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## Irrigation management transfer in sub-Saharan Africa: an analysis of policy implementation across scales

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### ABSTRACT

This article explores how irrigation management transfer policies were implemented in Mali, Mozambique, Malawi and Zimbabwe. In Mali and Mozambique, where the irrigation bureaucracy controlled one large irrigation system, state agencies retained control over irrigation management despite reduced state funding. In Malawi and Zimbabwe, where the state irrigation systems and the irrigation bureaucracy were smaller, users have taken over irrigation management, but are having trouble sustaining irrigated agriculture. We show how irrigation management transfer policies were shaped by the interplay between international donors, macro-economic dynamics, national politics and the interactions with (and the nature of) irrigation infrastructure, bureaucracies and organized users.

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## Introduction

Since the 1980s irrigation reforms have been implemented across the globe. Initially these reforms were inspired by the broader set of ‘participatory approaches’ to development that emerged in the late 1970s and early 1980s (Cernea, 1985; Cleaver, 1999) and were labelled ‘participatory irrigation management’ and ‘participatory irrigation development’ (Groenfeldt & Svendsen, 2000). These policies aimed at increasing the participation of water users to empower them to become actively engaged in decision making and to increase responsibility, accountability, transparency and the power of water users to define how ‘their’ irrigation systems are managed (Coward & Uphoff, 1986) to improve agricultural production. Some of these ideas were picked up, merged and hybridized with the broader liberalizing economic reforms that were promoted by international organizations in the 1980s and 1990s. In water and irrigation management these reforms emphasized decentralization, through the transfer of operation and maintenance responsibilities from national public entities to lower levels of government and organized water users (Johnson, 1997; Suhardiman & Giordano, 2014), and marketization, through the privatization of services. This has generally been called irrigation management transfer (IMT). How participatory irrigation management, participatory irrigation development and IMT were named and introduced varies greatly between countries. In most cases it led to the establishment of water user associations (WUAs), which were responsible for

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tasks associated with irrigation management at different levels (Wegerich, 2008). WUAs were to become financially self-sufficient through collecting fees from users. User participation, increased fee recovery, cost reduction and better performance in operation and maintenance (O&M) have frequently been cited as the benefits of these programmes (Vermillion & Garces-Restrepo, 1994). However, Senanayake, Mukherji, and Giordano (2015) show, in an extensive literature review, that ‘normative’ evaluations of the performance and effects of these interventions around the globe present little convincing evidence of improved performance. The underlying linear development model in which the WUA functions as a one-model-fits-all policy recipe indicates belief in social engineering (Merrey & Cook, 2012; Venot, 2014).

Critical studies of the implementation of IMT programmes show that these programmes had different objectives and implementation trajectories, moulded by a variety of actors with intentions that stretched beyond those that were made explicit (Rap & Wester, 2013; Suhardiman, Giordano, Rap, & Wegerich, 2014; Veldwisch & Mollinga, 2013). Several of these studies were conducted in Asia and Latin America, where state agencies had played an important role in large-scale irrigation development and management. In sub-Saharan Africa large-scale state-led irrigation development was never so important as in Asia and Latin America, and farmer-led irrigation development (by private investors and local communities) has not attracted much policy and academic interest until very recently (Woodhouse et al., 2017). Studies on irrigation management in sub-Saharan Africa have mostly focussed on the process of formation of local institutions, for instance using a critical institutionalism framework, and tend to show that these were amalgams of new and pre-existing organizations (Clever, 2000; Cleaver & De Koning, 2015; Venot, 2014). Yet, relatively little is known about the policy processes, politics and ideologies underlying their introduction. This is pertinent in a context where African governments are looking to greatly expand irrigated areas and where the state–irrigator (user) relation is under increasing pressure (Veldwisch, Venot, Woodhouse, Komakech, & Brockington, 2019).

The literature suggests that the size and technology of irrigation systems interact with the dynamics of national irrigation policies (Mollinga & Bolding, 2004; Mollinga & Veldwisch, 2016). This led us to select a range of contrasting countries in terms of the size and distribution of irrigation infrastructure. Mali and Mozambique each have one large-scale irrigation system which is central to national irrigation policies. Zimbabwe and Malawi are characterized by more dispersed, small-to-medium irrigation schemes with mixed histories of public and communal management. In this article we pose and address the question of how internationally advocated IMT policies were implemented across different scales in these four countries and what can we learn from the differences between them.

