

# Policy Brief

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Treadle pump irrigation, Malawi

## Innovation in small-scale irrigation: formality, scale and sustainability

### EXECUTIVE SUMMARY

Small-scale irrigation is seen as key to improving agricultural productivity, food security and rural incomes. However, a complex combination of challenges has frequently conspired to limit its progress, especially in sub-Saharan Africa. These challenges include pressure on agricultural water due to increased climate variability and perceived weaknesses of institutions.

This brief reports on research that investigated these challenges through ethnographic fieldwork in Malawi, Tanzania, and Bangladesh. We asked how different groups of people gain access to the resources needed for small-scale irrigation and how is this influenced by the formalisation of management. The research examined processes of knowledge creation and transfer concerning small-scale irrigation and assessed its influence on livelihoods. Study findings stress the importance of understanding small-scale irrigation within the wider context of policies for agricultural development and of carefully identifying both winners and losers in these processes.

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## Key findings

1. The project found significant evidence of farmer innovation with regard to irrigation. This was most common when irrigation practices were less formalised and located close to markets. However, increased productivity has not always resulted in improved livelihoods. This was especially so where barriers to markets were present. There is also frequently competition with other livelihood strategies, such as livestock management
2. Irrigation has often been promoted in schemes that bring farmers together into collective organisations. Such organisations can obscure inequality and conflicts within the schemes as well as between the schemes and adjacent areas. The formalisation of scheme management can consolidate such inequalities and does not necessarily overcome tendencies towards individualised production priorities.
3. A lack of integration between government departments promoting irrigation and national agricultural infrastructure can create barriers to irrigation development. Farmers can also be reluctant to learn from, and distrustful of, those who are used as 'lead farmers' by NGOs and the extension service, especially when these are singled out for 'study tours'.
4. Irrigating farmers appear not to be changing their practices in response to climate change-induced water scarcity. More generally, the strengths and weaknesses of different approaches to irrigation need to be considered as part of the wider hydro-politics within which they are embedded, in which access to water resources is increasingly contested.

# Background

## IRRIGATION - SUCCESSES AND FAILURES

The history of irrigation in sub-Saharan Africa is littered with tales of failure and collapse going back to colonial times. Reference is often made to the large government irrigation schemes implemented in the 1970s and 1980s, most of which fell into disrepair and were abandoned, or were run down by poor management structures in place. However, the current drive in agricultural development for economic growth has embraced irrigation, particularly small-scale irrigation, as a possible engine of such growth - despite these tales of failure.

In seeking to move beyond past failures and improve current practices, there has been an increasing focus on understanding and influencing institutional arrangements. In the light of common weaknesses in government-supported extension, and accepted assumptions concerning the importance of 'local control', this has followed a common pattern of formalising existing arrangements. Therefore policy has focused on 'handing over' irrigation to local management committees and water users' associations.

It is also the case that irrigation has not 'failed' in all parts of sub-Saharan Africa. Not only is there a long history of small-scale irrigation in specific areas, such as on the slopes of Mount Kilimanjaro in Tanzania, but there are also widespread, and much less regulated, irrigation activities taking place throughout the continent. What can be learned from these examples? How do they intersect with more formally-organised irrigation?

Our research examined the ways in which small-scale irrigation may be organised and the influence of this on both livelihoods and productivity. We took a perspective that aimed to move beyond a simple dichotomy of formal and informal, considering the ways in which formality may reflect power in different spheres. Ethnographic fieldwork was carried out in locations in which irrigation has been informal and the result of local innovation (in Tanzania and Bangladesh), and those that have been more formalised (in Tanzania and Malawi).

- In Tanzania, we compared the donor-supported Dakawa irrigated rice farm with the irrigation innovations taking place in Choma on the lower slopes of the nearby Uluguru Mountains.
- In Southern Malawi, research focused on the rehabilitation of a well-established irrigation scheme at Muona and a newer scheme at Chitsukwa, both in Nsanje District.
- In Bangladesh, comparative fieldwork considered the innovation of irrigated watermelon production in the Noakhali chars.

