

Can irrigation management transfer revitalise African agriculture? A review of African and international experiences

Le transfert de gestion d'irrigation, peut-il redynamiser l'agriculture africaine? Une revue des expériences africaine et internationale

Douglas J Merrey, Tushaar Shah, Barbara van Koppen, Marna de Lange and Madar Samad

Abstract

The paper reviews experiences of irrigation management transfer in smallholder irrigation systems in several African countries, and compares the observed outcomes with reported experiences in Asia and in commercial farming in Africa. The authors conclude that instances of successful transfers, in the smallholder sector, are very few in Africa. Four pre-conditions for successful transfers are identified, which are seldom satisfied in African smallholder systems. They note greater success in transferring commercial systems, explained by the larger size of holdings, implying that transaction costs of self-management are much more serious for smallholders, but represent a relatively small fraction of gross agricultural product for larger farmers. Smallholders are not motivated to want self-management nor to apply the effort for making it succeed. The paper concludes that transfer must be preceded by a strategy for general enhancement of the economic situation of the smallholders, and removal of a range of existing constraints.

Résumé

Cet article examine des expériences en matière de transfert de gestion de petits périmètres irrigués dans plusieurs pays africains et compare les résultats observés à ceux obtenus en Asie et dans le secteur de l'agriculture commerciale en Afrique. Les auteurs démontrent qu'il y a peu d'exemples réussis du transfert dans la petite irrigation africaine. Quatre conditions préalables pour garantir la réussite du transfert sont identifiées mais elles sont rarement respectées dans le cas des petits périmètres africains. Ils notent que le transfert des périmètres commerciaux est plus réussi, en raison de la taille plus importante des exploitations, ce qui implique que les coûts de transactions liés à l'autogestion sont plus élevés chez les petits agriculteurs alors qu'ils ne représentent qu'une proportion relativement réduite du produit brut réalisé par les agriculteurs commerciaux. Des petits agriculteurs ne sont pas motivés à vouloir l'autogestion et ils ne semblent pas disposés à déployer les efforts nécessaires pour la réussir. En conclusion l'article propose que le transfert doive être précédé par une stratégie visant à renforcer la situation économique des petits exploitants et à lever les contraintes de tous ordres.

1. Introduction

Irrigation management reform has a history of more than 50 years. It has gathered momentum during the past two decades. Irrigation management reforms are a key component of government policy in almost all countries with a significant irrigation sector. The overall experience has been mixed in the approach adopted in designing and implementing reforms, the extent of reforms, and their impacts on irrigation system performance as well as on farmers. Since the mid-1980s, the centre-piece of the reforms has been the transfer of management (only rarely ownership) of irrigation systems—wholly or in part—to Water User Associations (WUAs) or other non-governmental agencies, combined with the down-sizing or withdrawal of government's role in operation and maintenance (O&M), fee collection, water management, and conflict-resolution.

The driving force behind the reforms is usually the need to reduce the government's recurrent expenditures for irrigation. Irrigation systems in many developing countries were established with substantial financial contribution from international donors. It was assumed that the government and/or water users would be able to incur the cost of O&M of the systems, made possible by enhanced financial gains from improvements in productivity levels of irrigated agriculture. This assumption has often proven unfounded; public irrigation systems in the developing world have failed to generate returns commensurate with expectations. Moreover, governments have failed to set irrigation charges that cover actual O&M costs and even more so have failed in collecting them.

Some of the key stated and unstated assumptions underlying the recent reforms are:

- (a) Government management is neither a viable nor an ideal and sustainable approach to managing irrigation projects.
- (b) Most irrigation schemes are, in principle, financially and economically viable or have the *potential* to be so under reasonable management.
- (c) Transferring the management of irrigation systems partly or wholly to WUAs would result in better O&M of the systems; improve water management, conflict resolution and fee collection; and enhance productivity and food and livelihood security of the farmers in the schemes.
- (d) Management transfer takes time and requires capacity-building, and succeeds to the extent the enabling conditions (“supportive socio-technical context,” legal framework, water rights, and so on) are in place to ensure their success (Vermillion 1996; Vermillion and Sagardoy 1999; Frederiksen and Vissia 1998).