We approach this question through a comparative analysis of how IMT was shaped through interplay at three interconnected scales in the four selected countries. Specifically, we look at the interactions between international donors, macro-economic dynamics, national policy making and the interactions with (and the nature of) irrigation bureaucracies and organized users. We do so by adopting the notion of policy as a contested process that is shaped by the interactions between actors who operate in various institutions with different spatial reaches – local, regional, national and international (Hoogesteger, Tiaguaro-Rea, Rap, & Hidalgo, 2017). The analysis is based on a

review of English-language literature (published and grey) on IMT in sub-Saharan countries derived from searches of academic literature databases and focused on identifying descriptions and analyses of the policy processes associated with IMT.<sup>1</sup>

Our analysis highlights the contested nature and contextual specificities of the processes of policy implementation. It shows how internationally promoted policies, such as IMT, change form and meaning according to the context in which they are implemented, which, in turn, results from the interplay between international donor push, macro-economic dynamics, national politics and related policy making, and the interactions with (and the nature of) irrigation infrastructure, bureaucracies and organized users. The article thus makes a critical contribution to understanding how IMT processes have been implemented across sub-Saharan Africa, their attractiveness to certain actors and the difficulties experienced by others.

The next section provides a background on IMT processes and their histories from a global perspective, both empirically and how they have been studied. We then present our framework of analysis for the four case study countries, which are given in full in the next section. We conclude with a synthesis of the cases and propose an agenda to further study policy processes in the irrigation sector and specifically the aftermath of IMT.

## The history of IMT

Worldwide participatory irrigation management and participatory irrigation development approaches to irrigation management (mostly implemented in Asia since the late 1970s and early 1980s) pioneered and set the basis for the broad World Bank–financed IMT programmes of the 1990s. These programmes combined elements of participatory irrigation management and participatory irrigation development with broader ideas about economic liberalization, administrative decentralization and the privatization of services which still continue to characterize internationally advocated, liberally inspired sectoral reforms in the water and irrigation sector (Suhardiman & Giordano, 2014). Concerns about inefficient, and for the state expensive, irrigation management resulting from poor performance by government agencies provided fertile ground for the international promotion of reforms that rest on the principles of decentralization and the transfer of irrigation management responsibilities to farmer/user-based associations (Vermillion, 1994; Wegerich, 2008). International donor agencies such as the World Bank, the Inter-American Development Bank, the Asian Development Bank, and the US Agency for International Development (among others) which have a long history of involvement in irrigation development going back to the 1960s, played an important role in promoting, funding and supporting these irrigation-sector reforms (Mollinga & Bolding, 2004; Rap, 2006; Suhardiman & Giordano, 2014; Suhardiman & Mollinga, 2012). In broad terms these reforms aimed to rationalize public expenditure and ‘modernize’ the institutions in the irrigation sector and to promote the sustainable participation of the private sector to improve the performance and productivity of public irrigation systems. This was to be facilitated through the development of appropriate regulatory and administrative frameworks and the creation and strengthening of WUAs.

IMT programmes were central policy instruments in contributing to this and commonly included transferring the tasks of administration and O&M to financially autonomous WUAs. The expected outcomes were reduced state expenditure on the

management of state irrigation systems, better water delivery services through making water users responsible for irrigation management, better financial, managerial and administrative accountability, and fee recovery. Central aspects of these changes were the introduction of irrigation service fees, which would provide the financial basis for the WUAs' functioning (Johnson, 1995), and the introduction of democratic regulations for decision making within WUAs. While these international policies were often based on the same blueprints, there are great differences in how the policies were implemented and played out in different countries (Suhardiman et al., 2014; Veldwisch & Mollinga, 2013).

In a period in which IMT was becoming a globally lauded policy recipe Shah, Van Koppen, de Lange, and Samad (2002) had already warned that what had seemingly worked well in Mexico, Turkey and New Zealand could not be simply transferred to sub-Saharan countries. They noted that smallholder farmers in public irrigation systems were seriously constrained by their limited 'wealth-creating potential', low levels of commercialization and poor access to both inputs and technical support. They also argued that the scatteredness and small size of irrigation in many sub-Saharan countries posed an additional hindrance to IMT. There is no available overview of where, when and how IMT processes were implemented in sub-Saharan Africa, or their outcomes. Many countries do not explicitly name the process, in others the process has simply not been studied, and in yet others the transfer of management is a *de facto* result of state absence in light of under-resourced irrigation departments.

