human, technological, financial and physical capitals. At the one end of the continuum is 'light-touch' support to improve self-supply infrastructure owned by the community. Communities may seek, for example, additional materials or advice on water quality. At the other end of the continuum is infrastructure, such as municipal boreholes, owned, operated and maintained by government. Forms of co-management can be equally appropriate, for example, small repairs that communities can implement more quickly than municipalities, either voluntarily or with financial support. The specific co-management arrangements are different, but the process is similar, as follows.

Demonstrating stepwise community-led MUS

These guidelines for community-led MUS are based on the experiences of the demonstration project 'Operationalizing community-led multiple-use water services (MUS) in South Africa' from end 2017 to early 2020. Six demonstration communities in low-income rural areas of Limpopo Province (see map) differed in: population size, service level of infrastructure for self-supply and public infrastructure, surface and groundwater resources, and in extent of productive water uses. Funded by the African Water Facility of the African Development Bank, the Water Research Commission of South Africa was the implementing agent. The NGO Tsogang Water and Sanitation demonstrated community-led MUS in the communities as the 'support agency' mentioned below. The International Water Management Institute (IWMI) led the research, also for these guidelines.



Map. The six demonstration communities in Limpopo Province, South Africa

These guidelines target governmental (municipalities, local government, water, agriculture, employment generation, disaster management, other) and non-governmental support agencies (NGOs, corporate social responsibility, climate).

Figure 1 shows the steps of the process. Steps are not rigid; they only indicate that any next step requires actions and decisions at an earlier step. One often goes back to an earlier step for adjustments. For example, during construction in step 5, new technical opportunities and obstacles may come up, so one adapts the designs of step 3 accordingly. Ideally, the time frame is open and without spending pressure. In the following description of each step, expressions by community members during the MUS project are ‘in quotation marks’.

For the steps in the water stories of Tshakhuma and Ga Moela see also the participatory videos: <http://stories.iwmi.org/voicing-water-visions/mus-south-africa/>



Figure: step wise planning process for community-led MUS

Step 1. Initiating collaboration

Agreeing on goals

After approval by local authorities, everyone is invited to one or more open mass meetings. The support agency clarifies the available external support and its conditions. Both parties agree on common goals and criteria to monitor that common goals are being achieved. Co-management is the co-creation of innovations in the direct interest of communities. If no agreement is reached, both parties can leave ‘without hard feelings’.

The aim of community-led water services is to realize an improvement in water access for domestic and/or productive uses, for more health and wealth and less suffering. The available support includes technical and institutional advice and capacity development and some financial support for materials and partly for construction labour. There will be the stepwise process with communities in the driver’s seat. The process is mutual learning as equal partners. A broad time frame is agreed upon with the possibility to shift ahead if needed.

Conditions about which agreement is needed are the inclusion of women, youth and the most marginalized to leave no one behind. Communities need to collaborate in mutual trust and community spirit and give time for meetings throughout the steps. Also, the funding available for construction

labour is limited so part of the works will be voluntary. The project is not meant to create employment, but better access to water and more self-reliance.

Note: Communities' past experiences may have led to some mistrust vis-à-vis government or other external support agencies. Communities may also expect 'big money' and 'employment'. Support agencies should manage expectations, keep promises and be honest about the likelihood and approximate amount of financial support for the solutions that will be identified in step 3.

Community structure

At the first or next mass meetings, participants nominate a committee or other form of community structure. The support agency explains its double roles: serving as communication channel between the support agency and community with continuous report-back to the community and leading the stepwise process and co-management afterwards.

Relevant criteria for the selection of members include representation of relevant existing water and other community structures; geographic representation of village sections; gender balance and youth involvement; and being known as hard working, honest, and respected.

