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# Irrigation revitalisation

## Beyond the engineering paradigm



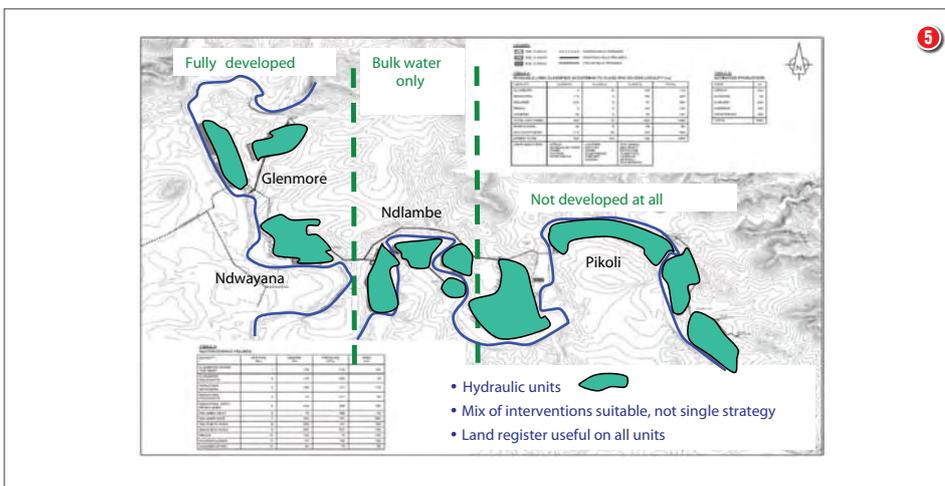
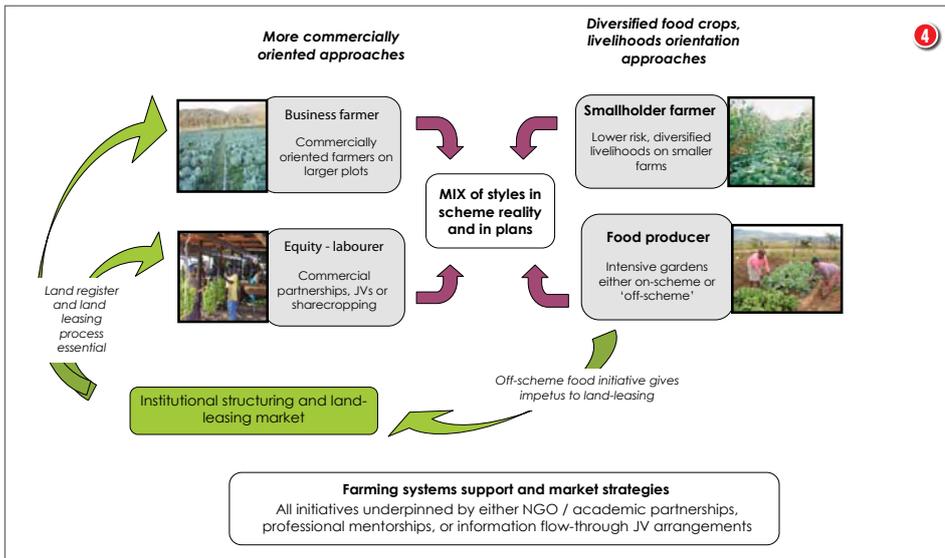
STANDING ON ONE of the hundreds of collapsed smallholder irrigation schemes in the former homelands, one has a tangible sense of unused opportunity which is starkly amplified by the surrounding poverty, unemployment and social need. It is easy to understand why inspired politicians imagine a sea of green and commit hundreds of millions of funding annually to rebuild infrastructure, in the hope that this will result in profitable production.

While this has been good news for some engineering firms, the hundreds of moribund pumpstations, centre-pivots and irrigation systems around the country are

monuments to a techno-centred approach which has failed historically and continues to do so in current times. The harsh reality of the under-utilisation of natural and infrastructure resources, and limited returns on major investments in smallholder irrigation prompted intensive research under an assignment funded by the Water Research Commission. The four-year study by an Eastern Cape engineer and his experienced land-reform colleague has culminated in substantiated findings which show that the predominant emphasis on repair, rebuild, re-design, refurbish and rehabilitate must be replaced entirely and the problem

statement re-defined. As important as technology is, it is only one of eight critical elements for successful change and if the other seven elements are not in place, technology alone will fail.