It was initially expected that farmer-management of public irrigation systems would enhance their performance and bring about wide-ranging socio-economic changes that would enable farmers to substantially improve farm incomes. In more recent years, management transfer is considered to be beneficial even if it just “saves the government money, improves cost-effectiveness of operation and maintenance while improving, or at least not weakening, the productivity of irrigated agriculture” (Vermillion 1996). The drift of the irrigation management transfer (IMT) discussion, in recent times, has been more towards getting irrigation off the back of the governments than towards improving the lot of the farmers and the poor, the original goal to which much public irrigation investment was directed over the past 50 years. Numerous case studies of the process and impact of management transfer are now available. Asian experiences are reviewed in a separate paper at this seminar (Samad 2001). The global experience with IMT is not uniform, and in many instances has been disappointing.

Many overarching patterns that emerge from a reading of the international IMT experience seem relevant to Africa but have not received adequate attention in the literature. IMT has been relatively successful where irrigation is central to a dynamic, high-performing agriculture, where average farm size is large enough for a significant proportion of farmers in the command area to operate like agribusinessmen; where backward linkages with input supply systems and forward linkages with output marketing systems are strong and well-developed; and where the costs of self-managed irrigation are an insignificant part of the gross value of product of farming. These conditions prevail in Mexico, Turkey, USA, and New Zealand where IMT has been a success.

In general, then, IMT has worked in situations where individual stakes are high and the irrigation community has been able to take the additional burden of self-management—financial and managerial—in its stride. This ability is strongly linked with the micro-economics of irrigated production, which propel the economy upward by generating powerful incentives for self-management. In sum, international experience with IMT suggests that four conditions must be met before a farming community makes a success of an IMT intervention:

- (a) It must hold out the promise of a significant net improvement in life-situations for most members.
- (b) The irrigation system must be central to creating such improvement.
- (c) The economic and financial cost of sustainable scheme management must be an acceptably small proportion of improved income.
- (d) The proposed organisation design must have—and be seen to have—low transaction costs.

A hard look at most smallholder IMT programme in Africa shows that they rarely satisfy these conditions. This larger perspective needs to inform our assessment of the prospects for successful management transfer of government irrigation schemes to African smallholder communities.

2. The African smallholder irrigation context

In many respects, the African smallholder situation differs from those where IMT has worked and has been sustained. Some of these differences are discussed in the following paragraphs.

2.1 History of dependency

IMT in Africa has often begun with reforms that entailed the drastic curtailment of the functions of parastatal agencies that were responsible for providing support services and management of irrigation schemes. Examples of such parastatal agencies include the Agriculture and Rural Development Corporation (ARDC) in the Northern Province of the Republic of South Africa, the White Nile Agricultural Services Administration (WNASA) in Sudan (Narayanamurthy, Samad, and Johnson 1997), and the Society for Land Management and Development of the Senegal and Falme River Valley (SAED) in Senegal (Wester et al. 1995). Although these are smallholder irrigation schemes, the parastatal agencies managed them in an “estate mode” in which they centralised input supply and output marketing functions to such an extent that farmers were often reduced to being workers on their own land.

In South Africa, the ARDC and its predecessors for over three decades managed smallholder irrigation schemes through an elaborate top-down command and support system that has proved to be unsustainable. Under a version of contract farming system, irrigation was fully subsidised. The ARDC organised mechanised cultivation, planting and fertiliser application. All that the plot holders or “farmers” did was weed, harvest and move the irrigation pipes around. They did not invest much working capital; nor did they make any decisions about farm management. The parastatal also organised the marketing of pooled produce. It deducted its expenses and the residual sum was given to the farmers. Under this arrangement the plot holders were neither farmers nor wage labourers. They did not take any entrepreneurial or managerial decisions. In reality, they only collected wages for weeding, harvesting and managing field irrigation. However, they shared the risk of crop yield variability, and in that sense, were not pure wage labourers.¹ As Bembridge (1999:11) notes: “Scheme managers have been attempting to ‘manage’ farmers rather than encouraging entrepreneurial development.” The situation is similar in other African countries.

The abrupt withdrawal of parastatal agencies from the management of irrigation schemes and the elaborate institutional support systems they provided has had serious impacts on smallholder farmers in many African countries. In the Arabie-Olifants scheme in the Northern Province of South Africa, the gross cropped area declined to 30 percent of the total arable land, a year after the withdrawal of ARDC, as plot holders were unable to mobilise working capital to pay for inputs and services (Shah and van Koppen 1999). Attempts were made to obtain crop loans from the Land Bank. Although the Bank had agreed in principle, no credit has been provided because farmers do not have titles to their land; and the Bank has been unwilling to accept other forms of loan guarantees.

