

# Small-scale irrigation in Malawi: challenges and opportunities



## SUMMARY

Small-scale irrigation has the potential to contribute to improved food security and higher rural incomes in sub-Saharan Africa. However, a combination of factors has hampered its development. These include pressure on agricultural water due to increased climate variability and perceived institutional weaknesses. How can such problems be overcome? How is knowledge about irrigation transferred and used? This briefing paper shares the findings from an ethnographic study in Malawi which sought to answer these questions. It demonstrates the complex context within which challenges and opportunities for small-scale irrigation are situated and aims to inform policy makers and their development partners on possible best practices for promoting irrigation development.

## KEY FINDINGS

- Irrigation can improve incomes and food security if farmers can access markets for inputs and produce, food pricing systems reflect real costs of production, and farmers diversify beyond staple cereals
- Crop management practices emphasise yield increase, but more attention is required to adapt irrigation to both climatic variability and climate change through optimising water use efficiency
- Lack of security of tenure of land and unclear water rights undermine livelihoods particularly of those excluded by irrigation schemes, fuel conflicts over land use, and are not compatible with sustainable land management practices
- Farmers are innovative and have modified both hard and soft technologies in order to protect their interests, reduce labour demand and raise production. When farmers' local knowledge is taken into account in designing projects, measures are more likely to be locally relevant and sustainable over the long term
- Irrigation development is more effective when coordinated at catchment rather than at administrative or irrigation scheme levels. Positive impact is achieved when projects build on previous efforts, rather than when development institutions operate in competition

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## THE RESEARCH

This research was one of a series of projects funded by the DFID-ESRC Growth Research Programme (DEGRP) which funds research on issues relating to inclusive economic growth in Low Income Countries (LICs). In Malawi, the project adopted an ethnographic approach to explore a range of issues pertaining to irrigation and agricultural development. Questions were asked concerning the contribution of irrigation, institutional responses to managing water under increased water scarcity regime, and the role of rules and norms in the governance of access to water. The research examined how knowledge about innovations that facilitate adaptation is produced, valued, transferred and used within and between 'communities'. Research focused on two irrigation schemes in Nsanje District, at Muona and Chitsukwa. Fieldwork combined ethnographic and qualitative methods along with a formal sample survey.

## BACKGROUND

Malawi is a predominantly agriculturally-based economy with the sector contributing more than a third of the national income and directly supporting over three quarters of the population. The agricultural sector comprises large-scale estates producing mainly for export, and small-scale farming operated on plots of less than a hectare and concentrating on food crops. While most food consumed in Malawi is produced by this smallholder sector, family farming is highly exposed to the vagaries of climate. The effect of stressors such as drought and flooding appear most magnified in the Lower Shire to the south of the country where both land scarcity and poverty are high, and the potential for irrigation development is, ironically, also highest. Growing agriculture through enhancing production and productivity in irrigation based small-scale farming is seen as an important strategy to respond to the challenges.

The history of irrigation promotion in Malawi spans over five decades and has been beset by problems and missed opportunities which are well documented. President Banda's government sought to transform and modernise smallholder farming by borrowing from the estate-farming model through setting up irrigation schemes. Most of these schemes, referred to as 'irrigation factories' by Veldswich et al. (2009) were judged to have been failures. Since the beginning of multiparty democracy in 1994, the government's strategy has been on formalising land, water and irrigation access and decentralising the management of such schemes (Peters and Mulwafu, 2007). The approach has been to transfer management responsibilities to the farmers through the establishment of Water Users Associations. While it has been argued that ensuring farmers' rights over land and water is a vital ingredient for an effective strategy for growing agriculture, most of the

existing land, water and irrigation laws and policies have centred on increasing the level of formalisation, rather than on examining *outcomes* in terms of access. At the same time as the promotion of irrigation through 'schemes', smallholders have continued to carry out irrigation in ways that are classified as 'informal'. There is a growing tendency towards formalisation of such practices, particularly as schemes are increasingly associated with donor and government financial support.

The two sets of irrigation practice examined in this research illustrate both cases. Muona scheme was formally established nearly fifty years ago and, like other schemes established by the government, has been 'rehabilitated' several times in its history, most recently by the World Bank-supported IRLAD project. Chitsukwa is of much more recent origins, and represents the gradual formalisation of irrigation practices following NGO-support for treadle pump technology. The two schemes are within a few kilometres of one another and have broadly similar socio-economic characteristics. These two irrigation schemes typify the majority of schemes in Malawi.