# Findings

## IRRIGATION - LIVELIHOODS AND INNOVATIONS

Irrigation can be an important contributor to livelihoods and improved productivity in each of our research sites. This is particularly significant in contexts in which water is relatively abundant and sites were close to markets. This was the case in Bangladesh and in Choma in the Uluguru mountains in Tanzania, where farmers have innovated in their irrigation practices, such as through the use of relatively cheap hosepipes and are successfully growing fruit and vegetables. In Choma, there was also considerable evidence of the adoption of organic and conservation agriculture. In both cases, much of this technological innovation had taken place without outside assistance and farmers learned from one another by observation. In all sites, one of the most important sources of information for farming was also the practice of labouring on the fields of others.

In the formal irrigation schemes of Muona and Dakawa, there was also evidence of improved productivity, especially of rice. However, there are doubts about the longer-term viability of such schemes, both of which were heavily subsidised by donor inputs, which mask the true costs of production. In addition, improved productivity has not necessarily resulted in improved livelihoods and wellbeing because of the considerable marketing challenges faced in both places. These include both problems of getting crops to market and falling prices because of increased production and cheaper imports. As irrigation is usually only one among several livelihood strategies in any one area, it is important to consider how it impacts on these. Competition and conflict with livestock production was significant in both Malawi and Tanzania.

The research found that farmers are innovative both in terms of the hard (physical) and soft (institutional, social) dimensions of innovation, and such innovations are driven by the need to reduce labour demand, attend to the challenge of lack of availability of support services and ensure continued and reliable access to land and water for irrigation. In Malawi, innovative market systems such as payment for labour based on the price of a bucket of maize on the day work is done, for example, has allowed labourers to hedge against food price inflation given the very volatile maize price situation. Some innovations that are seen to threaten equitable access to land and water, such as use of motorised pumps, have been resisted by farmers.



Irrigation channel in Malawi

# Findings



Terracing in the Uluguru mountains, Tanzania

## SCHEMES AND FORMALISATION

Promoting irrigation in smallholder 'schemes' remains popular, indeed almost an orthodoxy. Less formal irrigation practices have tended to be less recognised and have taken place beyond the purview of state and donor interests. However, irrigation schemes have historically suffered from management weaknesses and this is a problem that persists and was evident in both of the more formal schemes we examined, Muona in Malawi and Dakawa in Tanzania. Key concerns were:

- management weaknesses concerned sequencing and timing of farming operations
- a failure to maintain irrigation canals
- regular conflict over land and water access.
- sustainability of water access

A common solution to management difficulties in schemes has been seen by the promoters of irrigation to be one of handing over control to locally constituted water management organisations, or Water Users Associations. This was also the case in both of the formal schemes we examined. Such management organisations are generally presented as being the representative of the community of the scheme. However, there is a paradox: as such schemes are usually surrounded by a catchment of settlements, they tend to serve farmers who, together, do not constitute a 'community'. The concept of a community of small irrigators is therefore problematic where those involved have connections within and outside of those involved in small-scale irrigation.

The formalisation of existing irrigation practices at a local level may also have several drawbacks with regard to equity and poverty: we found evidence of the 'capture' of institutions and resources by those already in a position of strength and considerable variation in plot size within schemes. It tends to be the case that old power relations inhabit new structures. Among these, gender is an important variable and there is a tendency for men to take on the more formal roles in such formalised committees.

In addition, a focus on the scheme at the expense of the wider context within which it is situated can obscure the impact of project activities in areas beyond the scheme. In the case of Muona scheme, the introduction of leases to confirm rights to land have resulted in the exclusion of those farmers who had previously been irrigating in the same area that were predominantly women. Furthermore, the construction of a protective bund to protect the scheme from flooding caused catastrophic flooding in neighbouring villages. In this case, the donor took the priorities of the scheme management committee as representative of the views of the 'community'. However, the interests of multiple 'communities' were in conflict and the nature of this conflict was unresolved.