'Normative' outcome evaluations have assessed IMT policies on the basis of their effects on a variety of performance indicators. These include both qualitative and quantitative effects on crop production, users participation, the quality of the O&M of irrigation systems, the reliability and adequacy of water distribution, fee collection rates, the financial viability of WUAs, reduction of conflicts, impacts on users' livelihoods, and government spending (Bell et al., 2013; Senanayake et al., 2015). The study by Senanayake et al. (2015) is the most comprehensive and rigorous attempt in this direction. It identified over 1500 documents relating to IMT policies, of which 131 were selected for detailed scrutiny, based on criteria linked to their research questions. These jointly reported on 230 cases. The study included an analysis of the criteria used to evaluate performance outcomes and the direction of the impacts (negative/negligible or positive). Few discernible trends in impacts were observed; and in general there was nearly a balance between negative and positive effects. In 95% of the 40 cases for which data were available a decrease in government spending (a positive result) was reported, yet for 190 cases no result was reported. In only 15 (about 7%) of the 230 cases was evidence found that 'possess[ed] the minimum degree of methodological rigor to draw conclusions about impact' (p. 177). Thus, despite the extensive literature evaluating IMT, it turned out to be difficult to prove 'success' on the basis of such performance outcomes. This is due to both the lack of rigour in the evidence and the very contradictory outcomes in terms of most of the reported criteria.

Critical studies of IMT point to the fact that where the success of performance (improvement) has remained sketchy, the 'performance of success' has clearly played an important role in spreading the policy recipe across the globe (Rap, 2006). That is, an image of success was created to advance the interests of certain key actors in the policy process. The study by Rap (2006) is one example of several more critical in-depth case studies on the process of IMT implementation in some countries in Latin America and

Asia. Another study (Rap & Wester, 2013) shows how in the early 1990s specific actors in the Mexican bureaucracy used the internationally funded water reforms, which included an ambitious IMT programme, to re-establish an independent national water management institute, while at the local level IMT was implemented through strategic alliances between large commercial producers and local elites who had direct stakes in controlling the newly created WUAs. Hoogesteger et al. (2017) show that in Ecuador the creation of alliances between the top of the national government, the Ministry of Agriculture and the World Bank enabled a radical decentralization of the hydraulic bureaucracy. In turn, the implementation of the ‘successful’ Ecuadorian IMT programme and its outcomes greatly relied on how water users engaged in cooperating or resisting the IMT programme at the local level (see also Hoogesteger, 2013, 2015). Oorthuizen (2003) shows, in detail, how conflicts of interest between local, sub-national and national levels of the National Irrigation Administration in the Philippines stalled the reform efforts of the IMT programme. In Indonesia Suhardiman et al. (2014) show ‘the important role played by international donors in facilitating reform processes and the irrigation bureaucracy’s power to resist donor-driven policy reform agenda’ (p. 452), which led to waves of decentralization and recentralization. Veldwisch and Mollinga (2013) found similar processes at play in Uzbekistan and argue that the authoritarian post-Soviet state used the IMT process to reorganize its control over agricultural production. This analysis shows that IMT can be a strongly state-centric process that leaves little room for local experimentation. In such circumstances the desire of national bureaucracies to implement IMT has very little to do with increasing user participation or fostering autonomous governance. What these studies show is that negotiations between actors active in the water and irrigation sectors at different scales shaped the nature of IMT policy implementation.

### **Policy making across scales**

In our analysis we regard policy making as an intrinsically negotiated multi-scalar process and a contested political process. This by definition means that it is open-ended and dynamic. This contrasts with more linear (or cyclical) understandings of policy formulation and implementation often used by political scientists. Grindle and Thomas (1989) critique linear models for taking the policy decision as the critical choice, after which implementation automatically follows. Thomas and Grindle (1990) argue that to understand policy making and implementation processes it is necessary to focus on the societal conflicts and responses that a (proposed) policy produces. They also point to the importance of analyzing the resources policy makers need to mobilize to deal with these responses, such as interactive and ongoing negotiations (Grindle & Thomas, 1989; Rap, 2006). As a result, policies are actually ‘made’ during implementation, rendering them mutable and dynamic (see also Rap & Wester, 2013).

In our analysis we also pay attention to the notion of spatial scale. In human geography the concept of scale is used for ‘understanding the processes that shape and constitute social practices at different levels of analysis’ (Marston, 2000, p. 220). This can provide a better understanding of how spatial scale, as expressed through the different, apparently fixed, nested series of institutional levels (local water users, regional irrigation agencies, the national government and international donor agencies) matters for policy

processes. As a result we conceive the sectoral reform of IMT as political projects that aim to transform, and are in themselves transformed by, existing practices and their related legal and institutional frameworks at different interrelated scales (Hoogesteger et al., 2017). In doing so we link broader (inter)national socio-economic and political processes and their dynamics to more specific sectoral processes that occur at different scales. We seek to explain how the inter-relations between actors involved in the IMT process are influenced by, and tied to, broader socio-economic and political processes and the mobilization of resource flows.

