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Winners and Losers of IWRM in Tanzania

Barbara van Koppen

International Water Management Institute (IWMI), Southern Africa Regional Programme, South Africa;
b.vankoppen@cgiar.org

Andrew K.P.R. Tarimo

Sokoine University of Agriculture, Morogoro, Tanzania; andrewtarimo2@yahoo.co.uk

Aurelia van Eeden

Department of Environment and Development Studies (Noragric), Norwegian University of Life Sciences, Aas, Norway; aureliave@me.com

Emmanuel Manzungu

University of Zimbabwe, Department of Soil Science and Agricultural Engineering, Harare, Zimbabwe;
emmanuelmanzungu@gmail.com

Philip Mathew Sumuni

Sokoine University of Agriculture, Morogoro, Tanzania; philipsumuni@yahoo.com

ABSTRACT: This paper focuses on the application of the concept of Integrated Water Resources Management (IWRM) in Tanzania. It asks: how did IWRM affect the rural and fast-growing majority of smallholder farmers' access to water which contributes directly to poverty alleviation and employment creation in a country where poverty and joblessness are high? Around 1990, there were both a strong government-led infrastructure development agenda and IWRM ingredients in place, including cost-recovery of state services aligning with the Structural Adjustment Programmes, water management according to basin boundaries and the dormant colonial water rights (permits) system. After the 1990s, the World Bank and other donors promoted IWRM with a strong focus on hydroelectric power development, River Basin Water Boards, transformation of the water right system into a taxation tool, and assessment of environmental flows. These practices became formalised in the National Water Policy (2002) and in the Water Resources Management Act (2009). Activities in the name of IWRM came to be closely associated with the post-2008 surge in large-scale land and water deals. Analysing 25 years of IWRM, the paper identifies the processes and identities of the losers (smallholders and – at least partially – the government) and the winners (large-scale water users, including recent investors). We conclude that, overall, IWRM harmed smallholders' access to water and rendered them more vulnerable to poverty and unemployment.

KEYWORDS: Integrated Water Resources Management, water law, basin management, taxation, Tanzania

INTRODUCTION

In the narrative of Integrated Water Resource Management (IWRM), the 3Es of Equity, Environmental sustainability and Economic efficiency, are often mentioned as three concurrent goals. However, over two decades of operationalisation and implementation of IWRM have shown that equity has hardly been achieved (WGF, 2012). This is part of the broader IWRM problematic – IWRM claims to be a universal and globally relevant concept, and yet there are key determinants vis-à-vis the fit or misfit of a

standard application of IWRM in a country, in particular the level of economic development and formalisation of water provision and water business (Shah, 2007). These issues are especially relevant for low-income agrarian countries, in which most water uses are rural, small and informal. Here, states primarily tend to seek to mobilise the required resources to develop water infrastructure to promote welfare (Shah, 2007). However, little is known about the precise processes in low-income countries that represent such misfits and generate winners and losers and, if so, who they are, which was the primary focus of the study *Flows and Practices: The Politics of IWRM in Africa*, which informed this Special Issue. As documented by several authors in this Special Issue, this is partly due to the vagueness of the concept of IWRM itself. IWRM came with donors' funding earmarked for the training of water professionals to translate, interpret and put IWRM into practice, often paying little attention to its socioeconomic context. The donor dependency, which has given rise to a whole IWRM industry that brings together donors and water professionals who tend to gain in various ways, has tended to blunt evidence-based analysis. The present paper seeks to make a contribution to fill this gap in Tanzania where IWRM was introduced in the early 1990s (Tarimo et al., 2014). The paper aims to identify whether and how winners and losers emerged during the introduction ('birth'), translation and interpretation of the concept of IWRM in policy and legal frameworks as well as its early implementation at national, basin and local levels (the 'life' of IWRM). The study is based on the review of literature and policy documents and on interviews with key stakeholders at all levels.

Our definition of IWRM is derived from the study's findings that, at the abstract level, the definition of IWRM in Tanzania aligns with the global definition of the Global Water Partnership (Mutayoba, 2002). However, events and concrete activities carried out in the name of IWRM in Tanzania centred on a few typical ingredients: a new narrative of water as an economic good and the promulgation and initial implementation of new water policy and law, which stipulate basin organisations, permit systems, environmental flows, and transboundary water management. We focus on these aspects, with the exception of transboundary management, which is beyond this paper's scope. Further, we operationalise the broad question about equity in IWRM in Tanzania by asking the question: how did IWRM affect access to water by smallholder farmers?