Children in a flooded village in Nsanje District, Malawi

## SUPPORTING IRRIGATION

In all of our research contexts, the state bodies that are charged with promoting and developing irrigation tended to be insufficiently integrated into the broader national political context for managing agriculture and natural resources, with irrigation departments frequently relatively weak and under-resourced. This contributes to difficulties in managing scarce resources such as water, particularly across administrative boundaries. In Malawi, planning of irrigation development along political (e.g. district) boundaries is less helpful than at catchment level where issues of siltation of rivers and subsequent effects on irrigation schemes can be considered. There are also communication and cooperation problems between upstream and downstream users. For example, deforestation upstream may increase siltation problems downstream.

At the local level, support to irrigation also has limited resources and faces well-known extension problems. In Malawi, the solution to this, on the part of both government and external donors, is the use of 'lead farmers' who are expected to both attend training and convey knowledge and information to their peers. Although this model has been questioned over many years, it retains traction, possibly because there appear to be few alternatives.

# Findings

Our research also found problems with this approach. Lead farmers feel overworked and under-rewarded and met with distrust by other farmers. As one informant put it “They attend all those workshops and get paid for that, and then come here and expect us to adopt whatever they bring for nothing (for no payment). That ship won’t sail”. The use of ‘study tours’ and training in urban locations is another element of this distrust. It might therefore be minimised if there were greater use of on-farm, rather than off-farm, training activities.

## CLIMATE CHANGE AND THE POLITICS OF WATER CONTROL

In all our field sites, arguments about the strengths and weaknesses of different approaches to irrigation are inseparable from the wider hydro-politics within which they are embedded. In Tanzania, this has resulted in contested narratives of sustainability and viability. Farmers irrigating on the mountainside at Choma have been presented as illegal and unsustainable destroyers of the environment, while those on the plain compete with other water users. In both Malawi and Tanzania, where water for agriculture is increasingly at a premium, commercial interests in agriculture focus on the production of water-intensive cash crops, often for the export market. In this, they are often able to take advantage of the unclear valuation of water and weak enforcement by formal institutions.

In the case of Malawi, water scarcity does not appear to be taken into account in farmer practices in irrigation. The broad assumption that irrigation addresses water scarcity issues (particularly in comparison with rain-fed farming systems), coupled with insufficient information on producing water intensive crops with less water, has hampered adaptability of irrigation to climate change.

## ABOUT THIS BRIEFING

This brief is an output from the research project ‘Innovations to Promote Growth among Small Scale Irrigators’, led by the University of Sussex, with collaboration from Mzumbe University, Tanzania, Bunda College of Agriculture, Malawi, and Jahangirnagar University, Bangladesh.

Further information and other project outputs can be obtained from the website at:

[http://www.sussex.ac.uk/global/research/researchprojects/small\\_scale\\_irrigation](http://www.sussex.ac.uk/global/research/researchprojects/small_scale_irrigation)

The research is 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).

## FURTHER READING

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Mdee, A., E. Harrison, C. Mdee, E. Mdee and E. Bahati. 2014. *The Politics of Small-Scale Irrigation in Tanzania: Making Sense of Failed Expectations*. Working Paper 107, Brighton: Future Agricultures Consortium.

Woodhouse, P. 2012. ‘New investment, old challenges. Land deals and the water constraint in African agriculture’. *Journal of Peasant Studies* 39, 3-4: 777-794.

## Policy Recommendations

1. Policy makers should pay careful attention to the formation of interests groups both within irrigation schemes and between these and neighbouring areas. These may exist outside of formal structures of representation, such as WUAs.
2. A predisposition for collective irrigation-management practices should not be assumed.
3. It is important to ensure that irrigation development is centrally placed within overall agricultural development structures.
4. Irrigation should always be considered in coordination with rain-fed farming and other livelihood strategies. Extension activities that take place in situ should be prioritised over study visits for lead farmers.
5. As agricultural marketing is key to irrigation success, it is important to ensure that adequate mechanisms to support this are in place.



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