The election or nomination process can be by secret ballot. When participants feel 'we know each other' it can also be open. In that case, volunteering candidates raise their hands or participants mention someone's name, followed by one or two participants who second. Selection of the chair, secretary, treasurer, and, as needed, vices, can be internal by the new (additional) committee members. Further skills training may be needed on record-keeping, transparent budgeting and spending, and how to plan, organise, co-ordinate and run effective meetings. Local authorities can be ex-officio members. In any case, they have to be informed. As advised by a committee member: 'tell the leaders again and again till they get tired. And then they suddenly support'.

Note: Leadership is key. Community members need leaders to whom they can go with water problems. This 'software' of water management is equally important as 'hardware'. A community structure that is established in these first phases usually becomes the management structure afterwards. Reaching agreement on goals and procedures takes time and 'requires patience' but is indispensable. Transparency also in writing, especially on budgets and benefit allocation processes, serves two purposes. Committee members protect themselves against jealousies, political strife, rumours of eating money, pointing fingers, or people demanding 'I voted for you so want this and that benefit'. It also holds committee members to account who primarily pursue personal benefits.

Step 2. Diagnosing



Phiring



Ga Mokgotho

The basis for the participatory diagnosis is joint resource mapping of the village, houses, other sites, water sources and water infrastructure. During a mass meeting, participants draw a map on the ground. This is later copied on paper, which can also serve in later steps. The mapping is complemented by transect walks, interviews, observations and measurements. Joint resource mapping reveals the local knowledge and innovation that communities manage as a matter of daily life: the use and re-use of multiple sources of water throughout the seasons (both public infrastructure and self-supply) to meet their multiple domestic and productive needs: drinking, other domestic uses, livestock, crops, trees, vegetables, brick making, crafts, small-scale enterprise, decoration, and cultural uses. Multi-purpose infrastructure to meet as many needs as possible is most common, especially around homesteads. Single-purpose infrastructure, for example wells in distant fields, is the exception. Community members may have little idea about the precise workings of the government infrastructure. In such case, the few community members who know can explain.

The mapping and further discussions also expose problems in water resource availability, status of infrastructure, problems in fair distribution of water or other management problems, such as illegal connections, and conflicts and conflict resolution arrangements. When such problems emerge, further probing shows the underlying causes, including communal management challenges. The support agency advises to deepen the institutional and technical diagnosis. It starts more accurate assessments of flows, topographies with GPS sites, elevation and height differences, borehole and pump capacity, state of infrastructure, water quality, etc. Solutions naturally emerge in such diagnosis.

Note: The joint resource mapping of half or one day not only effectively informs the support agency but also creates a community spirit. Participants can realize 'if we do things together as a community instead of criticizing each other, we will achieve more'. If expertise is available, GIS or Google maps with exact scales can be used.

Step 3. Envisioning solutions



Ga Moela

Step 3 further identifies, examines, and systematizes the range of solutions and translates these into detailed institutional plans and technical designs of new (parts of) infrastructure, repairs, upgrades or extensions, and their approximate costs. The broad initial lists are discussed in a mass meeting.

Different groups in the community can experience different problems. So, the support agency ensures that each group can propose their own priorities, for example for locating new storage and taps. Instead of waiting until 'illegal' actions happen anarchically, for example household connections, step 3 is the phase to anticipate and plan for such higher aspirations and mobilize community members' willingness to invest and pay to that end. The relative importance of each of the solutions starts being weighed and ranked.

In this process, the support agency provides technical and engineering expertise to advise, check and strengthen communities' skills and expertise. When certain solutions are costed and appear to be too expensive for the available budget, they are dropped right away. Support agencies and communities also consider and agree on clear managerial conditions for future operation and maintenance that the community should fulfil before proceeding.

The draft lists of prioritized solutions are discussed in a mass meeting. In continuing exchange and fine tuning with the community structure, the support agency finalizes the provisionally prioritized options into draft designs with detailed technical measurements and Bills of Quantities with estimated costs, as required to submit for funding in the next step. Again, the support agency manages expectations and remains honest that it is still uncertain whether the community plans will be accepted for funding.