The next section provides the rationale for the focus on smallholder farmers. The following two sections provide a chronological analysis of context and relevant events. We then discuss the context of the late 1980s just before IWRM was introduced. This shows how key aspects of IWRM already existed. We further identify the 'birth' of IWRM as a strongly donor-influenced concept and trace the 'life' of IWRM during the upscaling of that concept into national policy and law, and expanding activities to implement IWRM and Integrated Water Resource Management and Development, as it was called later, in three river basins in Tanzania. Finally, experiences during the 25 years of IWRM are assessed in terms of winners and losers, and conclusions are drawn.

SMALLHOLDERS' POVERTY AND WATER USES

Smallholders' poverty and engine of growth

The reason for focusing on Tanzania's rural population many of whom are smallholder farmers, as an indicator for assessing equity objectives and whether IWRM is a fit or misfit in this regard, is that they are not only the country's poorest and most numerous citizens, but also the potential engine of growth. Overall, 64% mainland Tanzanians are poor and 31.3% live in extreme poverty, according to the Multidimensional Poverty Index (UNDP and URT, 2015). Poverty is worse in rural areas, where 73% of the population live (UNDP and URT, 2015). Moreover, population growth is fastest in the rural areas. At independence in 1961, Tanzania had a population of 10.1 million and, in 2014, thanks to a population growth rate of 2.8 and 4.95 children per woman the total population had grown to almost 50 million (Index Mundi, 2014). During this period, the growth in rural population was three times as high as the

growth in the urban population, in spite of massive urbanisation. For example, in Dar es Salaam, the country's capital, the population increased from 2.1 million in 2000 to 3.6 million in 2011 (Agwanda and Amani, 2014; Index Mundi, 2014).

The economic structure of Tanzania mirrored the importance of the rural sector for employment. In 2006, agriculture provided 77% of the total employment (UNDP and URT, 2015). Although cultivated area expanded, the faster population growth meant that average plot size fell from 1.3 hectares (ha) per household in the mid-1970s to 1 ha per household in 2005 (Skarstein, 2005). All the same, small-scale farming has become even more important as the mainstay of the rapidly growing rural population and, indeed, the country's potential engine of growth to overcome its current highly skewed 'jobless growth' (UNDP and URT, 2015).

However, in terms of contribution to GDP, agriculture has dropped while the agrarian structure has become more unequal. The high growth rate of 6% during the 2000s was primarily a result of foreign investors' extractive and (polluting) mining of gold, and also diamonds, iron, coal, nickel, Tanzanite, uranium and natural gas. Mining grew at an average of 13% over the 2000s and constitutes 40% of exports. Construction, manufacturing, services (especially communications and financial intermediation) and tourism also grew. The share of industry rose from 18% in 2001 to 22.1% in 2012 (UNDP and URT, 2015). The service sector is the largest sector in terms of output. For example, in 2012 it accounted for 44% of the GDP.

On the other hand, the share of agriculture to GDP fell from 29% in 2001 to 24% in 2010 (UNDP and URT, 2015). The export performance of the agriculture sector weakened, also as a result of declining global prices. The share of gross output of cash crops to GDP, mainly coffee and tobacco, fell from 6.7% in 1996 to 2.8% in 2010. The only success story is the horticulture sub-sector, which has grown at between 6 and 10% per annum with exports rising as well (UNDP and URT, 2015).

In spite of the economic growth of the 2000s, the poverty rate declined only slightly. According to the income-based poverty headcount of the 2012 Household Budget Survey, it declined from 36% in 2000/2001 to 33.3% 2007 and to 28.2% in 2012. Poverty persisted during the 2000s partly because food prices, which accounted for 44% of the cost of living for the majority of Tanzanians, rose more than prices of nonfood items. While the cheaper imported food was advantageous for poor urban net food buyers, it had the net effect of killing the markets for local producers. Poverty also persisted because, for the first time in history, the growth rates of employment shifted away from industry and services towards agriculture. The historical links between urban and rural economic growth were broken (UNDP and URT, 2015).

The agrarian structure became more skewed when the financial and food crisis of 2008 triggered large-scale foreign companies to invest in Tanzania's abundant land and related water (and mineral) resources for food and agro-fuel. By the end of 2010, they had requested over four million ha of land. By then, 70,000 ha of land had been formally leased to foreign investors (Oakland Institute, 2011). This was part and parcel of Tanzania's 'economic diplomacy', which saw the launch in 2009 of the 'Kilimo Kwanza' (Agriculture First) policy (Tarimo et al., 2014; see also van Eeden et al., this Issue). This policy has been criticised for favouring foreign big investors instead of the majority smallholder farmers. This is because in these land deals weaknesses in law are abused, sometimes with the complicity of politicians, government officials and unscrupulous village-level officials. As a consequence, peasant farmers and pastoralists have been sidelined, further aggravating their socioeconomic standing. Under this new large-scale production, Tanzanian wage workers risk becoming 'slaves' on their ancestors' land (Business Times, 2012). Similar large-scale land-based investments in sub-Saharan Africa have proved to become 'water grabs' at the same time (Mehta et al., 2012). Van Eeden et al. (this Issue) discuss how water grabbing has unfolded in Tanzania's Wami Ruvu Basin.

