

Water Policy Briefing

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Putting research knowledge into action

Irrigation management transfer: How to make it work for Africa's smallholders?



A review of international experience suggests that many African smallholder schemes will not survive Irrigation Management Transfer (IMT) as it is currently envisioned.

For IMT to be successful in the African smallholder context, governments must first enhance the income-creation potential of smallholder irrigated farming by strengthening market access, promoting high-value crops and improving extension and technical support to smallholder irrigators. This approach, rather than one which focuses exclusively on the direct transfer of irrigation management, will help create the right climate for IMT.

Irrigation management transfer: How to make it work for Africa's smallholders?

An international review of IMT experiences shows that for transfer to work, the irrigation system must be central to a wealth-creating agriculture within which IMT makes good economic sense to farmers. This is not the case in a majority of Africa's smallholder schemes.

Making IMT work in this context means addressing a number of challenges: smallholder dependency resulting from years of state intervention in farm operations and management, farmers' inability to depend on irrigated agriculture as their primary income source, insecure land tenure arrangements, and lack of access to credit and input and output markets.

Current IMT strategies which focus on investments in capacity-building and infrastructure rehabilitation alone are destined to fail. For IMT to succeed, it must be accompanied by interventions that extend beyond the irrigation sector to significantly enhance African smallholder productivity and incomes. Potential avenues for accomplishing this include strengthening access to markets and credit, promoting high-value crops, improving systems for extension and technical support, making investments in smallholder technologies, clarifying land tenure arrangements, encouraging the development of farm equity schemes, and providing necessary supports through farmers' associations.

Driven largely by financial pressures, governments throughout sub-Saharan Africa are in the process of transferring responsibility for irrigation management to farmers through Water User Associations (WUAs) or other farmer-based organizations. While large-scale commercial farmers have welcomed this reform, the result of government withdrawal from many of the smallholder schemes has been complete collapse.

A review of international IMT experience shows that in the areas where IMT has worked, the irrigation system is central to a dynamic, high-performing agriculture; average farm size is large enough for a significant proportion of the farmers impacted to operate like agri-businessmen; backward linkages with input supply systems and forward linkages with output marketing systems are strong and well-developed; and the costs of self-managed irrigation are an insignificant part of the gross value of product of farming. These conditions characterize Mexico, Turkey, USA, and New Zealand—the countries from which IMT success stories emerge.

The same conditions are also found to varying degrees in parts of India, China, Indonesia, and other

Asian countries—where IMT has had more limited success. Farmer-managed irrigation schemes in the hills of South Asia, tubewell companies in north Gujarat, lift irrigation schemes built and managed by sugar cooperatives in Maharashtra, and deep tubewell cooperatives in northwestern Bangladesh all demonstrate the extent to which well-managed, collective irrigation by farmers can play a central role in transforming smallholder livelihoods. In these situations, IMT worked because it made good economic sense to the farmers involved.

We often think that building people's economic institutions is essentially a matter of 'getting the process' right. But no amount of 'process and organizational savvy' or collective vision-building will get a group of rural poor—in Africa or in Asia—to accept a deal that does not make good 'here-and-now' sense to them. And where the deal has made sense, virtually no investment in instituting an 'organizing process' has been required. South Africa's Irrigation Boards of white, large-scale farmers and North Gujarat, India's tubewell companies are outstanding examples of self-organizing irrigation institutions. Both show

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Participation In IMT: How Farmers Decide

- For IMT to succeed it must offer improved livelihoods at an acceptable cost;
- It must hold out the promise of a significant improvement in the life-situations of a significant proportion of members involved;
- The irrigation system must be central to creating such improvement;
- The cost of sustainable self-management must be an acceptably small proportion of improved income; and
- The proposed organization design must have—and be seen to have—low transaction costs.

that people organize swiftly—and without the benefit of catalysts or facilitators—when organizing makes good economic sense. If development professionals have problems organizing poor people around an idea, they must take a hard look at what they're offering. Most often, it's a rotten deal.

The dilemma of African smallholder irrigation

Nowhere in Africa is there a significant body of positive experience to suggest that straightforward Irrigation Management Transfer (IMT) alone will work in smallholder irrigation as it has in the US, Mexico, Turkey, New Zealand and Columbia. Indeed, it would be surprising if, even with all necessary stress on 'process' and capacity building, IMT programs will meet even the moderate expectation of success, that it 'saves the government money, improves cost effectiveness of operation and maintenance while improving, or at least not weakening, the productivity of irrigated agriculture.' There are important questions about the viability of smallholder farming itself in many cases, let alone the viability of irrigation systems. In Africa, IMT may well be the last straw in the collapse of a smallholder irrigated agriculture run for decades in an 'estate mode', and barely surviving on the oxygen of government subsidies and supports.