In many African countries the management of smallholder irrigation schemes by parastatal agencies has left behind a legacy of a dependent and an impoverished group of farmers.² Often, such management has degenerated into oppressive ‘spoils systems’ that destroyed all pre-existing informal institutions. Nowhere, is this more vivid than in the descriptions of the Mwea irrigation and settlement scheme in Kenya (Kabutha and Mutero 2001).

2.2 High cash costs due to mechanisation

Under parastatal management smallholder irrigated farming in Africa emerged as a highly mechanised and capital-intensive activity. The ARDC in South Africa used heavy equipment for ploughing, spraying and harvesting. With the withdrawal of parastatal management, hiring farm machinery and equipment at affordable rates has become a major problem. The development of equipment rental markets at local levels has been slow and variable. The rental rates are high. As a result, the rising

¹ A World Bank study on the organisation of settlement farming in West Africa concluded: “Problems are encountered ... when the so-called ‘farmers’ are settled on centrally managed estates, where the ‘farmer’ has no decision-making power, yet carries the risks of failure” (cited in DWAF 1995:9).

² For the Nigerian experience in this respect, see Ogunwale, Maurya and Owonubi, 1994.

cost of production has not only eroded the margin from irrigated farming but has also increased working capital requirements. Most importantly, the high fixed costs have made smallholder farming extremely risky, with net gains plummeting far more rapidly than yields in a bad year.

In the Arabie-Olifants scheme in South Africa net incomes (excluding electricity) for wheat, computed from ARDC records, tended to be 20-25 percent of the cash costs of farming, which is less than the interest charged by private money lenders for short term loans to farmers. In the same scheme, farm budgets computed by Tren and Schurr (2000) showed that gross margins per hectare of wheat and maize were a mere US\$2 (R 14) and US\$289 (R 2,021) respectively. Further, these small farms face much higher “operating leverage”³ compared to Asian smallholders because the latter incur much lower cash costs. As a result, net income per hectare shows extremely high variability with respect to changes in yields: according to a document from South Africa’s Department of Water Affairs and Forestry (DWAFF 1995: table 5), for example, gross margins in maize, onions and potatoes are R 408, 1,487 and 5,739 per ha, respectively, at normal yields. But they reduce to R 0 at 50 percent yields; and for tomatoes, the gross margin falls from R 13,227/ha to a mere R 765/ha with the halving of the yield!

2.3 Absence of credit, input and output markets

Most smallholder schemes in South Africa are located in former homelands in remote areas away from towns and cities with which they often have poor linkages. With the rise of the “estate mode” of farming under parastatals, such markets as existed previously gradually disappeared; and now that the parastatals have withdrawn, there is a huge institutional vacuum. Based on a field assessment of the prospects of IMT in Dingleydale and New Forest, two of the better schemes in the Northern Province of South Africa, Merle and Oudot (2000) wrote: “Access to inputs is difficult. A lot of farmers fetch them from Hoedspruit or Hazyview with important transportation costs. Hiring a *bakkie* (small pickup truck) for 20 bags of fertiliser costs between R 100 and 150 (\$14-\$21).” Moreover, “Traditional markets that were available seem to have disappeared. The farmers are nowadays in direst need of markets especially for the winter crops. A lot of vegetables get rotten in the fields due to lack of buyers. The potential of the area for sub-tropical fruit trees must be accompanied by corresponding markets.” This story—absence of markets—is repeated in other parts of Africa.

2.4 Land tenure issues

One conclusion of international IMT research suggests that for farmer management to work, it is important to assign clear water rights. In the African smallholder context, land rights pose an additional intricate challenge (Lahiff 1999). Insecure tenure limits farmers’ incentives to make long-term development investments on their land. Moreover, the present arrangement does not provide much room and incentive for uninterested farmers to sell out and for interested and capable ones to expand their holdings (Bembridge 1999). Nor does it lead to the emergence of flexible rental markets in irrigated land, thus keeping it from achieving its full productive potential.⁴ As already mentioned inability to offer land as collateral for obtaining credit works as another disadvantage. Often, the lack of clarity amongst the plot-holders about what their rights precisely are with respect to their plots seems more problematic than the absence of ownership. In Dingleydale and New-Forest Schemes in the Northern Province of South Africa, Merle and Oudot (2000) noted that “some farmers do not know if they are allowed to rent their land, and are unwilling to discuss the matter in any detail. Some people are very reluctant to let someone crop on their field because they are afraid they won’t be able to get it back. The land is lent to trustworthy persons, such as influential persons, friends or relatives.” Abernethy et al. (2000:8) and Manzungu et al. (1999:6) report similar problems in Niger and Zimbabwe, respectively.