Note: solutions can include individual support, for example household storage tanks as a measure to ensure that nobody is left behind. The selection of such beneficiaries can be left to the political and/or tribal community leadership, as the MUS project did.

Step 4. Fitting the financial framework

In step 4, the costed technical designs and the provisional prioritization of step 3 are taken forward for final approval and reworking into a budget- and time- specific work plans that fit the due diligence and other conditions for funding. The work plan also specifies the implementation modalities for procurement of materials, recruitment of workers and builders, factual construction and quality control. Legally binding contracts among the funding departments, relevant implementation structures, support agency on the ground and the community structure stipulate the respective tasks, responsibilities, remuneration and compliance rules. For infrastructure owned by government, the contracts or agreements tell which repairs and upgrades are planned and how government and communities will co-manage use, operation and maintenance after finalizing construction.

If communities will handle funding and/or play other formal roles, local structures may need to be formalized. Depending on local conditions and works at stake these can vary, for example service level agreements, Primary Cooperatives, or otherwise.

The contracts also stipulate construction arrangements and technical quality control. In support to self-supply, it is obvious that communities continue the construction, but community-led construction has also many advantages for the refurbishment of government systems or other systems constructed with external finance. The newly developed capacities stay in the community. Also, co-designing and constructing infrastructure ensures real ownership and commitment, not just a 'sense' of ownership. The support agency can train, supervise and take final responsibility for technical performance (and may need an insurance for the latter).

On the question whether to pay or not for semi-skilled works, and if so, how much, alignment with other national arrangements is useful. Employment creation programs, for example, self-select the

poor and communities are already familiar and aware of the remuneration rates. However, one should keep the ultimate benefit of better access to water in mind, and that users should contribute if they want higher service levels.

Depending on the mode of payment of workers chosen, the support agency has to operationalize the planned works accordingly. Another question to agree about is when to pay. It is often best to only pay after both the community structure and the support agency inspected and were satisfied about good performance. The procedures for recruitment of workers and record keeping can be in the hands of the community structures.

In community-led MUS, transparency is key for both the costed designs in step 3 and criteria for prioritization and final budgets in step 4. It avoids rumours that ‘money is eaten’ and teaches communities about costs and choices to make. Communities decision-making power over available funding can stimulate to save money on labour costs to spend more on additional materials or other common goods. Communities can swiftly respond to unforeseen opportunities or obstacles according to local understanding and priorities. Contingencies in the budget should enable a similar flexibility. Differences between the approved designs and ‘as built’ designs can be justified ex-post.

*Note: In the MUS project, all communities and the support agency were adamant that communities should do the construction work. This was obvious for improvements to self-supply systems, but communities also preferred that community members do the construction work for upgrades of government owned systems. The MUS project aligned with the daily rates of ZAR90 of the South Africa’s Community Works Program and Extended Public Works Program. The remuneration was purposively called a ‘stipend’ and **not** a ‘wage’. Tsogang Water and Sanitation split the designs into daily tasks for semi-skilled workers of ZAR90 each, and lump sums for assignments for skilled workers.*

Step 5. Implementing

Procuring materials

Procedures for procurement of materials include: a wide announcement of requests for quotations; transparent adjudication of bids; purchase; and delivery of materials to the storage site. Government and other centralized support agencies often have centralized procurement procedures for materials, but still buy from local suppliers. Local procurement, either directly by communities or by communities as advised and checked for due diligence by the supporting agency has various advantages over centralized procurement. On-the-shelf prices in local shops are lower than prices with mark-ups of suppliers in centralized procurement. Some materials, such as sand, are near, so prices are even lower. Communities know the road conditions. As direct beneficiaries, community members insist on high quality material. When they buy in bulk, they can buy from more than one shop to get the best deal and negotiate discounts. Purchase of materials improves communities’ knowledge about available materials, their quality and prices; and strengthens contacts with suppliers for future maintenance, repairs and upgrades. Upon delivery in the village, communities scrutinize the lots provided and find a secure place for storage, for example with the tribal authorities.