Based on these notions we pose that the policy process of IMT is shaped by both top-down policy implementation and the bottom-up responses these policies create within institutions, at the different scales with a concern in irrigation management – water bureaucracies, irrigation agencies, WUAs and local communities (Hoogesteger et al., 2017). Through this approach we analyze the literature to distil what is known of the multi-scalar policy processes in our four case study countries (Mali, Mozambique, Malawi and Zimbabwe) and to identify how the policy processes panned out through negotiations between actors at the following scale interactions:

- International–national interaction: the policy changes at the national level and how these were related to the conditionalities of international funding agencies and the broader socio-economic and political context. Structural adjustment and decentralization programmes play a key role here.
- National–irrigation agency interaction: the processes of decentralization and how these influenced the bureaucracy of the irrigation agencies. Here, we also look at how irrigation agencies navigated and negotiated IMT policies in relation to O&M practices, both before and after IMT policies were introduced.
- Irrigation agency–WUA interaction: the interactions, actors and factors that determined how IMT was implemented and received at the (local) irrigation scheme level.

## **IMT implementation in Mali, Mozambique, Malawi and Zimbabwe**

### ***Mali: the long and contested dismantling of the Office du Niger***

In Mali the main focus of IMT was to decentralize some irrigation management tasks to organized water users in the Office du Niger's irrigation scheme, which is responsible for irrigating 80,000 ha of land cultivated by smallholders, with an average plot size of around 2 ha (Vandersypen et al., 2008). The process of transferring responsibilities was managed in a top-down manner by the Office du Niger, a state agency with strong political ties to the central government. In 1977 the Office du Niger proposed a project to expand the irrigation scheme, which was supported by Mali's president, who requested financial and technical aid from the World Bank. A follow-up diagnosis by the World Bank and bilateral donors concluded that management reforms in the Office du Niger were needed prior to expanding the scheme. Loans were conditional on these reforms, which primarily included making irrigators active participants in scheme management, reforming the rice marketing structures, breaking the agency's monopoly over rice commercialization and irrigation management, reducing O&M costs and improving water delivery through field and canal improvements (Aw & Diemer, 2005). The

Malian government and the Office du Niger refused the reform package as threatening their position and power. A stalemate with the donors was avoided in 1982 by negotiating a pilot project to test a combination of technical and institutional improvements in one secondary canal.

The pilot project significantly increased yields and shifted some power from agency staff to the users (Aw & Diemer, 2005). Based on this success and the negotiation of small reforms between 1984 and 1986, the Office du Niger and its personnel lost more power over the irrigation scheme. Rice threshing and hulling was decentralized from the Office du Niger through the introduction of new technologies, and rice markets (until then controlled by the government) were liberalized. Rules giving farmers a licence to keep using the same plot indefinitely (including inheritance rights) increased land tenure security. This reduced the Office du Niger's power over farmers and settlers. Elected farmers were included in decision making (though with limited powers) over how water service fees were spent by the Office du Niger. These and other measures increased farmers' power in relation to agency staff. In 1989, the World Bank signed the consolidation loan, after the Malian government also acknowledged the need to reform the agency, which had already lost much of its political power.

In 1991, a new government committed to liberalizing the economy and reforming the Office du Niger. A reform unit under the prime minister's office became responsible for dealing with the Office du Niger employees' union, farmers, ministries and donors. This led to a downsizing of the agency's staff and the creation of new user-based institutions with full control over the tertiary infrastructure and part of the secondary infrastructure (Aw & Diemer, 2005; Vandersypen et al., 2006a). The reformed and greatly slimmed-down Office du Niger kept responsibility for the main infrastructure and some of the secondary infrastructure (Vandersypen et al., 2006b). In exchange, donors committed to the rehabilitation of the scheme and at a later stage its expansion.

Later in the 1990s, the Office du Niger became responsible for facilitating WUAs' organization, while farmers became more active in O&M of tertiary units. The organization of farmers in WUAs was imposed on farmers in a top-down model through donor-funded projects (Vandersypen, Verbist, Keita, Raes, & Jamin, 2009). The results for the authority, legitimacy, capacity and functioning of the WUAs were mixed. Yet Aw and Diemer (2005) argue that in terms of productivity, food production, democratization and reduction of state expenditure in the irrigation sector, the reforms were successful.

In summary, the introduction of IMT in Mali was a long and contested political process in which international donors, the national government, the Office du Niger and local actors continuously negotiated their interests and positions. Embedded in a much broader socio-economic and political context, the implementation of IMT only came about after the Office du Niger had gradually lost its monopoly over land distribution, water management and rice production and commercialization in the irrigation scheme. This opened up space for local actors to engage in these processes and activities and to gain political space at the local level. Simultaneously, the Office du Niger lost its position in the national political arena, paving the way for reforms that led to a new configuration of irrigation management, in which organized local-level water users have a much more important role, with the Office du Niger still controlling the main and secondary canals.



