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The WRC operates in terms of the Water Research Act (Act 34 of 1971) and its mandate is to support water research and development as well as the building of a sustainable water research capacity in South Africa.

# Lessons learned: Smallholder Irrigation Schemes

***South Africa has made significant investments into small-scale irrigation schemes over the last 20 years. Despite these investments a large number of these schemes remain underutilised and underperforming. A project funded by the Water Research Commission (WRC) investigated factors influencing the under-utilisation of smallholder irrigation schemes in Limpopo and opportunities for improvement. The final report makes a number of recommendations for the improvement of these schemes.***

## Background

The National Development Plan 2030 advocates an expansion of irrigated agriculture, with emphasis on smallholder farmers where possible. More specifically, the New Growth Path targets opportunities for 300 000 households in agricultural smallholder schemes, plus 145 000 jobs in agro-processing by 2020. In order to achieve these targets, smallholder schemes would be provided with comprehensive support around infrastructure, marketing, finance, extension services and other aspects.

However, although significant investments have been devoted to smallholder irrigation schemes over the last 20 years, the majority of these schemes are either underperforming or have collapsed. Innovative solutions and possible interventions have not been proposed, so the WRC funded a project to investigate the causes of under-utilisation of existing smallholder irrigation schemes in Limpopo province and to identify opportunities for improvement.

## Methodology / The assessment process

Six smallholder irrigation schemes were selected for the study with the assistance of the Limpopo Department of Agriculture and Rural Development (LDARD). The schemes, which covered the Vhembe, Mopani and Sekhukhune districts included both failed and successful schemes, and ownership was a mix of private, communal and private-public partnership.

A questionnaire was developed to use as an assessment template for interviews with committee members of the smallholder irrigation schemes, as well as extension officers. It included details of the farm and socio-economics relating to the beneficiaries, crop types and management, soil types, irrigation infrastructure and management, availability of resources, and markets and finance. In addition, a transect walk of each scheme was conducted, where features such as pump stations, balancing dams, infield irrigation and power supply were assessed, with pictures taken and GPS coordinates recorded.

## Findings / Causative factors for under-utilisation



*Soil erosion challenges at the scheme due to flood irrigation.*



*Vandalised drip irrigation lines at one of the schemes investigated.*

The key factors identified as causing under-utilisation of the smallholder irrigation schemes are listed below. Results from this research study strengthen previous work conducted by several institutions on the under-performance of irrigation schemes across the country.

**Lack of skills in irrigation scheduling.** All the schemes were found to rely on crude and inaccurate methods for determining when to irrigate and how much water to apply, with direct implications for crop quality and yields.

**Problems with the strategic partner approach.** The strategic partnership model was introduced to capacitate and mentor farmers, but its implementation requires an agreement for each scheme specifying how both parties will participate and benefit. Typically, strategic partners would provide training, access to markets, as well as inputs and machinery, in exchange for profit sharing. However, lack of transparency by strategic partners about costs and profits resulted in lack of trust by beneficiaries. Schemes have collapsed following the departure of strategic partners, indicating that the approach in its current form may not be sustainable.

**Shortcomings of cooperative farming.** The study revealed that the allocation of farms or plots to several people resulted in conflicts and infighting, causing either the collapse of the smallholder farming or reduced production levels. The 'one block one household' approach was found to be more viable. Irrigation methods that do not allow for demarcation into individual blocks, such as the floppy irrigation system, are therefore not suitable for smallholder irrigation schemes owned by several beneficiaries.

**Lack of business attitude and record-keeping.** The farmers have no proper and detailed records of production costs, nor their seasonal water use or other input quantities. They are not aware if they have made a profit, and cannot demonstrate performance of the farm or irrigation scheme. Without an income/expenditure attitude, the level of production will remain low.

**No prior arrangement of markets.** The farmers cultivate the crops and only look for markets at the point of harvest. As a result, their produce fetches low prices or gets spoiled if they cannot find a market in time.

**Vandalism and theft.** Three of the schemes had experienced serious problems related to vandalism and theft of irrigation assets. This can be attributed to overall management problems and lack of accountability in leadership.

## Recommendations

The study proposed the following for further investigation and/or intervention for improved performance of smallholder irrigation schemes in Limpopo province, and South Africa in general:

- The new strategic direction to support smallholder irrigation schemes must adopt the 'one block one household' approach.
- The strategic partnership model should be reviewed and an innovative solution found to address its current problems.
- Smallholder farmers must be trained in basic business management, marketing and record keeping with a view to transforming them into entrepreneurs and business people.
- Easy and affordable irrigation scheduling methods must be introduced to assist smallholder irrigation farmers, and training provided.
- The sustainability of 'floppy' irrigation systems in terms of operational costs, design and profitability should be investigated, and there should be a gradual conversion of existing large-scale sprinkler irrigation schemes to drip-irrigation farming.
- Vandalism experienced in some of the irrigation schemes needs to be addressed by the owners to ensure the sustainability of these and future irrigation schemes.
- Youth should be encouraged to participate in the irrigation schemes and ultimately take over from ageing farmers, with the use of digital technologies promoted to attract them.
- Mechanisation centres should be introduced in the medium term to facilitate access to agricultural machinery, equipment and transport at the farms.

**Table 1. Status of irrigation schemes during assessment**

| Name of Scheme   | Municipality and District          | Status                                     | Size                                   | Number of Beneficiaries             | Irrigation type                                                         |
|------------------|------------------------------------|--------------------------------------------|----------------------------------------|-------------------------------------|-------------------------------------------------------------------------|
| Mbahela-Tshiombo | Thulamela, Vhembe                  | Operational                                | 100 ha                                 | 85                                  | floppy irrigation                                                       |
| Mphaila          | Makhado, Vhembe                    | Operational                                | 71 ha                                  | 62                                  | drip and overhead sprinkler irrigation                                  |
| Tours            | Greater Tzaneen, Mopani            | Tours 1: Collapsed<br>Tours 2: Operational | Tours 1: 140 ha<br>Tours 2: 120 ha     | Tours 1: formerly 17<br>Tours 2: 53 | Tours 1: drip irrigation vandalised<br>Tours 2: 49 ha furrow irrigation |
| Thabina          | Greater Tzaneen, Mopani            | Operational                                | 229 ha but only 45 ha under production | 155                                 | furrow irrigation                                                       |
| Phetwane         | Greater Ephraim Mogale, Sekhukhune | Non-operational at time of study           | 48 ha                                  | 48                                  | floppy irrigation                                                       |
| Kolokotela       | Makhuduthamaga, Sekhukhune         | Collapsed                                  | 243 ha                                 | Formerly 188                        | floppy irrigation                                                       |

## Further reading:

To order the report, *Factors influencing under-utilisation of smallholder Irrigation schemes and opportunities to improve the schemes' productivity in Limpopo province, South Africa (Report No. TT 787/19)*, contact Publications at Tel: (012) 761-9300, Email: [orders@wrc.org.za](mailto:orders@wrc.org.za) or Visit: [www.wrc.org.za](http://www.wrc.org.za) to download a free copy.