This is not to say that African smallholders do not or cannot manage irrigation, or that they cannot engage in sustainable cooperation. Indeed, private smallholder irrigation has proved that it can be an

efficient, livelihood-creating mechanism in Africa. Similarly, there are many outstanding examples of large-scale cooperation amongst small-scale dryland farmers in Africa. But transferring the management of government irrigation schemes is a different matter all together. For example, most of South Africa's 180 smallholder schemes would not have been built if they were to be turned over to farmers because their financial viability was always doubtful unless water users generated fairly high levels of income per hectare. And no reasonable planner would have ever assumed that smallholders would attain value-productivity levels comparable to commercial farmers unless they had access to truly high-quality support institutions.

To create the right climate for IMT in African smallholder schemes, interventions are needed to improve smallholders' productivity and income to the point that smallholders can, with little effort, absorb the

Policy Options

- Building a Foundation for Smallholder IMT

Improve farming practices

- Promote high-value crops
- Improve extension and technical support systems
- Invest in smallholder technologies
- Revise land tenure arrangements

Strengthen access to markets and credit

- Foster partnerships between smallholders and agri-businesses
- Encourage co-operatives
- Develop farm equity schemes

Reform irrigation management agencies and strategies

- Devise new, more farm-centered models to address smallholder needs
- Support IMT built on existing informal mechanisms of local cooperation
- Structure Water User Associations to provide a range of non-irrigation support services to members to fulfill supply, equipment, marketing and other needs

additional cost and responsibility of managing their irrigation systems. Global responses to IMT strongly suggest that once African smallholders derive decent livelihoods from their irrigated holdings, they will be ready and eager for IMT. The experience of the Office du Niger irrigation scheme in Mali is a widely cited example. Here an increase in the national price of rice significantly improved the profitability of irrigated farming—making it possible for smallholders to take on IMT.

Addressing smallholder challenges

Policymakers can help create the necessary conditions for profitable smallholder agriculture by implementing policies that encourage improved farming practices, strengthen access to both credit and output markets, and reform irrigation management agencies so that they can effectively respond to the full range of smallholder needs.

As successes in many Asian countries suggest, under the right conditions smallholder irrigation systems can serve as an engine of agricultural growth in sub-Saharan Africa. But first the particular challenges faced by African smallholders must be addressed.

Challenge 1: A history of dependency

The discussion of IMT in the African context began with reforms that entailed the drastic curtailment of the functions of the parastatal agencies responsible for the provision of support services and management of irrigation schemes. Under the parastatals, smallholder schemes were managed in an 'estate mode' that precluded farmers from making any entrepreneurial or managerial decisions, and reduced them to functioning as workers on their own land. In most cases, all plot holders did was weed, harvest and move the irrigation pipes around. They did not deploy much working capital; nor did they need to make any decisions about farm management, which was largely centralized. Many parastatals also organized the marketing of pooled produce—deducting their expenses before turning the residual sum, such as it was, over to farmers.

Withdrawal of state management from smallholder irrigation schemes in many African countries, has left a dependent and impoverished group of farmers in its wake. In some situations, parastatal management had degenerated into oppressive spoils systems that destroyed all pre-existing informal institutions. The



In countries such as South Africa, where parastatals introduced the use of heavy equipment for ploughing, land preparation, spraying and harvesting, smallholders are finding it difficult to access and maintain machinery, after government support is withdrawn.

Mwea irrigation and settlement scheme in Kenya is a case in point. Though the scheme showed signs of success in the early period of its establishment, over time, mismanagement by the National Irrigation Board (NIB) led to the impoverishment of the farming community whose earnings were barely sufficient to satisfy basic subsistence needs. While these conditions suggest that Mwea farmers should have welcomed IMT, in reality the demands of the scheme are so great that replacing the much-loathed NIB has proven difficult.

Challenge 2: Absence of credit, inputs, and output markets

Smallholders' difficulties in obtaining credit have proved a major obstacle to viable, postparastatal agriculture. In South Africa, cropped areas in many smallholder schemes dropped sharply in less than a year after government withdrawal simply because plot holders were unable to organize the working capital needed to hire tractors, buy seeds and fertilizers, and to obtain services.

In addition, many smallholder schemes are located in remote areas away from towns and cities with which they often have poor linkages. Even if they can obtain the necessary capital, they often do not have ready access to good quality seeds and fertilizers or to markets to sell their produce. With the rise of the 'estate mode of farming' under parastatals, such markets as previously existed gradually disappeared; and now that the parastatals have withdrawn, there is a huge institutional vacuum.

Challenge 3: Insecure land tenure

The African smallholder also suffers the disadvantages of communal land ownership with insecure tenure. The present tenorial arrangement does not provide much room and incentive for uninterested farmers to sell out and for interested and capable ones to expand their holdings. Nor does it lead to the emergence of flexible rental markets in irrigated land, thus keeping it from achieving its full productive potential. Often, the lack of clarity amongst the plot holders about what their rights precisely are, seems more problematic than the absence of ownership. Inability to offer land as collateral for obtaining credit works as another disadvantage.