Note: procurement of materials in the MUS project followed central government procedures. Communities felt side-lined and recommended their eligibility in future tender processes.

Recruiting workers

Recruitment procedures should be fair when more people are keen to get work than available jobs or tasks. Further, compensation of works can be lower than a formal minimum wage because the community will benefit from better access to water.

For the skilled workers, artisans and local builders, plumbers and welders are invited to a meeting. The technical designs are explained, either orally or, if builders understand, with the drawings. They can submit quotations. The bidder's previous works are inspected for quality control.

Note: in the MUS project, a mass meeting with raffles (yes-no cards or identity cards to pick from a hat) was unanimously seen as fair procedure to recruit semi-skilled workers.

Constructing



Tshakhuma

Finally, 'dust flies' to construct. Designs can be somewhat adjusted, as needed. Workers are organized, trained and supervised. Works can be allocated across sections, so without considering whether semi-skilled workers would work on their own (segment of) the system or on others' water supplies. This strengthens community spirit. On the other hand, working on the own infrastructure for direct benefits may be an incentive for high quality work.

Selected workers may take up as many tasks as possible and invite family members to help. This enables to do more tasks per day, so earn more. In other cases, workers stick to certain assignments, so once one batch of workers finishes, the next batch gets the opportunity. Works by each worker are well

recorded. Selected workers can also choose to group themselves and work independently on the specific task for a lumpsum of the total amount of all stipends.

The support agency provides regular on-the-job training, advises and monitors the quality of the works. They certainly supervise during key moments in the construction, for example when pipes are joined or when it is tested whether there are leaks before backfilling the trenches. This capacity stays in the community. Also, after hard work communities protect what they constructed.

Upon satisfactory performance and at regular intervals payment is organized. For example, the total amount of stipends due is drawn from the bank and paid in cash or in the worker's bank account, for ease and safety.

When construction has been tested and finalized, step 6 of use, operation and maintenance starts. The support agency prepares the new phase by training on operation and maintenance and on point of use treatment of 3-5 litres that need to be safe for drinking is important.

Note: the MUS project found no difference whatsoever between women and men in performing semi-skilled works: both were equally keen and performed equally well in construction work. However, skilled workers were invariably elder men. In training sessions, such cultural beliefs were challenged.

Benefiting: more and more reliable water for health and wealth

The five steps led to the following benefits in two different communities, Ga Mokgotho (repair and upgrades and institutional development of a large gravity system for 800 households) and Ga Moela (first-time access to new storage and reticulation of two existing but underused municipal boreholes for 108 households).

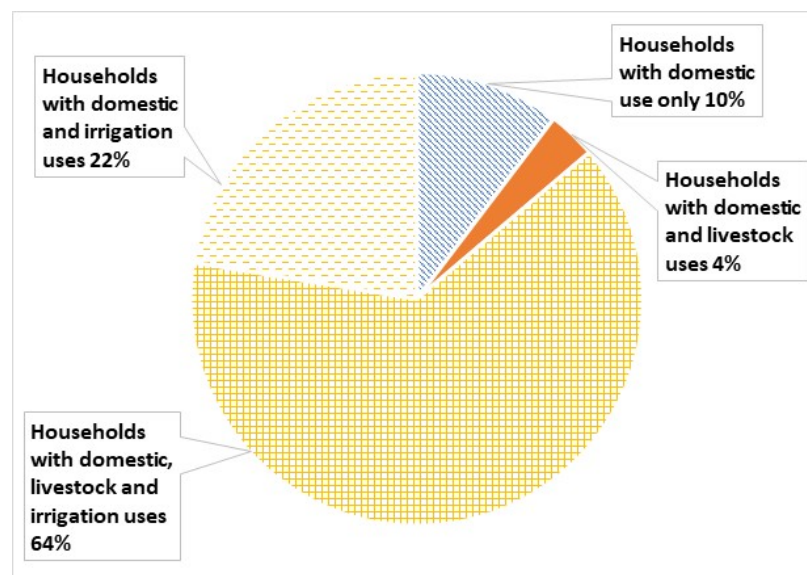
In Ga Mokgotho, the community improved the intake of water into the existing large brick reservoir and newly installed or repaired distribution valves, pipelines and taps. Users remain responsible for repair of the taps and the reticulation line that they share. Most importantly, the new community structure sets and enforces rules, and holds a new scheme operator accountable. The scheme operator is temporarily paid by the Extended Public Works Program. The community continues requesting some support for more materials for extensions.