In this economic climate, self-employment in family farming for subsistence on smaller plots has become more important. The Tanzania Household Budget Survey records a rise in the percentage of

people working on their own farms out of total employment, from 57% in 2007 to 63% in 2014. Production for own consumption also gained in importance: while the absolute level of marketed crop production has increased over the past decade, the relative proportion of non-marketed crops appears to have slightly grown. Food crop production dominates. Out of the 5.1 million ha cultivated annually, 85% is for food crops. But productivity is a challenge (UNDP and URT, 2015).

Low and stagnating productivity is reflected in low technology use. About 70% of Tanzania's crop area is cultivated by hand hoe, 20% by ox plough and 10% by tractor. The use of fertiliser in Tanzania is only 9 kg per ha compared with 27 kg in Malawi, and 279 kg in China (UNDP and URT, 2015). Above all, productivity is low because most agriculture is rain-fed and vulnerable to seasonal fluctuations, droughts and floods. These uncertainties also limit the benefits that can be derived from expensive high-yielding seeds and fertiliser for high-value crops. Hence, improved access to water through water storage and conveyance infrastructure is pivotal for increased agricultural productivity. Higher smallholder productivity would not only improve smallholders' livelihoods but also provide food for markets at lower prices. This could revive smallholder agriculture as the engine of broad-based growth (Timmer, 1988). This sets the stage for the question that is examined in the remainder of this paper: how did IWRM affect smallholders' access to water? Next, we discuss smallholders' current water uses and the availability of water resources, as one of the conditions to expand water use.

Smallholders' underdeveloped water uses

Smallholders are not only the most numerous and the poorest citizens, but also the largest number of water users in Tanzania. Irrigation accounts for about 89% of the total water withdrawals (by volume), domestic water supply for 9% and industrial water for the remaining 2% (MoWI, 2010). The total irrigated area is about 500,000 ha (see below). About 80% of this is irrigated by smallholders, primarily as traditional informal self-managed irrigation (MoWLD, 2002). River diversions and cultivated wetlands, which are part of the traditional irrigation systems, existed well before the arrival of settlers (Hillbom, 2010). The other 15-20% are cultivated by sugar companies (Sukari, 2014), irrigated paddy enterprises and tea estates.

Tanzania has abundant water resources, which have yet to be developed. Tanzania has groundwater and surface water, inland and bordering freshwater lakes, wetlands and swamps. Total annual water withdrawal for various socioeconomic purposes is estimated to be 5184 km³, which is 6% of the total internal renewable resources. With an estimated 2000 m³/capita/year, the availability of the country's water resource is well above the level of 1700 m³/capita/year set by the United Nations as denoting water stress (MoW, 2014). The issue is the variability of water during the seasons and between different parts of the country. About one third of Tanzania, mainly the central and northern parts, receives less than 800 mm of rainfall per annum, and is classified as arid or semiarid. Moreover, the dry season is long, normally extending from June to October, which results in low seasonal river flows. In contrast, in the southern, western and northern highlands, which receive more than 1000 mm/year of rainfall, rivers are perennial and flooding is frequent.

The country's irrigation potential has hardly been exploited. Out of 44 million ha suitable for agriculture, the area suitable for irrigation is estimated to be about 29.4 million ha. Out of this, 2.3 million ha are classified as high potential, 4.8 million ha as medium potential, and 22.3 million ha as low potential (MoWI, 2009). Recent estimates of total irrigated area vary between 460,000 (Kamwelwe, cited in Mugarula, 2016) and 589,254 ha (Makoye, 2013). This translates to 2% of the full potential of irrigable land. In sum, water resources for further smallholder irrigation development are available. The question is whether IWRM provides a good platform to exploit this potential.