## FINDINGS

### IS IRRIGATION IMPROVING LIVELIHOODS?

Irrigation can result in improved crop productivity for farmers, but this has not generally been promoted alongside a full appreciation of the significance of the interaction of this with dry land farming. While irrigation development has had the potential for leveraging human and financial resources for developing smallholder farming, interventions have primarily focused on setting up the physical and management infrastructure for irrigation without necessarily addressing the underlying constraints that afflict agriculture in general. Increases in production do not translate to better incomes if farmers lack outlets to favourable markets. While a small proportion of farmers has received government farm input subsidies, the overall production-cost savings have not been sufficient to allow farmers to make a profit out of farming, thereby minimising opportunities for poverty reduction. Thus, barriers to irrigation development are intimately connected to wider issues of labour and market access, input supply, and access to knowledge and information.

Irrigation development in southern Malawi has favoured production of single crops by targeted farmers. In the two irrigation schemes, the emphasis has been on rice



or maize only farming systems in Muona and Chitsukwa, respectively. In addition, promotion of irrigation has sometimes been at the expense of other livelihoods especially livestock farming. In Chitsukwa, land use change in favour of cropping with more people moving into crop growing there has been a problem of irrigators encroaching into pastures, driving conflicts and upsetting social relations that were responsible for the sharing of manure, milk and grain. In this case, building resilience through irrigation has resulted in worsening vulnerability for those whose livelihoods depend on livestock farming.

There are also fewer staff within the extension services dedicated to livestock issues than those with responsibility for agronomy and irrigation. Irrigators also appear to be more organised than livestock farmers. The encouragement of mulching has not considered livestock farming needs. Change in land use from livestock to crop production has sparked conflicts among farmers, and farmers have been left to resolve these issues on their own. Ironically, some farmers view livestock farming as their ideal livelihood but are unable to transition from crop production to a predominantly livestock oriented livelihood.

### INNOVATION, LEARNING AND FARMERS' ACCESS TO KNOWLEDGE

Farmers can and do innovate in their irrigation practices. For example, some farmers made treadle pumps lighter by removing some rubbers that made working the treadle pump strenuous. One person could operate the lighter treadle pump, significantly reducing labour demand. In the absence of spare parts, farmers innovated with cut-offs from flip-flops to replace some cylinder rubbers required for the treadle pump. The ease with which the treadle pump could be operated encouraged more people to move into irrigation. Also, a system of intensive maize planting called Sasakawa has been widely adopted. Farmers have, without any extension involvement, come up with a smaller-bladed and shorter-handled hoe to replace the traditional hoe that would otherwise be too large for the narrower row spacing required.

Within irrigation schemes, farming knowledge is transferred through participation in *ganyu*, while mobility of tenants spreads knowledge, including skills for canal maintenance. This is important because there is a lack of extension capacity to support farmers. In the field sites, extension officers considered themselves to be only responsible for providing services to farmers in the dry land, and believed that the irrigation schemes should be managed by the Irrigation Department. However, the Ministry of Water and Irrigation Development in Nsanje only had two officers for the entire district. There are also attitudinal problems in which farmers are frequently dismissed as ignorant and slow to learn.

Because of the lack of extension support the promoters of irrigation also rely on lead farmers. But we identified a strong reluctance to take notice of their information that came from this source. Some respondents see lead farmers as too 'local' to know any more than they do. One lead farmer was told, *"Babies like you cannot advise us on anything. We have been farming even before you were born"*. Other farmers believe that those that have received training from government and NGOs have been paid and are not willing to take their advice for this reason. They also believe that the extension services are biased towards NGO-funded projects where the officers have an opportunity to claim expenses. Lead farmers themselves find the demands on their time excessive and, contrary to the view among their neighbours that they gain from study visits and training at a distance, argue that it would be better for such activities to take place where they live, *'Instead of simulations conducted in hotel gardens in the city.'*

#### IRRIGATION IN 'SCHEMES'

The model widely used in support of irrigation is that of 'schemes'. But such schemes involve a need for collective management alongside the reality of individualised and household-level interests. Irrigation schemes also do not equate

neatly with 'communities'. For example, the Muona scheme is used by farmers who come from at least 45 surrounding villages. They have certain shared interests and a sense of common purpose in different – but not always compatible – spheres; these include their households, lineage groups, villages and the schemes themselves. Farmers derive their livelihoods from a combination of cultivation both inside and outside of the schemes and may see it is more important to prioritise dry land cultivation than take part in shared scheme management. Even within the schemes, farmers tend to prioritise their own farming over collective action.

However, such schemes have been treated by donors and government alike as equivalent to a community. Measures to formalise this in terms of land and water access and management of the scheme have not taken into account the ways in which the community of the scheme does or does not intersect with other interest groups. This has important implications for both scheme management - and hence productivity, and for the livelihoods and wellbeing of farmers both within and outside of the scheme.

#### DECENTRALISING IRRIGATION: CHALLENGES FOR MANAGEMENT

In Muona scheme there are significant and recurrent problems of siltation. This is partly an issue of regional water catchment management. The challenges of siltation are seen by many to be due to unsustainable cutting down of trees for charcoal and stream bank cultivation in higher districts of Thyolo and Mulanje. There is reportedly a lack of communication between the upland and downstream district authorities on the matter.