### ***Mozambique: ambivalent transfer and re-control in the Chókwè irrigation system***

The 26,000 ha Chókwè irrigation system played a central role in Mozambique's IMT process. In 1977, after independence and inspired by Marxist-Leninist ideals, the Complexo Agro-Industrial de Limpopo was established in the area of the Chókwè irrigation system to form the largest state farm in Mozambique. The Complexo was a single state organization taking full control of all agricultural activities in the irrigation system, with the exception of managing the canal system, which was put under the control of an irrigation agency, the Sistema de Regadio Eduardo Mondlane. After several reforms of the organization of production in the Chókwè irrigation system (Bowen, 1989; Veldwisch, 2015), including the stepwise distribution of land to individual farmers, in 1997 the Sistema de Regadio Eduardo Mondlane was replaced by the Hidráulica de Chókwè public company through a reform that included selling off old buildings, reducing staff numbers and devolving management responsibilities for IMT to newly created WUAs. These WUAs (*associações dos regantes*) were established around hydraulic units, mostly at the level of the secondary canal (*distribuidor*), typically covering 1000–2000 ha each. They were made responsible for water distribution and maintenance of the irrigation infrastructure from the secondary canals downwards. Hidráulica de Chókwè remained responsible for maintenance of the primary infrastructure and the distribution of water from it. Hidráulica de Chókwè's attempt to dissolve the producers' associations was opposed by the farmers, who wanted the associations to become members of the new WUAs rather than to be individual members (Pellizzoli, 2008). WUAs have had an important role in coordinating rice production with Hidráulica de Chókwè and external investors, as well as in land (re)allocations in some of the tertiary units (Veldwisch, 2015). But Hidráulica de Chókwè still plays a central role in the whole process of irrigation management and the coordination of production down to the tertiary level, making the WUAs auxiliary bodies to Hidráulica de Chókwè, with little autonomy or decision-making power over the O&M of the system. Our preliminary fieldwork findings also suggest that in the last few years Hidráulica de Chókwè has increasingly centralized irrigation- and production-related responsibilities and power, raising question about the effect IMT policies have actually had on water users' role in irrigation management.

Recapitulating, how the large-scale irrigation system of Chókwè is managed has been closely related to the organization of agricultural production, which moved from individual colonial settlers, via various models of socialist state farms, to mostly individual farms. Though IMT was implemented in 1997 alongside the creation of Hidráulica de Chókwè, the role of WUAs has remained marginal in O&M. Rather, they have come to play a role in the coordination of production alongside Hidráulica de Chókwè; this parastatal agency de facto manages irrigation O&M down to the tertiary canals, with a very limited role for WUAs.

### ***Malawi: formalization of an existing practice in smallholder irrigation schemes***

In the absence of large-scale public irrigation systems in Malawi, and a small and politically weak Department of Irrigation, the IMT policy mostly formalized an existing practice of state disengagement from irrigation management. This led WUAs to be caught in the ongoing struggle between local chiefs and the national government over control of natural resources.

During a period of large investments in public irrigation schemes, between 1967 and 1975, under the autocratic rule of President Banda, 16 public irrigation systems were established, covering a total of 3,600 ha and varying in size between 20 and 505 ha (Veldwisch, Bolding, & Wester, 2009). In the 1980s the government of Malawi had heavy financial constraints, caused by falling tobacco prices and increasing costs for (fuel) imports. De facto management of various irrigation schemes was partially handed over, even before an official IMT policy existed (Veldwisch, Bolding, & Wester, 2009). The financial situation led the government to seek support from the International Monetary Fund, the World Bank and other donors, who demanded the adoption of structural adjustment programmes as a condition for support (Nkhoma & Mulwafu, 2004). Under pressure from the international donor community, the focus changed from constructing new schemes to rehabilitating existing ones and combining this with farmer participation and cost recovery. Scheme management committees were set up in the public irrigation schemes (1989–94), following the institutional model for ‘self-help schemes’ developed under donor-assisted programmes, with full smallholder participation in design and construction.

In the final years of President Banda’s rule, donor support waned, but with the move to a more democratic system of government (from 1994 onwards) international donors re-engaged with the development of numerous agricultural and irrigation policies in the country (Nkhoma & Mulwafu, 2004). Under the dominant policy discourse, ‘less state, more market, more farmers’, irrigation-policy donors pushed for farmer management, cost recovery and water pricing. In 2001 the new National Irrigation Policy and Development Strategy was formally adopted, promoting full government withdrawal from the public irrigation schemes and their transfer to the still-to-be-created WUAs (Veldwisch et al., 2009). This did not prevent Japan from pressuring Malawi to maintain ownership and control over the 800 ha Bwanje Valley Irrigation System, the construction of which it was financing, and which on completion in 2000 became the largest public irrigation scheme in the country.