³ Operating Leverage, the opposite of break-even volume, is defined as fixed costs/[contribution/ha]. For the Asian smallholder, a crop failure implies wasted human and animal labour, both of which have low opportunity costs, but no major cash costs from borrowed funds. For a comparable African small farmer, a failed crop is significant cash loss and the risk of falling into a debt-trap.

⁴ In a wide-ranging review, Rukuni (1997) suggests that communal ownership of land and the present tenorial arrangements would promote productivity and efficiency enhancement if only the communal ownership was secure. In his assessment, problems of tenorial insecurity arise primarily because all communal land that tends to be viewed as state-owned gives every bureaucrat the power to intervene at will and tinker with communal lands.

2.5 Irrigated holding size and smallholder hedgehog behaviour

Literature documenting international IMT experience suggests that most 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 and committing time and resources to it. In the African smallholder context, farmers who work tiny plots are forced to pursue what Chambers (1983) calls a “hedgehog strategy” of depending on a variety of sources to earn a livelihood. In Senegal’s Village Irrigation Schemes (Périmètres Irrigués Villageois), the plot size varies from 0.1 – 0.4 ha (Wester et al. 1995:3). In a sample of smallholder schemes studied in the Niger valley, the plot size was 0.25 ha or less (Abernethy and Sally 1999). In the Nyanyadzi scheme in Zimbabwe, it ranges from 0.76 to 1.1 ha (Manzungu et al. 1999). In the five schemes proposed for rehabilitation in the Northern Province of South Africa, the plot size is about 1 ha (NPDALE 1999).

Inability to depend upon irrigated farming for a substantial proportion of their livelihood modifies the incentives and behaviour of smallholders. It is common for men to seek urban jobs while the women cultivate the plots. The smaller the plot, the stronger is this tendency (Mpahlele et al. 1999; Ngqaleni and Makhura 1996). Similar patterns are reported in Niger (Abernethy and Sally 1999; Abernethy et al. 2000), Zimbabwe (Manzungu et al. 1999) and elsewhere: household members pursue a wide variety of livelihood strategies to reduce risks and enhance their income.

This has many implications. Firstly, plot holders are often more interested in keeping their plots as insurance rather than working them to their full productivity potential. According to Charles Crosby, a senior South African observer, “Their plots are some sort of security although few are interested in active farming... there is danger of losing their holdings if they do not use them” (Crosby et al. 2000). Secondly, there are stringent limits on the amount of investment of time, effort and resources a typical smallholder irrigator might be willing and able to make on activities associated with the irrigated plot, if it involves sacrificing other livelihood options. Thirdly, 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, etc—all invisible costs that vary directly with the number of irrigators served by the scheme and inversely with the average landholding.

2.6 High cost of pump schemes

African smallholders seem to have received more than their fair share of pump irrigation schemes, which are more costly and difficult to operate and maintain than gravity schemes. As outlined earlier, an aspect of successful IMT experience world-wide is that operation and maintenance costs are an insignificant proportion of total income – typically less than 5 percent of the gross income from farming. In many African pump irrigation schemes, this proportion is far higher. If the Arabie-Olifants scheme were to be turned over to farmers in today’s conditions, running it would cost 20-25 percent of the total value of irrigated output the scheme produces (Shah and van Koppen 1999). Similar high costs of pump schemes are reported in Zimbabwe (Manzungu et al. 1999), Senegal (Wester et al. 1995), Nigeria (Ogunwale et al. 1994), and Burkina Faso and Niger (Abernethy and Sally 1999). Even after paying extremely high fees, Abernethy and Sally (1999:216) concluded “none of the nine organisations which have been studied in the two countries seem to be sustainable in the long run, because none can undertake the necessary major maintenance and renewals of equipment or facilities.” If net income is 20-25 percent of the gross income and if irrigation fees under self-management are as high as 15-20 percent of gross income, the implications are that most turned-over pump schemes would leave the farmer in the red, unless gross income increased substantially before the transfer.

Despite this, pump schemes offer a window of opportunity for farmer management because, if maintained well, they offer better-quality irrigation and also, by their design, they help impose a certain financial discipline. Gravity systems generally cost more to build but less to run than pump schemes. However, many invisible transaction costs involved in farmers’ management of gravity systems probably tilt the balance in the other direction. In general, with a favourable economic environment and high land and water productivity, pump schemes, though costlier to run, may well be more amenable to farmer management than gravity schemes, because the transaction costs of the latter are high. The problem in African smallholder pump schemes is that they cannot use the unique managerial advantages offered by pump schemes because of low farm productivity and income and high cash and transaction costs.