Challenge 4: Need for diversified livelihood strategies

The reading of international IMT experience suggests that all or a majority of farmers in successful IMT cases are full-time farmers deriving a substantial proportion of their livelihoods from irrigated farming. This builds their stake in self-management of their irrigation system and their willingness to commit time and resources to it.

In the African smallholder context, farmers who work plots smaller than one hectare must depend on a variety of sources to earn a livelihood. The inability to depend upon irrigated farming for all or a substantial proportion of the family income means men often leave home to seek urban jobs, while women stay behind and cultivate the family plot. The typical African smallholder's income from irrigated farming may be negative when the full value of family labor is taken into consideration. Even for smallholders with plots of between 1–5 hectares, irrigated farming is often not the primary source of income, at least not in South Africa (see table 1).

This diversified approach to earning a livelihood has many implications. First, plot holders are sometimes more interested in keeping their plots—as some form of a security or insurance—rather than working them to their full productivity potential. Second, there are stringent limits on the time, effort and resources a typical smallholder irrigator is willing and able to make on the irrigated plot if it involves sacrificing other livelihood options. Third, smallholders are generally risk averse, and often would prefer to go with a low-input, low-output system, than a high-input, high-output system, such as intensive irrigated agriculture, that also involves higher risk.

Table 1. Overview of farm and off-farm employment in three smallholder irrigation schemes in South Africa

Households with:	less than 1 ha (n=41)	2.5 ha (n=22)	5 ha (n=3)
• Estimated percentage of annual household income derived from irrigated farming	21	37	13
• Average monthly off-farm income in Rand (US\$)	1122 (\$196)	772 (\$135)	5233 (\$915)
• Percentage of households whose head does not engage in off-farm employment	12	18	0
• Major off-farm occupation of head of household (expressed as percentage of households):			
• Wage-employed	7	9	33
• Self-employed	49	32	68
• Pensioner/disabled	32	41	0

An IWMI-supported survey by the University of the North of three smallholder schemes in Limpopo Province, South Africa, before transfer suggests that even farmers who obtained relatively large plots of 5 hectares still derive a significant portion of their income from off-farm employment.

Source: IWMI South Africa Working Paper 3

Challenge 5: High transaction costs

In smallholder systems where landholdings are very small (less than one hectare, some cases even less than 4-5 hectares), IMT may not be possible. The management cost of an irrigation system—like most service institutions—increases more rapidly with the number of customers than with the volume of business. The large number of members even on a small scheme greatly increases the invisible ‘transaction costs’ of collective self-management—such as costs of fee collection, responding to complaints, delivering water to each user, extracting consensus on key decisions, of checking ‘wanton irrigator misbehavior of blocking canals, cutting off embankments, illegal lifting of water by pumps or siphons and breakage of control structures’—all invisible costs that vary directly with the number of irrigators.

A 1,500 hectare system that serves 1,500 irrigators costs much more to manage—in terms of the logistics of service delivery, fee collection, maintenance, and so on—than a similar system that serves 5 large farmers, or even 100 medium-sized farmers. Moreover, it is a lot easier for 5 large customers to come together and agree to the rules of self-management than for 1,500 smallholders to do so.

Lessons from smallholder success stories

Better support services and readily available markets appear to be the key to successful IMT in African smallholder schemes. The pump irrigation scheme at Saga in Niger and sugar cooperatives in South Africa demonstrate that African smallholder schemes can survive the transition to farmer managed irrigation when farmer organizations are designed to work on the full scope of smallholder issues.



With the net revenue derived per person per day of family labor in irrigated farming at 2.19 times the market wage rate, the Saga scheme survived IMT because it is profitable despite very high irrigation fees. The organizations that manage the schemes are integrated rice-producing cooperatives that provide farmers inputs on credit as well as market outputs. In effect, irrigation charges absorb some of the overheads of other services provided, which makes smallholder irrigated farming viable as a whole.

Smallholders involved in some sugar projects in South Africa have been able to take on irrigation management because they enjoy access to broad-based credit, input supply, and markets. The Small Grower Development Trust, a bottom-up farmer organization is a case in point. It has evolved a unique array of financial, training and other support services, which lie at the heart of the success of some 42,000 smallholder sugarcane growers in Kwazulu Natal and KaNgwane regions.

These examples show that farmers will choose to participate in WUAs, even in the face of high user fees, as long as they gain the support necessary to make farming profitable. Nonirrigation services that can attract and maintain WUA membership include supply of fertilizers and seed, equipment for hire, land preparation, marketing assistance, and purchase of crops for transport and sale.