However, scheme management is also affected by problems that relate to a lack of

a sense of collective responsibility that is increased by formalisation. Muona irrigation scheme is managed by a Water Users Association (WUA). However, the WUA has difficulties in both ensuring equitable access to land and water, and in resolving conflicts among farmers. It also finds it difficult to enforce regularity of irrigation practice, with corresponding negative effects on productivity. The problems faced by the WUA result both from scheme design (lack of levelling, inappropriate layout), and from a lack of overall legitimacy among farmers. However the presence of the WUA and a focus on bureaucratic resolution of disputes provides a reason for the farmers not resolving their water management conflicts.

#### THE CONTRIBUTION OF IRRIGATION TO REDUCING VULNERABILITY AND ENHANCING RESILIENCE

Formalisation of land and water access has also resulted in both the exclusion of some farmers and in interventions that can result in the resilience of some at the cost of the vulnerability of others. In Muona, a bund was constructed with donor support to protect Muona scheme from the overflowing Tangadzi River. However, this caused flooding in an adjacent area, Makhapa, leading to significant loss of homes, crops and food and worsened vulnerability to food insecurity. A different donor was constructing an irrigation scheme in Makhapa, and farmers were excluded from their fields during the construction process. This exclusion compounded the serious effects of the flooding. We found little evidence of communication between the two donors or their contractors and unclear lines of responsibility. The flooding in Makhapa was seen as 'unfortunate' but it was argued that the construction of the bund reflected the wishes of the 'community' of the scheme, as promoted by the WUA.

A different group of farmers in an area called Magreaver, also adjacent to Muona scheme, cannot continue accessing the Tangadzi River with the new bund constructed. They are now only growing maize because of the loss of floodwater that previously enabled rice farming. Ironically Magreaver was the original inspiration behind the establishment of the Muona scheme back in the 1960s. This exclusion has important gender dimensions because those farming in Magreaver were predominantly women. They have been told that they do not have rights to access the water from the Tangadzi, *'because they have not paid'*.



Applying the treadle pump in brick making

## POLICY IMPLICATIONS

### A MORE COMPREHENSIVE APPROACH TO IRRIGATION DEVELOPMENT IS ESSENTIAL TO MAKE IRRIGATION WORK FOR THE POOR

Such an approach involves ensuring complementarity of agricultural interventions particularly to ensure that farmers are supported not only to produce but to market their products and earn an income sufficient to lift them out of poverty. Pricing policies should be revised in light of the need to make

produce a wider diversity of crops and raise farmer incomes. There is scope for developing a strategic overview of the nature and use of national water resources, including the cost and benefits of supporting water-intensive and export-oriented crops.

### THE ORGANISATION OF IRRIGATION

For smallholder irrigation, consider moving away from a model of irrigation development based on 'schemes' that formalise access to land and water and

develop complicated bureaucratic mechanisms for scheme management. Build on farmers' innovation instead.

### KNOWLEDGE AND INNOVATION

It is important to support farmers' innovation where it occurs and to understand the constraints within which farmers work. Those seeking to improve irrigation should focus on gaining an understanding of, and support to existing irrigation practices. Approaches to training extension officers should recognise the value of farmers' local knowledge and ensuring that irrigation knowledge is part of general agricultural extension training. If 'lead farmers' are used, it would be more practical if training and support were offered where they live and work. This would obviate the need for travel expenses, reduce costs to farmers incurred by being absent from their fields, and also lessen the mistrust created of such farmers.

### PARTNERSHIPS IN BUILDING RESILIENCE

Water as a mobile resource transcends administrative boundaries. Managing irrigation takes into account managing water across administrative boundaries and should therefore be coordinated by well-resourced teams at catchment level. Budgets should be considered for maintaining inter-district dialogue on catchment management. Further, partners operating at the local level need to consider more seriously the costs of their interventions on the lives and livelihoods of those for whom the interventions are *not* intended.



Using the treadle pump for maize irrigation in Chitsukwa

irrigation profitable; particularly with labour costs factored in. Clear land and water rights are essential to ensure that the poor and those operating outside the confines of the schemes are not excluded from irrigation. The poor should be enabled to participate in planning and making decisions about irrigation, including those pertaining to water sharing, as they often operate in areas underserved by scheme canals and shallow wells. Skills in understanding the gender implications of irrigation management are essential. Evaluation of potential hard technologies for irrigation should emphasise labour cost-effectiveness, and implications for land and water accessibility.

### MANAGEMENT OF IRRIGATION

Improving water use efficiency should be at the centre of efforts to promote irrigation development. Linking farmers to markets and information could encourage farmers to



A woman farmer tries the cornweeder on a rice field in Muona

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