3. Downward ratchets

Crosby et al. (2000:chapter 9), reviewing the prospects of small-holder irrigation in the Northern Province, South Africa, write: "It is unbelievable that with the exception of sugar projects there are virtually no schemes that have been successful ... (and) the pattern of failure is so similar that it is not really necessary to undertake a needs analysis for individual projects." This pattern of failure is what we refer to as "downward ratchets."⁵ The overall micro-economic dynamic is such that piecemeal interventions with marginal benefits will most likely fail to relaunch the small-holder schemes into a significantly higher trajectory of productivity and farm incomes from where the irrigation community can take the additional costs and effort of self-management in their stride. In the analysis by Crosby et al. (2000:3), the downward ratchets are evident in the "common aspects (which) are: total dependence→water supply infrastructure dilapidated→ineffective water management→low production levels→little knowledge of crop production or irrigation→ineffective extension→lack of markets and credit→difficulty in sourcing inputs→expensive and ineffective mechanisation services→unrepaired fencing→damaged soils."

Other observers have arrived at similar conclusions elsewhere in Africa and found that farmers in small-holder schemes need and want support systems that go far beyond just irrigation if they are to improve their livelihoods significantly (Ogunwale et al. 1994; Maluleke 1999; Narayanamurthy, Samad and Johnson 1997; Shumba and Maposa 1996; Manzungu et al. 1999).

Many observers focus on the high productivity of tiny holdings, and this is supported by a good deal of empirical evidence (e.g., de Lange et al. 1999; Mpahale et al. 1999; Rukuni 1997). Nobody can deny this internationally supported negative relationship between farm size and productivity. The point is that small-holder irrigated farming income *per household* for food plot owners as well as so-called small-scale commercial farmers remains too low for them to meet all their subsistence requirements and generate the surplus needed for development. As a result, food plot farmers who achieve high productivity as well as 2.5 ha plot owners who do not – all "could be classified as poor or vulnerable to poverty" (Mpahlele et al. 1999: 23). The issue in making a success of IMT in African small-holder irrigation thus is not only of getting the "process right" nor of getting laws and rights right but in addition, of devising a "lift strategy" to replace the downward ratchets by upward ones.

In our analysis, then, the only way farmer management of African small-holder irrigation can be sustainable, is for management transfer to be part of a larger "lift strategy" that can dramatically enhance economic returns to smallholder farming. Such a lift strategy, however, will have to include much more than just irrigation management transfer. It will need to deal effectively with the whole host of constraints that African smallholder schemes are facing. As Crosby et al. (2000) assert: "Sustainable irrigation farming is only possible if the production levels attained make it affordable. This implies favourable natural resources, knowledge, motivation, management and the essential independent support services."

4. Institutional support systems for sustainable farmer-managed irrigation

Throughout Africa, there are very few cases of successful and sustainable farmer-management of smallholder irrigation schemes; and there are hardly any cases of *institutional failures* in farmer-management of irrigation schemes involving large, commercial farmers. Putting in bold relief the importance of upward and downward ratchets in shaping successful IMT, Tren and Schurr (2000) contrast the results of two commercial Irrigation Boards (Loskop and Hereford) and two smallholder schemes (Hindustan and Coetzeesdraai in Arabie-Olifants Scheme) in South Africa. In the small-holder schemes, farmers pay little or nothing for irrigation, whereas the Irrigation Board farmers pay for irrigation on a full cost of O&M basis and they will pay much more for water itself once the government's new full-cost water pricing policy comes into force. Yet, farmer management in the small-holder schemes is deemed to be a failure whereas Irrigation Boards are highly successful.

⁵ After "ratchet effects" used by Robert Chambers to describe how the operation of multiple constraints disable poor people "like movements down past a cog which are difficult or impossible to reverse, making poor people permanently poorer..." (Chambers 1983: 115).