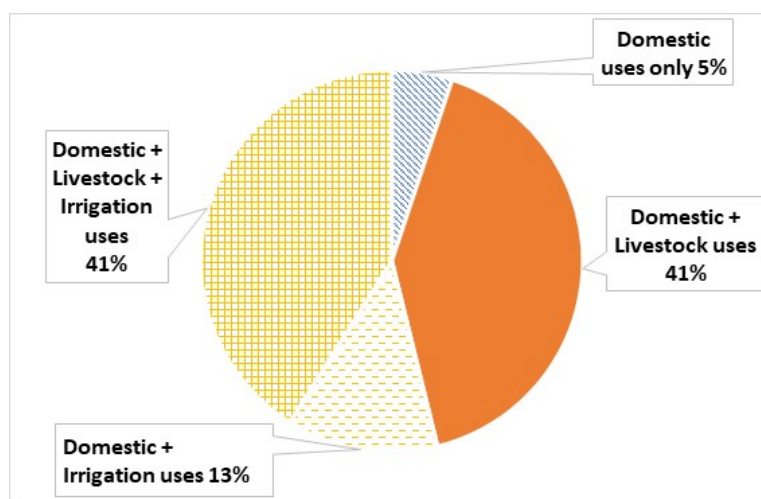
Ga Mokgotho

In Ga Moela, most households used scattered unimproved hand-dug wells in the past. Two under-used municipal boreholes were extended with new storage, reticulation and street taps. The time to fetch water is less. The community remains dependent on the municipality for operating and maintaining the boreholes. Most community members are willing to take responsibility for small repairs and organize own fuel to save time, but others prefer waiting for the municipality to provide that. Co-management arrangements between the municipality and community should clarify mutual responsibilities.