WATER MANAGEMENT IN TANZANIA: BACKGROUND AND CONTEXT

Rolling back the state

Julius Nyerere, the country's founding president, by the Arusha Declaration of 1967, ushered socialism as the country's economic philosophy. The Arusha Declaration adopted the vision of an African socialist state to spearhead state-led economic growth for self-reliance (Tarimo et al., 2014). Central to the inclusive economic growth was 'Siasa ni Kilimo' (Politics is Agriculture) based on modern technology including irrigation. It was envisaged that higher smallholder productivity would generate the surplus for autonomous industrialisation and independence from the foreign powers and markets which, otherwise, would derive disproportionate benefits and widen inequalities (FAO, 2011). The blossoming smallholder coffee and cotton cooperatives were converted into state-managed 'authorities' and became an important funding source for the ruling party. The National Food Corporation (NAFCO) led the transformation of the former irrigated estates into state farms (Tarimo et al., 2014).

The one-party state provided public education, health care, and domestic water. 80% of the dispersed population was resettled in the '*ujamaa*' villagisation from 1971 to 1974 to enable such service delivery. All land was nationalised, and managed by new village councils. There was neither place for tribal chiefs, who had become unpopular allies of the British, nor for ethnic sentiments among the over 120 ethnic groups (Tarimo et al., 2014).

A rigorous, militaristic top-down discipline co-existed with a remarkable reference to human rights and bottom-up, non-elite freedom of debate and the promotion of gender equality as enunciated in the Arusha Declaration. Top-down discipline and authority were also warranted because of the surrounding political and security uncertainties as a consequence of the country's support for the military liberation of other southern African countries. Tanzania, together with Zambia, were important springboards of the liberation movements. While the Russians provided military support and training, the Chinese also provided military and other forms of help, for example by building the railway to Zambia (Tarimo et al., 2014).

By the early 1980s, it became clear that the nationalisation and monopolisation of economic enterprises by the ruling party had not worked and was not working: productivity dropped; state enterprises became a drain on the national budget instead of contributing revenues; and funding for public services dried up. This was compounded by the global oil and debt crises and the regional Tanzania-Uganda war in 1978-1979 (UNDP and URT, 2015). The government initially reacted to the economic breakdown with self-guided adjustment efforts, but in 1985 it finally and reluctantly agreed on a Structural Adjustment Economic Recovery Programme. This adjustment was strongly influenced by the paradigm shift of the World Bank and International Monetary Fund (IMF) in the mid-1980s, and Nyerere stepped down – he could not steer the country into the new direction. The centrally planned economy by the one-party state shifted to a multi-party democracy from 1992 and a liberalised 'free market' economy followed (Wobst, 2001).

The state was 'rolled back' and many officials were retrenched. The former parastatals and state enterprises were opened up for sale to the private sector. Under its new strategy, dubbed 'economic diplomacy', the Tanzanian government launched a charm offensive to attract foreign investors. In 1997, the Tanzania Investment Centre was formed as a one-stop shop to facilitate such investments (UNDP and URT, 2015). In this process, politics and economy increasingly colluded. This was formalised in the Zanzibar Declaration of 1992, which allowed the party's politicians and civil servants to take up additional employment. This gave especially the party elite preferential access to land, water and other assets that used to be held by the state (Shiviji, 2009). They also became the gatekeepers for the growing number of national and foreign investors seeking land, water and, increasingly, minerals and gas.

This collusion of political and economic power fuelled widespread corruption and bribery, which has haunted the country ever since. Nyerere had instilled a high sense of moral among civil servants through his own impeccable example, and strict, if not dictatorial, control. However, when he retired in 1985, the new president Mwinyi appeared unable to control corruption in his government. Mwinyi's successor, Mkapa's promised to tackle corruption but this did not materialise.

Stringent cost-recovery measures became the mantra in public services (Mashauri and Katko, 1993), alongside local government and line agencies that further decentralised and expanded. Districts employed professional staff from village level upwards reporting to both their national line agency and the District Executive Director (DED) under the Prime Minister's Office of Regional and Local Government. The DED and District Development Committee interacted with the political arm of elected village, ward and district councillors. Decentralising local government, free and relatively fair elections, and gradual civil awareness-raising became the new mottos for bottom-up democracy (UNDP and URT, 2015). To what extent these new democratic structures facilitate the much needed further water development for the majority of smallholder farmers is the question which we explore hereunder.

Infrastructure development for multiple uses and basin boundaries

In the 1960s the post-colonial state supported by foreign agencies set out to develop water infrastructure to meet the range of water needs, both for smallholder agriculture and the growing water needs for hydropower and urbanisation. Boundaries for planning and implementation were pragmatic – they either followed administrative or river basin boundaries. The Food and Agriculture Organisation (FAO), for example, adopted a basin perspective as far back as 1956 in a study on determining the potential for irrigation development in the Wami Ruvu River Basin (FAO, 1969).