The most important distinguishing factor is the *stakes* of farmers in their farming and in the irrigation system. Farmers in the Irrigation Boards have reasonably large farms, access to capital to invest in commercial crops, and average farm incomes in the range of R1–2.5 million (1 USD = R7). Farming is the only or the primary source of livelihood and income for these farmers; and in their case, the double-coincidence of need and capacity is well established. A well-functioning irrigation system is central to their livelihood (need). They have the resources, significant interests as well as the management skills (capacity) for trouble-free and sustainable management of large systems. Smallholder groups have neither: their tiny farms give them little or no net income. And they do not have the resources and management capacity to operate their schemes viably. A Policy Proposal prepared by a group of South Africa's most experienced scholars appropriately asserts that: "Irrigation farming can be very remunerative provided the following are present: high quality management, markets and infrastructure, and sufficient equity capital" (Backeberg et al. 1996: vii). Africa's smallholder irrigation farmers have none of these; and without these, IMT can easily become a "millstone around the neck."

Farmer management of small-holder irrigation schemes can become viable and sustainable but only as an element in a broader "lift" strategy that attacks at once an entire complex of constraints (including capital scarcity, low enterprise and risk-taking capacity, shortage of machines, poor market-linkages). Such little African evidence as is available suggests that smallholder schemes can survive when farmer organisations are designed to work on this broad array of constraints rather than just manage the irrigation system. Saga, a pump scheme in Niger studied by Abernethy et al. (2000), is such an example: despite extremely high irrigation fees, the effective marketing and support system enables farmers to earn good profits from irrigated agriculture. We have found successful cases in South African sugar projects, where smallholders have access to broad-based credit, input supply and market access (e.g., Pike, cited in Makhura and Mamabolo 2000).

In sum, then, plain IMT—with all the accent on "process," capacity-building, getting the right socio-technical conditions in place, and so on—is by itself unlikely to work in the context of African smallholder schemes. Successful IMT will have to be accompanied by a quantum jump in smallholder productivity and incomes; and unless communities feel confident about managing these schemes viably, they will be reluctant to accept IMT. Successful IMT requires much more than smooth transfer of these irrigation schemes to farmers, i.e., it entails removing a host of other constraints.

5. The way forward

Under intense budgetary pressure to curtail expenditures on O&M, many African countries have taken recourse to plain abandonment of smallholder schemes that have gradually collapsed. In South Africa, the latest to initiate state withdrawal, this implies virtually writing off, as sunk costs, over R 2 billion of past investments of public funds in the small-holder irrigation sector. Instead of abandonment, however, South Africa has chosen a more positive and proactive stance towards the management of state withdrawal from smallholder irrigation schemes. The National Department of Agriculture has led a process of study and consultation aimed at developing a viable national policy.

Besides getting the process right, South Africa—and the rest of Africa—must focus on evolving an IMT strategy that addresses the entire complex of constraints that small-holder irrigation schemes are facing, replacing the so-called downward ratchets by strong upward ones. The tenor of discourse in the African smallholder irrigation context needs to shift from institutional reform of smallholder irrigation management to institutional interventions designed to significantly enhance smallholder productivity and incomes. Institutions appropriate for this are probably not pure Water User Associations, but either farmer-controlled organisations with a much bigger mandate and capacity or strong institutional linkages with agri-businesses to play a central role in executing a lift strategy.

Regrettably, there are not many examples of such broad-based smallholder support systems that have succeeded and proven sustainable, especially in Africa. But what we can find suggest that central to an effective lift strategy for African small-holder communities is helping them find stable, reliable markets for value-added products; once this is ensured, much else follows. Africa is replete with many examples of contract farming that have failed, but it is not clear if the potential offered by this institutional alternative has been explored fully, especially in the context of small-holder irrigation schemes. Doing this is important because in the African smallholder irrigation context, agri-business companies have operated farmer support systems akin to what the erstwhile parastatals were originally to offer.

Coulter et al. (1999) have explored “contract default,” both by the company as well as the farmers, as the major impediment to developing the agri-business path to small-holder farming. They have suggested that one reason why farmers as well as companies default on their commitments is that the farmers are not organised. According to them, when companies make input supply, credit and marketing commitments to a self-help group or a co-operative of small farmers, peer-pressure checks individual default. Equally, organised groups of small farmers with their superior bargaining power can extract more favourable terms for contract farming and guard against company defaults. With organised small farmer groups, there is also room to design and introduce self-enforcing incentives and penalties with respect to honouring the contract, thereby drastically reducing the monitoring and contract enforcement costs that scare agri-business companies away from smallholders.

In conclusion, our review of global and African experience suggests that straightforward IMT will not work in African smallholder irrigation. Indeed, it would be surprising if IMT, with its stress on “process” and capacity-building, will meet even the moderate expectation of IMT 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” (Vermillion 1996:153). This is because of the entire complex of institutional constraints affecting the viability of most smallholder irrigated farming.