A series of donor-funded rehabilitation programmes were established, with the idea that these should be completed before transfer to the farmers (Mulwafu & Nkhoma, 2002). The latest of these is the World Bank-funded Irrigation, Rural Livelihoods and Agricultural Development Project (2005–2014), under which four public schemes were rehabilitated and formally handed over to WUAs (Posthumus, Baltissen, Mweninguwe, Veldwisch, & Beekman, 2014).

Ferguson and Mulwafu (2007) made a detailed analysis of two schemes (Domasi and Likangala) in southern Malawi, showing that the actual implementation of IMT policies was influenced by local history and context, and occurred within the field of authority over natural resource management contested between the state and traditional authorities. In Likangala the ‘transfer of authority’ was used by the state to ‘reassert its authority’ by orchestrating the scheme management committee’s selection and training through a local branch office of the Ministry of Agriculture (p. 221). By contrast, in Domasi the process was used by local elites (in alliance with traditional authorities) to strengthen informal land arrangements, including ‘renting and increased land concentration’ (p. 225). Van Beusekom (2011) describes how the government subsequently imposed new heads of the WUAs, some even from outside the local area, going against locally elected traditional authorities. In the conflict that arose farmers boycotted WUA

meetings and refused to accept WUA decisions on plot distribution for the different cropping seasons, because they did not recognize the WUA or its leaders as their representatives.

In conclusion, what we see in Malawi is a cash-strapped government that accepted decentralizing its administration and deregulating its economy under international pressure for structural adjustment. This did not pose many challenges for the irrigation agency, as it already practised a de facto hands-off policy on irrigation management. In the implementation of the policy, scheme management committees and WUAs became part of ongoing struggles for authority between local chiefs and the state, which was further coloured by local farmers' reluctance to take over irrigation management, as this brought responsibilities and financial obligations which they considered beyond their capacity.

### ***Zimbabwe: transfer 'by default' in smallholder irrigation schemes***

In Zimbabwe the introduction of IMT was a gradual and rather dispersed process, especially as the control and management of state agency-managed irrigation schemes was institutionally dispersed. In 1980 the country opened up for international development, aid agencies and NGOs, after the United Nations lifted the sanctions imposed on Rhodesia. The International Monetary Fund, supported by the World Bank and the African Development Bank, proposed turning over the smallholder irrigation schemes managed by state agencies to the farmers in the early 1980s (Madyiwa & Zawe, 2012; Zawe, Madyiwa, & Matete, 2015). In the years that followed, the smallholder irrigation schemes in Zimbabwe benefited from substantial investments from donor agencies. The IMT process targeted this same sector, managed by the Department of Agriculture, Technical and Extension Services, working in close collaboration with the Department of Water Development and the Department of Rural Development, all of which operated at the ministerial level (Zawe, 2006). However, these schemes represented only 5% (9,300 ha) of the total 172,000 irrigated hectares in 1999. At that time the lion's share (126,000 ha) was controlled and autonomously managed by large commercial farmers, followed by parastatal estates (13,500 ha). In 1983, the Department of Rural Development introduced irrigation management committees to help the state agency manage irrigation projects. Zimbabwe's economic structural adjustment programme, launched in 1990, was meant to herald a new era of modernized, competitive, export-led agricultural industrialization (Saunders, 1996). The programme led to a reduction of government subsidies, which hit the smallholder irrigation sector, making it impossible for the Department of Agriculture, Technical and Extension Services to sustain the O&M of smallholder irrigation schemes. The Irrigation Division of the department started to experiment with different ways of transferring the management of irrigation schemes. In some cases farmers were forced into joint irrigation management arrangements, and trials were made of the commercialization of irrigation services through the Agricultural Revolving Fund (Zawe, 2006). This period was characterized by a Janus-faced strategy in which on the one side farmers and commercial service providers were introduced into the O&M of irrigation schemes, while on the other side the state agencies tried to keep control of O&M in smallholder irrigation schemes through the operation of the primary infrastructure (Madyiwa & Zawe, 2012).

In parallel, between 1990 and 1999, the Zimbabwean government, in coordination with international support, was focused on developing new smallholder irrigation schemes and handing them over to farmers through the built-own-operate-transfer system that was run with farmer syndicates (Madyiwa & Zawe, 2012; Zawe, 2006). In 1998 a new Water Act, which greatly leaned on donor-promoted water policies, was put in place. The act centralized water-related agencies and responsibilities under the newly created Zimbabwe National Water Authority, operating under neoliberal principles (Kemerink-Seyoum et al., 2017). But in the early 2000s the Zimbabwean government declared bankruptcy, transferring irrigation management to farmers 'by default' (Bolding, 2004).