After independence the key ministry was the Ministry of Agriculture, which also employed young Tanzanian irrigation engineers who had obtained irrigation degrees abroad. In 1975, an irrigation division was established. In the new agricultural universities, irrigation departments were set up. Administrative irrigation 'zones' were established when the growing number of cadres enabled decentralisation into more zones. On the ground, irrigation officials collaborated with the local government. However, irrigation schemes were built according to top-down modern technical insights, and those of the aid agencies, such as the FAO. However, without stakeholder consultations, there were hardly any success stories of these investments (Majule and Mwalyosi, 2003; Tarimo et al., 2008). Informal farmer-managed irrigation was not recognised.

Initially, domestic water supply services were also housed in the Ministry of Agriculture. However, urban demands in Dar es Salaam and other towns were so specific that the water supply division was moved to another ministry in 1964. After the 1970 elections, a separate ministry was established (Zephania, 2015). The single Principal Water Officer who was responsible for the registration of water rights of the entire country (see below) moved with them. Hydropower generation and mining were added to this ministry. Over time, there were many combinations of sectors with the water ministry as shown in Table 1.

By the early 1980s, Water Master Plans were developed for larger-scale planning of irrigation, electricity, mining, and municipal uses. Foreign agencies, such as the Danish International Development Agency (DANIDA) and the Norwegian Agency for Development Cooperation (NORAD) supported this planning, motivated by a mixture of own economic interests and humanitarian development aid considerations. These master plans were based on administrative boundaries (DANIDA, 1983). Boundaries also served some degree of geopolitical interests and specialisation among the different donors (Hirji and Patoni, 1994). For example, Japan focused on the Ruvu Basin (Andersson, 1980). Considering the rapidly growing water supply requirements of downstream Dar es Salaam, they adopted a basin approach. By 1993 Japanese engineering firms for International Cooperation Agency

(JICA) had compiled a basin-wide resource development master plan for the Ruvu Basin (Macha and Mwakalinga, 1994).

Table 1. Ministries with water mandates in Tanzania since 1961.

Year	Ministry with water mandate
1961	Agriculture
1964	Lands, Housing and Water Development
1971	Water and Power
1976	Water, Electricity and Minerals
1978	Water, Energy and Minerals
1982	Water and Energy
1985	Water, Energy and Minerals
1987	Water
1990	Water, Energy and Minerals
1996	Water
2001	Water and Livestock
2006	Water
2008	Water and Irrigation Development
2010	Water
2016	Water and Irrigation

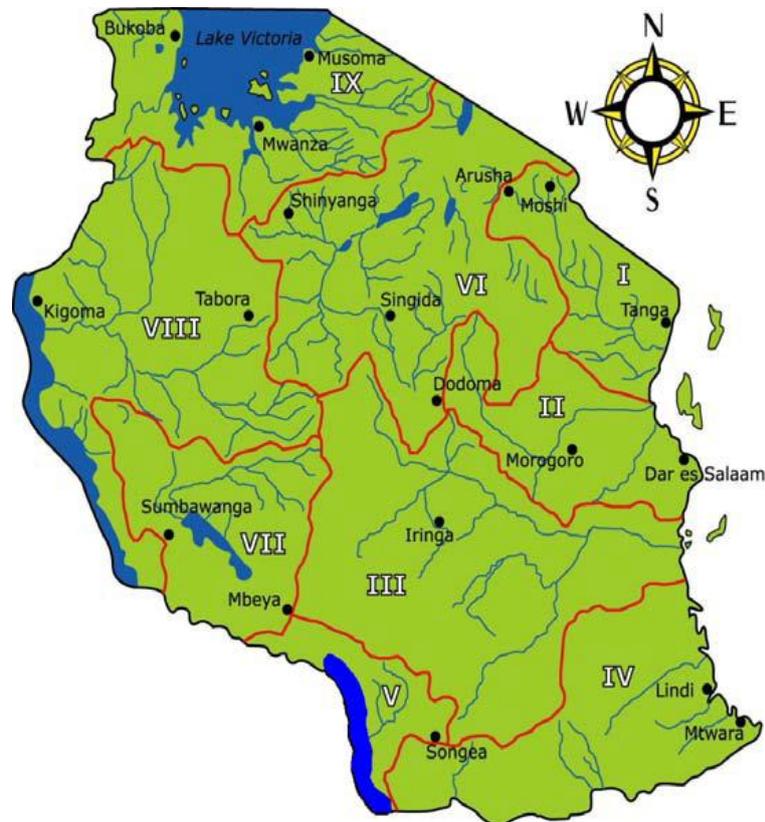
Source: https://en.wikipedia.org/wiki/Minister_of_Water_and_Irrigation