Institutional alternatives that have the greatest chance to work in this situation are those that help small-holders move to a substantially higher trajectory of productivity and income from where they can take in their stride the additional cost and responsibility of managing their irrigation system. And the best place to start seems to be markets: bring smallholder communities in contact with stable, reliable markets for value-added products. This will help install upward ratchets; and once their irrigated holdings help them make decent livelihoods, African smallholders will be ready and eager for IMT.

Acknowledgements

Earlier drafts of this paper have benefited from comments by many people, both within IWMI and elsewhere. They are too numerous to mention here. We would like to thank the anonymous external reviewer of the larger paper that is forthcoming as an IWMI Research Report. This work was carried out under a research grant provided by the British Department for International Development (DFID) for Achieving Sustainable Local Management of Irrigation Water in Water-Short Basins: South Africa Case Study (Reference NRE 9800 605/966/001A). IWMI is grateful to DFID for this support. This paper is a revised and abridged version of a forthcoming IWMI Research Report, *Institutional Alternatives in African Smallholder Irrigation: Lessons from International Experience with Irrigation Management Transfer*, by Tushaar Shah, Barbara van Koppen, Douglas Merrey, Marna de Lange and Madar Samad.

Bibliography

- Abernethy, Charles; and Hilmy Sally. 1999.** Experiences of some government-sponsored organisations of irrigators in Niger and Burkina Faso, West Africa. *In: Charles Abernethy and Franz Heim. (eds). Irrigators' Organisations: Government Actions Towards Effective Irrigators' Organisations with special reference to Lao PDR and Vietnam, Proceedings of an International Workshop, 1-6 March, Vientiane, Lao PDR. German Foundation for International Development (DSE), Feldafing, Germany.*
- Abernethy, Charles; Hilmy Sally; Kurt Lonsway; and Chegou Maman. 2000.** Farmer-based financing of operations in the Niger Valley Irrigation Schemes. *Research Report 37. International Water Management Institute, Colombo, Sri Lanka.*
- Backeberg, G. R.; T. J. Bembridge; A. T. P. Bennie; J. A. Groenewald; P. S. Hammes; R. A. Pullen; and H. Thompson. 1996.** Policy proposal for irrigated agriculture in South Africa. *Discussion Paper. Water Research Commission, Pretoria.*
- Bembridge, T. J. 1999.** Guidelines for the rehabilitation of small-scale farmer irrigation schemes in South Africa. *Paper for the International Seminar on the Performance of Large and Small-scale Irrigation Schemes in Africa. 15-19 November. Abuja, Nigeria.*
- Chambers, Robert. 1983.** Rural Development: Putting the last first. *London: Longman.*
- Coulter, Jonathan; Andrew Goodland; Anne Tallontire; and Rachel Stringfellow. 1999.** Marrying farmer co-operation and contract farming for service provision in a liberalising sub-Saharan Africa. *Natural Resource Perspectives, no. 48, November, Overseas Development Institute, London.*
- Crosby, Charles; Marna de Lange; Chris M. Stimie; and Isobel van der Stoep. 2000.** A review of planning and design priorities applicable to small-scale farmer irrigation plots. *Report No. 578/2/00. Water Research Commission, Pretoria, South Africa.*
- De Lange, Marna; Lydia Pardeller; Dumisani Magadla; Stephanus Smal; Anne Sugrue; Chris Stimie; and Barbara van Koppen. 1999.** Rural Women's Association: An assessment of the success factors and sustainability. *South Africa Working Paper No.1. International Water Management Institute, Colombo, Sri Lanka.*
- Department of Water Affairs and Forestry (DWAF). 1995.** Discussion document on future irrigation in South Africa. *Department of Water Affairs and Forestry, Pretoria.*
- Frederiksen, Harald. D.; and Rodney J. Vissia. 1998.** Considerations in formulating the transfer of services in the water sector. *International Water Management Institute, Colombo, Sri Lanka.*
- Kabutha, C.; and C. M. Mutero. 2001.** From government to farmer-managed smallholder rice schemes: The unresolved case of the Mwea Irrigation Scheme. *FAO-IWMI Seminar on Private Sector Participation and Irrigation Expansion, Accra, October 2001.*
- Lahiff, Edward. 1999.** Land tenure on the Arabie-Olifants Scheme. *South Africa Working Paper No.2. International Water Management Institute and Nkuzi Development Association. International Water Management Institute, Colombo, Sri Lanka.*
- Makhura, M.; and M. Mamabolo. 2000.** Socio-economic issues in small-scale irrigated agriculture: A literature survey of the Olifants Basin, South Africa, and Southern Africa. *Unpublished paper. University of Pretoria and IWMI, Pretoria.*
- Maluleke, M.G.; 1999.** "The impact of credit on commercialisation of smallholder farmers in the Olifants River Basin." *Unpublished paper for B. Agric. Admin. Honours. University of the North, Sovenga, South Africa.*
- Manzungu, Emmanuel; Alex Bolding; and Conrade Zawe. 1999.** Quarter and half measures and beyond: The case of irrigation management reform in Zimbabwe. *Paper presented at the International Researchers' Conference on Irrigation Reform, 11-14 December, Hyderabad, India.*