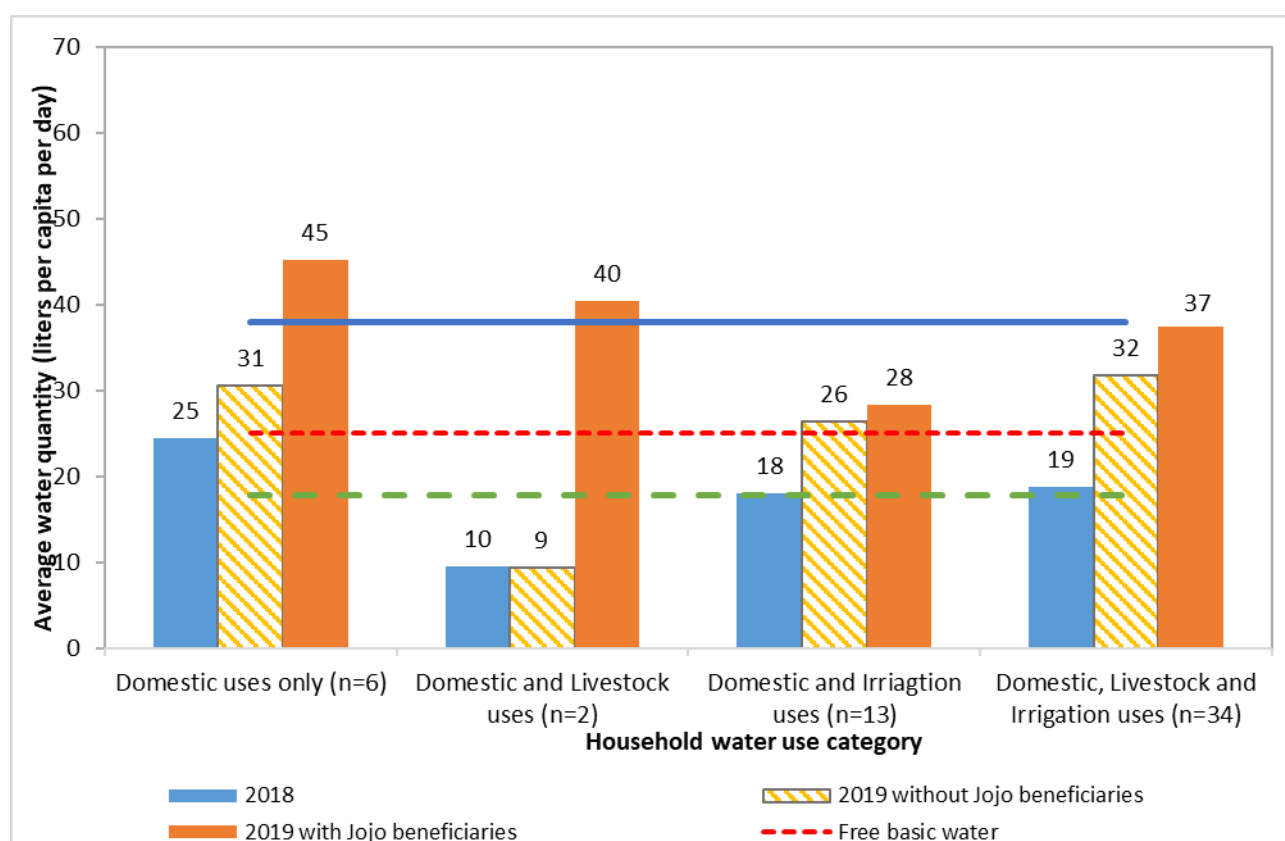
Graphs 1 to 4 show how almost all households use and re-use water for multiple uses. This is also the case below the minimum basic volumes of 25 litres per person per day. In 2019, the MUS project had increased the quantities used compared to the dry season of 2018 before construction. The increases were across all uses. The beneficiaries of the household storage tanks benefitted most, as the average shows when they are included in the calculation.