The river basin approach was widely adopted in hydropower planning, as downstream plants depended on upstream flows and uses. For a long time, hydropower was by far the most important source of electricity generation in the country and was provided by the nationalised parastatal Tanzania Electric Supply Company (TANESCO). Downstream in the Pangani Basin, the Hale power plant was built in 1964, followed by the Nyumba ya Mungu plant further upstream in 1969 and was supported by Norway. In the Great Ruaha tributary in the Rufiji Basin, the Mtera and Kidatu hydroplants, which function in tandem, were constructed between 1969 and 1981. This was supported by the World Bank and the Swedes. The Kihansi plant was added in 2000.

Nyerere had also envisaged the construction of the Stiegler's Gorge Dam, which would have the country's largest hydropower plant (2100 MW). The Rufiji Basin Development Authority (RUBADA) was established in 1975 for integrated planning of hydropower, smallholder agriculture and nature reserves. However, for economic and environmental reasons, the construction kept being postponed. By 2015, alternatives to hydropower had become more attractive: diesel and the recently discovered onshore and offshore gas reserves. By then, hydropower supplied only a bit more than one third of the country's energy needs (MEM, 2015). Electricity provision still favoured urban areas. In spite of recent rural electrification programmes, usage in rural areas was still only at 8%, while this was 49% in urban areas in 2014 (UNDP and URT, 2015).

Legally, the Water Utilisation (Control and Regulation) Act of 1974 mentioned Regional Water Officers and the option that the Minister "may declare any area and land to be water basin" (URT, 1974, section 7). In an amendment in 1981 (URT 1981), management according to basin boundaries was further articulated by dividing Tanzania into nine basins, as in Figure 1: Pangani (I), Wami Ruvu (II), Rufiji (III), Ruvuma and Southern Coast (IV); the (transboundary) Lake Nyasa (V), the internal drainage basin (VI), Lake Rukwa (VII), Lake Tanganyika (VIII), and Lake Victoria (IX). The amendment also stipulated that each new basin has a Water Officer and a Basin Advisory Board. The national Principal Water Officer has a Central Advisory Board. In this sense, basin boundaries and the design of the governance structure of basin management, typical ingredients of IWRM, already existed in Tanzania by 1981.

Figure 1. River basins of Tanzania.



Source: MoWLD, 2004.

Water rights

The other typical aspect of IWRM is the legal system of water 'rights' (a name that changed into 'permits' in the Water Resource Management Act of 2009). Although water law reforms in the name of IWRM are often portrayed as 'an innovation', the water rights system in Tanzania dates back to 1923 and was consolidated in the Water Ordinance of 1948, chapter 257 (TUTT, 1948). This water rights system was a massive colonial water grab: section 4 states that "the entire property in water within the Territory is hereby vested in the Governor, in trust for His Majesty as Administering Authority for Tanganyika" (TUTT, 1948). Initially, only settlers could obtain a water right derived from this colonial authority. One national Water Officer meticulously registered these rights holders and their 'lawful' abstractions. Customary water arrangements were recognised as existing legal arrangements, but sections 3 and 5 of the Ordinance stipulated that only the "duly authorised representative of natives" was recognised [section 13 (9)]. Moreover, in most cases, representation was only "in addition to the District Commissioner" [section 33 (9)] (TUTT, 1948). With a stroke of the pen, all prior and future local and customary water users became losers in any competition for water, at least on paper.

The Water Ordinance of 1959 (TUTT, 1959) expanded this water right system to cover everyone in the entire territory. Instead of the few hundreds of colonial settlers with relatively larger water-dependent enterprises, the law was to apply to the 10 million at that time and, in principle, 50 million citizens today. It stipulated that *all* those who 'divert, dam, store, abstract and use water' were required to register that use with the Water Registrar (Maganga et al., 2004). At the same time, it underlined that a formal water right, let alone just a registration, was no 'right' in the sense of state-backing of any property claims: "[n]othing in any such water right shall be deemed to imply any guarantee that the

quantity of water thereon referred to is or will be available" (art 15 (4)). By imposing one single law across the country, customary water rights regimes were entirely annulled.