- Merle, Sophie; and Stéphanie Oudot. 2000.** Stratégies, systèmes techniques et situations économiques d'exploitations agricoles familiales dans un périmètre irrigué d'Afrique du Sud. *Série Irrigation R&E, 2000-18. CEMAGREF and CIRAD, Montpellier, France.*
- Mpahlele, R. E.; T. M. Malakalaka; and B. Hedden-Dunkhorst. 1999.** Characteristics of smallholder irrigation farming in South Africa: A case study of the Arabie Olifants River Irrigation Scheme. *South Africa Working Paper No.3. International Water Management Institute, Colombo, Sri Lanka.*
- Narayanamurthy, S. G.; M. Samad; and Sam Johnson III. 1997.** Comparing theoretical and actual feasibility of transferring management of river lift irrigation systems in Sudan. *Natural Resources Forum, v. 21, no. 1, February.*
- Ngqaleni, Malijeng; and Moraka Makhura. 1996.** An analysis of women's status in agricultural development in the Northern Province. *In: Lipton and Lipton. (eds). Land, labour and livelihoods in rural South Africa, Volume 2: KwaZulu-Natal and Northern Province. Indicator Press, Durban.*
- Northern Province Department of Agriculture, Land, and Environment (NPDALE) . 1999.** Mega business plan for Water Care Program in Northern Province. *Prepared for National Department of Agriculture, Government of South Africa.*
- Ogunwale, S. A.; P. R. Maurya; and J. J. Owuonubi. 1994.** Farmers' views on the management of irrigation schemes in Nigeria. *Irrigation Management Network Paper 31, April, pp.10-19, Overseas Development Institute, London.*
- Rukuni, Mandivamba. 1997.** Creating an enabling environment for the uptake of low-cost irrigation equipment by small-scale farmers. *Invited paper for the FAO/IPTRID East and Southern Africa Workshop on Small-Scale Irrigation Technology, Harare, Zimbabwe, 14-17 April.*
- Samad, M. 2001.** Impact of irrigation management transfer on the performance of irrigation systems: a review of selected experiences from Asia and Latin America. *FAO-IWMI Seminar on Private Sector Participation and Irrigation Expansion, Accra, October 2001.*
- Shah, Tushaar; and Barbara van Koppen. 1999.** Arabie-Olifants Scheme. *Field notes of a mission. Unpublished.*
- Shumba, E. M.; and R. Maposa. 1996.** An evaluation of the performance of six smallholder irrigation schemes in Zimbabwe. *Irrigation and Drainage Systems, v 10, no. 4, pp. 355 - 366.*
- Tren, Richard; and Michael Schurr. 2000.** Olifants River Irrigation Schemes. Report 1: Crop and Irrigation Data for Four Separate Irrigation Schemes, and Report 2: Irrigation Management Structures for Four Separate Irrigation Schemes. *South Africa Working Paper No.5, International Water Management Institute, Colombo, Sri Lanka.*
- Vermillion, Douglas [ed.], 1996.** The privatisation and self-management of irrigation: Final report. *International Irrigation Management Institute, Colombo, Sri Lanka.*
- Vermillion, Douglas L.; and Juan A. Sagardoy. 1999.** Transfer of irrigation management services: Guidelines. *FAO Irrigation and Drainage Paper 58. IWMI/GTZ/FAO, Rome.*
- Wester, Philippus; Arjen During; and Joost Oorthuizen. 1995.** Locally managed irrigation in the Senegal valley in the aftermath of state disengagement. *Short Report Series on Locally Managed Irrigation, Report no. 9. International Water Management Institute, Colombo, Sri Lanka.*