Paving the way for IMT

Policymakers can help build a foundation for IMT success in Africa by implementing policies that encourage improved farming practices, strengthen access to markets and credits, and reform irrigation management agencies to support effective responses to smallholder issues.

Improve farming practices

Specific policies that lead to improved farming practices include promotion of high-value crops, expansion of systems for extension and technical support, investment in smallholder technologies, and clarification of land tenure arrangements.

Strengthen access to markets and credit

Strengthening smallholder access to markets through collaboration with agri-business may

provide a window of opportunity for smallholder irrigators—particularly in South Africa, Kenya, and other countries with growing urban-based markets and dynamic agri-business sectors. These partnerships, if managed well, give smallholders the possibility of replacing some of the supports and services formerly provided by government agencies. While there are many examples of contract farming failures—where companies or smallholders have not fulfilled their commitments—when successful, these partnerships offer smallholders an opportunity to make their plots profitable, thereby making irrigation management worthwhile.

To help foster healthy collaboration between agribusiness and smallholders that benefits both sectors, governments need to explore ways to make contract farming sustainable by reducing incentives for default on commitments by both farmers and companies. In addition, governments need to redesign farm equity schemes to enable smallholders to develop stable alliances with input suppliers and output marketers.

Institutional reform

Policy thinking needs to shift from reform of smallholder irrigation management, to the development of interventions that significantly enhance smallholder productivity and incomes. The institutions appropriate for this are probably not pure Water User Associations, but either farmer-controlled organizations with a much broader mandate and capacity, or specialized marketing associations with strong institutional links with agri-businesses.

In a comparative analysis of state disengagement from smallholder pump irrigation schemes in two areas of the Senegal Valley, farmers who were involved in farmer organizations created to cushion the effects of abrupt withdrawal fared better than those who were not. The project, however, faced great difficulties in organizing farmers to take up activities formerly performed by the state and found it particularly difficult to successfully organize small farmers in separate bodies, i.e., one to provide credit, another to supply inputs, and yet another to maintain pumps. Policymakers must devise new, more farm-centered models as they reform irrigation management agencies to operate in the wake of estate-mode farming.

South Africa's experience

South Africa's irrigation situation offers uncommon insight into what will work and what won't. Here, on the one hand, government and NGOs are trying to coax smallholders, many of whom are running away from farming to accept IMT. And in this very same locale, we find some very successful water user organizations, composed of large-scale commercial farmers. These organizations, known as Irrigation Boards, have always turned government irrigation systems into their instruments for wealth creation.

When IMT was tried on government-managed irrigation systems in these 'white' areas, it clicked effortlessly. It did so because, first, IMT merely formalized and legitimized the high *de facto* farmer participation in irrigation management that existed from the start. With reasonably large farms (25-1,000 ha), access to capital to invest in commercial crops, and average household net farm incomes in the range of US \$125,000 – 300,000, South Africa's commercial farming community is ideal for IMT. Farming is their only (or the primary) source of livelihood and income; and in their case, the double-coincidence of *need* and *capacity* for IMT is well established. Smallholder groups have neither: their present tiny farms give them little net income (some suggest it is negative if the full value of family labor is costed), and they do not have the resources and management capacity to operate their schemes viably.

The experience of farmers in South Africa's Arabie-Olifants scheme (now known as the Flag Boshielo scheme) typifies the dilemma faced by smallholder irrigators after government withdrawal. Without state support services and management, the area being cropped declined to only 30 percent of total arable land within the first year. Plot holders couldn't pay for seeds, fertilizer, or tractor rental, and were unable to secure crop loans from the Land Bank, as they had no way to guarantee repayment since they lacked clear titles to their land.

Another consideration that should be built into reform is institutional ability to recognize and respond to local conditions. The relatively high performance of farmer management in South Asian hill irrigation schemes, for example, may be attributed to the tradition of collective self-management of irrigation that prevailed there for several hundred years. Turkey provides another example of successful IMT built on a longstanding tradition of farmer participation in the maintenance of the irrigation system through informal village-level organizations. Enabling institutions to build IMT on existing informal mechanisms of local cooperation is likely to result in more successful farmer managed irrigation schemes.

Water Policy Briefing Series

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IWMI's research centers around five core themes:

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- Sustainable Groundwater Management
- Smallholder Water and Land Management Systems
- Water Institutions and Policies
- Water, Health and Environment

The Institute fields a team of over 200 researchers from some 30 countries in Africa, Asia, Australia and North America. IWMI is headquartered in Sri Lanka with regional offices in India, Pakistan, South Africa and Thailand.

All IWMI research is done with local partners (universities, government agencies, NGOs, research centers, etc.). The Institute's outputs are public goods that are freely available for use by all actors in water management and development. The IWMI Research Reports, data and other publications can be downloaded from the IWMI web site. A series of tools for improved water management is also available.

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