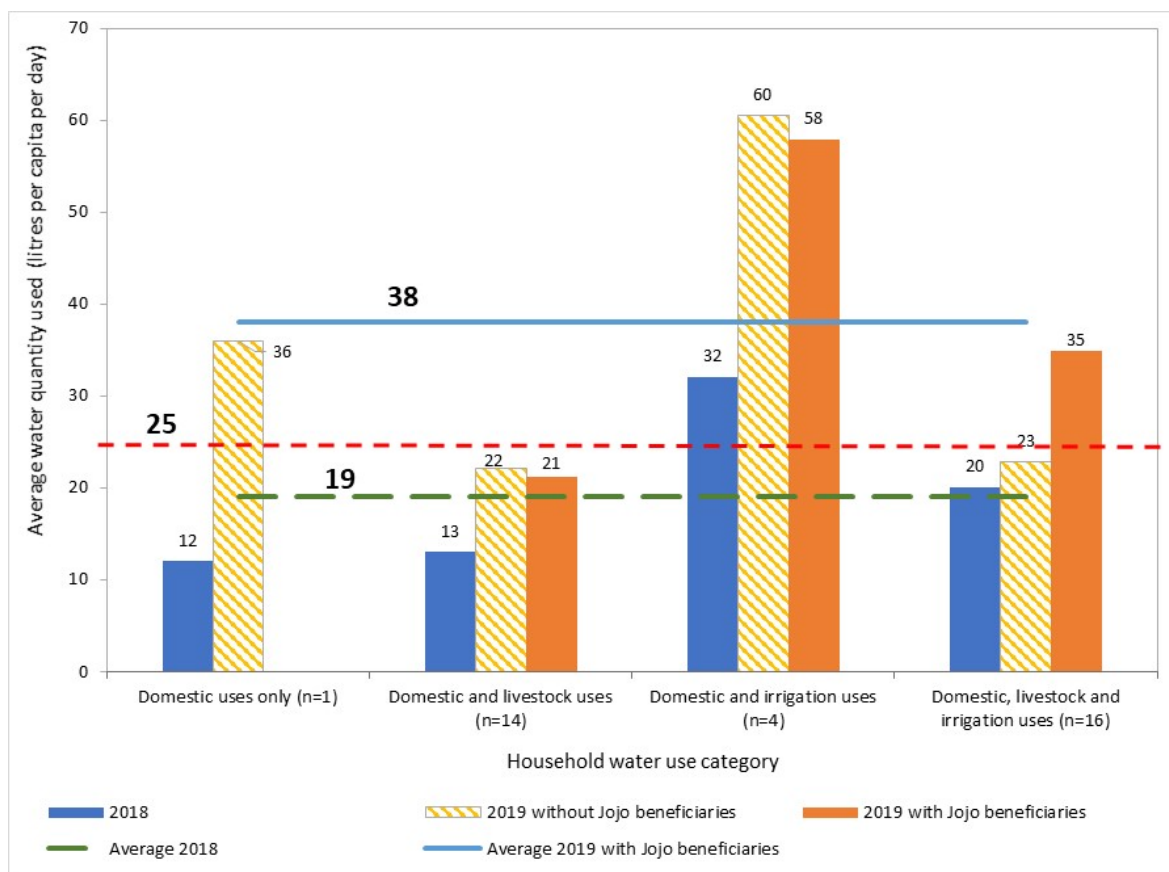
Graph 1: Categories of households by use pattern (n=59) in Ga Mokgotho



Graph 2: Categories of households by use pattern (n=39) in Ga Moela



Graph 3. Water quantities (litres per capita per day) used at homesteads by use categories in 2018 and 2019 with and without jojo beneficiaries in Ga Mokgotho (n=55)



Graph 4. Water quantities (litres per capita per day) used at homesteads by use categories in 2018 and 2019 with and without jojo beneficiaries in Ga Moela (n=35)

In Ga Mokgotho, the better water supplies enabled more irrigation of trees, especially mangos, across the gravity system. The estimated yield increases, plus an expected slight improvement in market prices, increase the estimated monetary value of all trees from ZAR 2 324 123 in 2018 to ZAR 3 713 198 in 2019, so with ZAR 1 389 075, or 60%. Benefits of this homestead-based tree and vegetable irrigation largely accrued to women. In 68% of households with homestead cultivation, management was exclusively by women; in 17% mainly by women; in 9% by both women and men equally, and only in 6% of households with homestead cultivation, homestead cultivation his was exclusively managed by men.

In Ga Moela, the value of irrigated produce (trees and vegetables), with hardly any expected increases in price, was expected to move from ZAR 164 666 in 2018 to ZAR289 136, so adding a value of ZAR 124 470, an increase of 76%. Similarly, women managed irrigated cultivation in 60% of the cases; men managed in 25%, and both women and men were managers in 15% of the irrigating households.

Conclusions

In sum, community-led MUS respects communities' voices: 'nothing about us without us'. It is **performance-oriented in a common interest**. Communities have a direct interest in high quality and sustainable results and work hard in a community spirit. The six-step process can be applied in any rural condition, although the precise division of responsibilities between communities and external agencies

in 'co-management' will depend on the infrastructure at stake. Infrastructure can range from small-scale technologies for self-supply to complex municipal borehole systems.