The post-independence Water Utilisation (Control and Regulation) Act of 1974 replaced 'the Governor for His Majesty' by 'the United Republic' as the entity in which water was vested (URT, 1974). Other provisions simply continued. The Principal Water Officer kept the authority to allocate water rights to any citizens who 'divert, dam, store, abstract and use' water, with conditions as he saw fit. Only abstractions of water for domestic purposes, and only if this was without construction of any works (art. 10), were a right exempted from this obligation. A collective water right could be vested in a local association of water users. Applications for water rights needed to be communicated to those who might be affected, so they could express objections. Owners and occupiers of land could abstract groundwater up to a daily volume of 22.7 cubic meters (m³). Enforcement, on paper, was rigorous. After a written request by the Water Officer to remedy an offence, all Tanzanians developing water were declared offenders and liable to fines or imprisonment of up to two years, until they had applied for a formal water right and until the country's single Principal Water Officer had administered and approved the application. Unregistered customary and informal water arrangements became criminal.

Up to the 1990s, this water law was primarily a paper register of public water schemes and a number of individual water users. As procedures just to reach the single Principal Water Officer were long, it often took years after the construction of a public scheme before the right was finally allocated. For some uses a fee was introduced, for example for TANESCO's royalties. Public irrigation schemes also paid some amount to the Principal Water Officer. IWRM revived and transformed this largely dormant register.

THE BIRTH AND LIFE OF LATTER DAY IWRM IN TANZANIA

This section describes the birth and life of present-day IWRM in Tanzania in terms of how it all began and was implemented. The consequences of this on the majority of smallholder farmers are described in the following section.

Two basin offices for hydropower

In 1991, before the 1992 declaration of the Dublin principles, Tanzania's first basin office was established: Pangani River Basin Office, financed by NORAD. The establishment of this office was the condition for the Pangani Falls Redevelopment Project to go ahead. Further upstream, the Lower Moshi and Ndungu Irrigation Schemes sponsored by JICA had been completed in 1987. Both JICA's irrigation schemes and the hydropower plants were reliant on certain flow rates, and the Pangani Basin's Water Officer was given the task of bringing water use under control. In this zero-sum game, informal water users became the target. The officer identified 1015 abstractions with water rights and 1881 abstractions without formal water rights that were used by smallholder farmers. A crash programme was launched to install several hundred control gates to limit the abstractions of water for farmer-managed irrigation. Most of the new control structures were, however, broken down by farmers as soon as the constructors had left (Lein and Tagseth, 2009).

In 1993, the Tanzanian government financed a second River Basin Office in the Rufiji Basin. The Mtera-Kidatu power plants, the Ruaha National Park, and the Kilombero catchment for sugar cane are in this basin. The RUBADA questioned why they could not become the basin organisation with the authority to charge water fees, but this was rejected by pointing at the national legal framework (Hirji and Patorni, 1994). The World Bank financed the opening of a subbasin office in Rujewa, primarily with the aim to implement the water rights system in the Upper Ruaha Subbasin.

In 1994, the World Bank and a few European donors, in collaboration with the Ministry of Water, Energy and Minerals, initiated a Water Sector Review and a Rapid Water Resources Assessment in four

prioritised basins: Pangani, Rufiji, Ruvu and Lake Victoria (MWEM, 1995). DANIDA and the World Bank compiled a basin study for the Rufiji Basin (World Bank/DANIDA, 1995). A seminar on water resources management in Tanzania was organised to discuss the preliminary findings of this review, and other issues and international experiences relating to basin management (Hirji and Patorni, 1994). This was a first effort to synthesise the limited existing data on the availability of water resources. The seminar highlighted the need for cross-sectoral coordination, including the need for coordination among donors driven by government. Hydropower received much attention, as capable of providing an estimated 85-90% of electricity at the time (Msuya, 1994). Also, in line with the structural adjustments and dwindling government funds of the period, the need for cost-recovery of water infrastructure services was emphasised. Past practices were to be abandoned in which "social and political considerations have outweighed economic and financial considerations in the setting of water tariffs". Participants welcomed that 'water is now seen as an economic good', but this referred to a more stringent recovery of the actual costs of infrastructure and service delivery. This handful of professionals also still envisaged infrastructure development for all uses (Hirji and Patorni, 1994). This changed with the introduction of IWRM.

The concept of IWRM and its upscaling

The World Bank's next project, which started in 1996, was the River Basin Management – Smallholder Irrigation Improvement Programme (RBM-SIIP) (World Bank, 1996). The RBM-SIIP project was highly influential in translating the globally prevailing ideology of IWRM for Tanzania. The project management confirmed that the interpretation of IWRM in RBM-SIIP was "more or less the same as the definition of IWRM by the Global Water Partnership" (Mutayoba, 2002). The 1991 National Water Policy had largely focused on the need for more community participation in the design of water supply, also as a precondition for payment. Just five years later, the World Bank declared this policy as inadequate and introduced radical changes justified by a new notion of 'water as an economic good'. This had six aspects.