When the state agencies lost their operational capacity due to a lack of funds and personnel, farmers were forced to manage, operate and maintain their own irrigation systems. In the following years the country descended into mayhem as it transitioned to a state-managed economy. Privately owned 'white' farms were invaded, redistributed and (in 2005) nationalized as part of the 'Fast Track' land redistribution to native African people (Madyiwa & Zawe, 2012). In the political and economic turmoil, Zimbabwe's National Water Authority had little capacity to intervene in the irrigation sector, and international agencies were kept at bay (Kemerink-Seyoum et al., 2017). As a result, smallholder farmers (and those on redistributed irrigated lands) have had to use their own means to operate and manage their irrigation systems, with varying degrees of success.

Thus, after a long process in which irrigation agencies experimented with water users' participation in irrigation management, IMT basically came about 'by default' after 2000. Since 1980 international donors and development agencies, as well as the Department of Agriculture, Technical and Extension Services, had worked on the construction and rehabilitation of irrigation schemes and the development of users' capacity/engagement in O&M, but without turning over responsibility for the management of the main infrastructure. The bankruptcy of the state in 2000 put an end to this, as state agencies became unable to operate. Without state involvement in O&M farmers were forced to take over the management of their systems, with very divergent results (Madyiwa & Zawe, 2012).

## Analysis and conclusions

In this section we return to the central questions of this article: how the implementation of internationally advocated IMT policies was differently shaped across three scales in Mali, Mozambique, Malawi and Zimbabwe, and the relevant lessons for current policy implementation in sub-Saharan Africa.

We have focused on understanding how IMT was shaped by the interplay between international donor push, macro-economic dynamics, national policy making and the interactions with (and nature of) irrigation infrastructure, bureaucracies and organized users. Our analysis shows that the implementation of IMT changed form and meaning according to the context in which they were implemented. This led to variegated processes and outcomes that were all bundled under the shell of a common policy name.

By looking at how the different IMT policies were implemented we try to explain which factors and interactions influenced and shaped the policies across different scales. In doing so we focus on the main and most salient aspects of the cases, which necessarily leaves out many details. [Table 1](#) summarizes the main interactions at different levels in the four case-study countries.

**Table 1.** Overview of interactions regarding irrigation management transfer (IMT) at different scales in Mali, Mozambique, Malawi and Zimbabwe.

	International–national interaction	National–irrigation agency interaction	Irrigation agency–WUA/farmer interaction
Mali	In the late 1970s international finance institutions made investments in irrigation conditional on reforms of the Office du Niger. The Malian government long resisted this, but minor reforms to the agency in the 1980s and its reduced political power at the national level paved the way for IMT implementation in the 1990s.	IMT implementation only came about after the Office du Niger lost its political power in the national government and its monopoly over land distribution, water management and rice production and commercialization. This was the joint result of broader economic liberalization and technological changes.	In the 1990s, the Office du Niger became responsible for facilitating the organization of WUAs, and farmers gained more autonomy and became more active in the O&M of tertiary units. The Office du Niger still controls the main and secondary canals.
Mozambique	After years of state agency management, real steps towards IMT were made in Chokwè in 1997 with international funds.	Under national pressure, the institutions for irrigation management in Chokwè were reformed in the late 1990s when Hidráulica de Chokwè and WUAs were created. Hidráulica de Chokwè kept most of the power and is currently recentralizing its power over irrigation management and production.	WUAs were created to support Hidráulica de Chokwè but never became autonomous. They play a role in coordinating production at the local level but have little power in irrigation management.
Malawi	User participation started in the 1980s in the context of structural adjustment programmes after pressure by the World Bank. IMT processes were started in the 1990s, but in irrigation policy only emerged in 2000, together with rehabilitation plans. Adoption of IMT policies seems to have been instrumental to accessing international funds.	The irrigation agency is closely linked to the national government. The handing over of O&M was half-hearted; in the Bwanje Valley Irrigation System the bilateral donor did not want IMT to happen, and in other cases the state installed a WUA chairman and in practice kept control over O&M and plot allocation.	Locally, IMT became part of ongoing struggles for authority between local chiefs and the state. In Domasi local elites (in alliance with traditional authorities) used IMT to strengthen informal land tenure arrangements.
Zimbabwe	In 1990, IMT was introduced by international finance institutions as part of structural adjustment programmes and became an integral policy of external development agencies. In the early 2000s, the country became internationally isolated and the state became bankrupt, with funds for the irrigation agency drying up.	In the 1990s, there was a focus on new irrigation schemes, based on ‘build–own–operate–transfer’. In the early 2000s, the agency managing smallholder irrigation schemes had no operational budget, and IMT happened largely ‘by default’.	Smallholder farmers have had to rely on their own means for the O&M of irrigation systems, with varying degrees of success.