Community-led MUS **improves livelihoods** by bringing more water more reliably and nearer to homes. This alleviates burdens of domestic chores and livestock watering and enables using or re-using more water for trees and crops, brick making, enterprises, decoration and other uses. Training about point-of-use treatment and protection of intakes improved water safety of 3-5 litres per person per day for drinking and cooking.

Community-led MUS is **inclusive**. Open invitations to attend mass meetings from the first introduction onwards can reach everybody, also in openly nominating a representative community structure. Some remuneration for works self-selects the poor. Women and youth are included. Their training in skilled technical works will remain important to overcome their current underrepresentation in such works.

Community-led MUS is **cost effective**. It harnesses communities' existing knowledge, skills and assets for investments in cash and kind in water infrastructure. It welcomes the cost effectiveness of multi-purpose infrastructure. Local procurement of materials can further reduce costs compared to more centralized procurement. Communities' decision-making in fund allocation can further reduce labour costs. The costs of the support agency for its socio-technical process facilitation, institutional and technical advice and quality control, are comparable to service providers' fees normally charged in water infrastructure projects.

Community-led MUS is **swift**. Communities do need time to discuss and agree on issues, but works are swift because it improves access to water. Remuneration of works, even if modest, accelerates construction. By involving communities in the diagnosis and identification of solutions, time is saved that is otherwise needed for tendering for pre-feasibility and feasibility assessments by consultants.

Community-led MUS can **create jobs** if community members are remunerated for their works, as widely applied in employment generation programs.

Last but not least, community-led MUS strengthens **sustainability** by: starting from the *localized* technical and managerial problems in the mix of public infrastructure and self-supply; following people's priorities in identifying *localized* solutions; (potentially) procuring locally; recruiting local semi-skilled and skilled workers for construction and developing their technical and managerial capacities that stay in the community; improving caretaking because communities realize: 'We would not vandalise the infrastructure as we worked extremely hard for it'; strengthening community leadership structures from the onset that will continue in the future; and initiating and strengthening contacts with government agencies and suppliers throughout the process.

Further reading

Adank, Marieke, Barbara van Koppen, and Stef Smits. 2012. Guidelines for planning and providing multiple-use water services. [CGIAR Challenge Program-Multiple-Use Water Systems (CP-MUS) Project guidelines]. Hague, Netherlands: International Water and Sanitation Centre (IRC); Pretoria, South Africa: International Water Management Institute (IWMI). 123p.
<https://www.musgroup.net/sites/default/files/d59f4119902ead8226ccf53371e0377d.pdf>

Butterworth, John, Sally Sutton, and Lemessa Mekonta. 2013. Self-supply as a complementary water services delivery model in Ethiopia. *Water Alternatives* 6(3): 405-423

Van Koppen, Barbara, Moritz Hofstetter, A. Edward Nesamvuni and Quinex Chilwe. 2020. Integrated management of multiple water sources for multiple uses: rural communities in Limpopo Province, South Africa. *Water SA* 46(1) 1–11 / Jan 2020. <https://doi.org/10.17159/wsa/2020.v46.i1.7870>

Van Koppen, Barbara, Manuel Magombeyi, Inga Jacobs, Virginia Molose, Kenny Phasha, Thando Bophela, Itumeleng Modiba and Malcolm White. 2020. Process and benefits of community-led multiple use water services: comparing two communities in South Africa. IWMI-WRC-Tsogang Water and Sanitation-African Water Facility Working Paper 193. Colombo: International Water Management Institute

Van Koppen, Barbara, Virginia Molose, Kenny Phasha, Thando Bhopela, Itumeleng Modiba, Malcolm White, Manuel Magombeyi and Inga Jacobs. 2020. Guidelines for community-led water services for multiples uses. IWMI-WRC-Tsogang Water and Sanitation Working Paper 194. Colombo: International Water Management Institute