The result of the applied research is the publication of the *Rough Guide for Irrigation Development Practitioners* by the Water Research Commission, which sets out pathways to constructive change for collapsed schemes. The guidelines, which are based on extensive case-study research, multi-stakeholder workshops across the country and a review of major South African and East African smallholder ir-



irrigation programmes, present development principles, specific fieldwork approaches, planning tools and inspiring case studies. The research has led to new ways of understanding and addressing the challenge of smallholder irrigation development.

In many cases it is civil engineers who find themselves leading revitalisation initiatives, and the guide is written for such individuals, as well as for the technocrats who make funding decisions. The guidelines show why irrigation enterprises at scheme and farm level must be viewed as complex systems if successful outcomes are to be achieved. This means that all elements – technical, historical, social, financial, institutional, land-ownership and crop production – are unavoidably inter-dependent and dynamically affect, and are affected by, each other. Smallholder irrigation planning can thus only be attempted with whole-system thinking where the scheme is conceptualised as a productive, socio-bio-physical entity (figure 5).

The challenge for the project leader is to develop a team whose members think iteratively and in a highly integrated way, and where the influence of disciplines on each other is fully articulated and the resulting consequences accommodated. Engineering design directly impacts on costs, which

influences crop choice and marketing strategy, which impacts on landholding size and institutional relationships, etc, and a change in any one alters the input criteria to the next. The isolation of disciplines is therefore impossible and the days of 'let the engineers handle the design and the sociologists the people' are long gone.

An additional challenge is that the range of 'specialists' must include members of the beneficiary community, who have local knowledge, insight and critical information. New planning processes were developed, such as the Iterative-Consultative Approach (ICON), which combines conventional pre-feasibility processes with participatory rural appraisal (PRA) and rapid appraisal of indigenous agricultural knowledge systems (RAAKS). These are usually well outside the comfort zone of any one specialisation, given the technical, language, cultural, gender, political and other challenges of integrating a range of specialisations and local knowledge in a dynamic planning process.

The guidelines set out a range of newly-developed planning concepts which are wider and more inclusive than those of the past, as well as step-by-step methodologies to inform smallholder irrigation planning in the South African context. Whether

- 1 Irrigating with low-tech but high-efficiency short furrows
- 2 Girls with produce from home-gardens at Keiskammahok irrigation scheme
- 3 Indigenous knowledge – woman farmer at Tugela Ferry irrigation scheme
- 4 Farming styles as development pathways
- 5 Hydraulic units as institutional and production planning units

teams are led by engineers, land-use planners, economists or sociologists, the guide provides practical working concepts and 'route-maps' for scheme development.

One of the research innovations is that four farming styles are categorised, enabling interventions to respond to the fundamentally different needs of distinct groups on any one scheme (figure 4). The four styles reflect the reality of different plot sizes, livelihoods strategies, investment capability, skills levels, risk appetite, cropping interest, and marketing interests. These four representative groups require wholly different support strategies and cannot be catered for by homogenous interventions targeting a 'virtual' and non-descript 'farmer'. A second innovation is the pioneering community-centred methodology for formalising land-leasing initiatives on communal land. This aims to unlock the potential of large tracts of unused irrigation land through a quasi-legal mapping and registration process and the strengthening of local land administration systems. Home-food production initiatives off-scheme, supported by rainwater harvesting, play a catalysing role in the land-leasing approach. The research provides clear evidence that success demands a major investment in long-term farm-system support and human capital development through training, institutional support and mentoring over a minimum of five to eight years.

The guidelines link these different themes, technical innovations, strategies and approaches into a route-map for action which covers each of the eight critical elements necessary for successful smallholder irrigation. While the process is unavoidably complex and the outcomes inevitably uncertain, the guidelines present pathways to change with a higher chance of successful outcomes. The guidelines can be downloaded free of charge from the WRC website:

- **Volume 1** [http://www.wrc.org.za/downloads/report lists/web rpts/agric/TT 308-07.pdf](http://www.wrc.org.za/downloads/report%20lists/web%20rpts/agric/TT%20308-07.pdf)
- **Volume 2** [http://www.wrc.org.za/downloads/report lists/web rpts/agric/TT 309-07.pdf](http://www.wrc.org.za/downloads/report%20lists/web%20rpts/agric/TT%20309-07.pdf)

## PROJECT TEAM

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Source:

[http://www.saice.org.za/downloads/monthly\\_publications/2007/CivilOct2007/#/0](http://www.saice.org.za/downloads/monthly_publications/2007/CivilOct2007/#/0)