Looking at the relations between international donors and national governments, it becomes clear that in all four countries IMT was pushed, promoted and financed by donors in the water sector from the 1980s onwards. The long and phased processes that took place in the decades that followed went hand in hand with high-level negotiations with sitting governments as shifts occurred in national politics. These negotiations greatly determined when and how international donors were able to push their agenda, through conditional loans and targeted water reform programmes. These programmes were paired with budgetary cuts and (inter)nationally imposed economic restructuring. This shaped IMT in these countries where donors, NGOs and governments invested little in increasing the irrigation management capacity of WUAs, production capacity, commercialization or access to inputs and technical support.

In some of these countries the interface between the national government and the irrigation agency changed markedly. In Mali the Office du Niger greatly influenced how IMT was rolled out. Its strong political clout at both the local and national level initially held IMT at bay; the process was significantly postponed and only gradually implemented by a new government after the Office du Niger lost its powerful political position. However, because of the large scale (80,000 ha) and complexity of the irrigation scheme, the agency remained in control of all primary and secondary canals. In Mozambique, funder pressure led to the irrigation agency of the Chókwè irrigation system (26,000 ha) being replaced by Hidráulica de Chókwè, which found strategies to maintain and regain its power in both irrigation management and rice production, in the midst of reform.

In the countries with smaller agencies managing smallholders' schemes (Malawi and Zimbabwe), irrigation responsibilities were more dispersed institutionally, and farmer engagement pre-dated these reforms (going back to the late 1970s and early 1980s). As a result, open resistance to IMT from irrigation agencies was politically less significant at the national, regional and local levels. In most irrigation systems, O&M responsibilities were delegated to WUAs without much technical or managerial support and training.

At the local level, the responses to IMT were context-specific and very divergent. In Mali and Mozambique, WUA participation was organized for the tertiary and sometimes secondary irrigation units, while in Zimbabwe and Malawi WUAs acquired more control over the management of whole (albeit much smaller) formerly state-managed or co-managed smallholder irrigation systems. In Mali some local leaders or chiefs were eager to take over control over WUAs and irrigation management. In Mozambique the space for user engagement in O&M was very limited, and non-existent above the tertiary units. In Malawi and Zimbabwe smallholder irrigators were generally reluctant to take control of their irrigation systems, due to their lack of capacity to assume O&M responsibilities. In both countries there was a marked decline in the size of the irrigated areas, confirming that users could not cope with the challenges of irrigation management.

This seems to confirm Shah et al.'s (2002) warning that IMT could not be simply transferred to sub-Saharan countries, as well as Mollinga and Veldwisch's (2016) observation that the size and technology of irrigation systems matters, and interacts with the dynamics of national irrigation policies. Smaller, widely distributed public irrigation systems were readily abandoned by less developed and centralized irrigation bureaucracies. Smallholder farmers in Malawi and Zimbabwe had great difficulty sustaining these systems. In the countries with larger irrigation systems (Mali and Mozambique),

state agencies navigated IMT while managing to keep the irrigation bureaucracy and (parts of) the irrigation systems running with state/external support.

Our analysis of IMT policies across scales provides important insights on the inter-relatedness of policy implementation at different levels, i.e. the interplay between international donor push, macro-economic dynamics, national policy making and the interactions with (and nature of) irrigation infrastructure, bureaucracies and organized users. More detailed case-study-based anthropological insights on the interactions and processes that take place between the actors and brokers who make such policies at different scales would make a meaningful contribution to better understanding policy implementation and its impacts.

More than 20 years after the implementation of IMT in many sub-Saharan countries, there are still many important questions about the effects of these policies on the smallholder irrigation sector. To better understand these, we suggest that special research attention be given to:

- the new roles and modalities of operation that international donors, development agencies, national governments and their agencies have developed to engage with, and stimulate, the irrigation sector at different scales in each country;
- the strategies smallholder farmers in sub-Saharan Africa have adopted (individually and collectively) to sustain working irrigation systems and agricultural production within them (Woodhouse et al., 2017); and
- the effects these developments have had on agrarian livelihoods and livelihood strategies in different contexts.

Such analysis can inform policy makers at different scales about the strategies and policies that contribute to the development of more inclusive agricultural development in the irrigation sector of sub-Saharan African countries.

## Notes

1. We do not aim to construct a complete overview of where, when and how IMT processes were implemented in sub-Saharan Africa but focus on an in-depth analysis of these processes in four different national contexts.

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