First, unlike the earlier agenda of developing storage and conveyance infrastructure to meet the range of growing water needs, the focus shifted to competition for water as a scarce finite resource. Implicitly, this assumed that the level of water development was bound to stay as low as it was. The assumption was that direct competition between agriculture and hydropower in a zero-sum game, as in the Pangani and Rufiji basins, was inevitable. Second, in such a competition, the highest economic value should have the priority. Hydropower got such priority over agriculture, irrespective of agriculture's role as an engine of economic growth. The emphasis on economic value was later somewhat balanced by considering the environment, narrowly interpreted as quantitative environmental flows. The environment also gained a higher priority than agriculture. Third, economic goods were to be paid for. This was not anymore just translated into cost-recovery for services provided, but there was also an obligation to pay for the use of the water resource. Fourth, as the World Bank reasoned: payment for water would support wise water use. Fifth, and most importantly, water fees collected by the Basin Water Officer would be the revenue to finance the new Basin Officers and the office's operations. The last aspect concerned the pivotal tool to achieve wise water use, namely water allocation to the highest economic value, and payment for the use of water resources to finance the new basin organisations. This tool was established by the revival and transformation of the dormant water rights system into a taxation tool.

The Smallholder Irrigation Improvement (SIIP) component of the RBM-SIIP project targeted smallholders to use less water. They should become more 'efficient' on their existing irrigated areas and certainly stop expanding new water uptake. The project constructed concrete weirs in river diversions that were supposed to enable such curtailment of water use (World Bank, 1996). The River Basin Management (RBM) component of RBM-SIIP financed the formulation and adoption of the new

concept in new national policy and law. The six aspects of 'water as an economic good' were upscaled nationwide, starting the life of IWRM.

An amendment to the law in 1994 introduced a fixed once-off payment for registration of a water right of USD40, plus the so-called 'economic water users' fees' proportionate to annual volumes of water allocated [in absolute volumes (m³) or flows (l/s)] (URT, 1994). In 1997, a Schedule of Fees for much higher amounts was promulgated (URT, 1997), with the introduction in 2002 of a more rewarding flat tariff for any small-scale uses, irrespective of factual uses (URT, 2002).

Further, Water Utilisation (General) Regulations in 1997 changed the status of the National and Basin Water Boards from advisory bodies to bodies that would oversee the work of the Central Water Officer and – still to be appointed – new Basin Water Officers. So the basin-level government officials became accountable to these boards. Moreover, membership of the Central and Basin Water Boards, given to those who used to come exclusively from government bodies, was opened up to non-State actors as well, including the private sector.

In 2002, the new water policy was promulgated, lifting the six aspects up to national policy, now also including the priority water needs of the environment (MoWLD, 2002). The policy was followed by the National Water Sector Development Strategy 2006-2015 (MoW, 2006). A new statutory water law was drafted with early drafts in 2004. It took five years before a new Water Resources Management Act in 2009 was promulgated (URT, 2009a). This confirmed the new parallel five-tier governance structure proposed in the National Water Policy (2002): national, basin, catchment, sub-catchment and water user association (the latter encompassing several wards sharing the same surface water source). A Water Supply and Sanitation Act was promulgated in the same year (URT, 2009b).

This course of events was hardly contested, partly because there was hardly any public debate on the new water policy and law. Issues were technical and complex and seemed legitimised by formal law. With the exception of a disagreement on the role of local government (see below), water officials generally accepted the World Bank's conceptual construction of physical water scarcity that ended the earlier primary focus on infrastructure development for all, promoted basin institutions, and invented a new taxation tool to finance water resource management functions by an increasingly under-sourced state to which, nevertheless, a new governance layer of tiered basin institutions was added.

THE LIFE OF IWRM IN THE PANGANI, RUFJI AND WAMI RUVU BASINS

The two main IWRM laboratories, the Pangani and Rufiji basins, were studied by many international and national researchers (Sabine et al., 2008; Lankford et al., 2004). In the Pangani Basin, the International Conservation Union (IUCN) implemented the Water and Nature Initiative (WANI). The project was the first to calculate an environmental flow in Tanzania (IUCN, 2010). On its part the World Bank undertook various projects to support the implementation of the transformed water rights system.

In the Rufiji Basin, the focus was on the Mkoji Sub-catchment and Usangu Plains in the Great Ruaha. Many stretches had always been ephemeral (Mwaruvanda, 1994), but the alarm bell was rung when the river was dry during more days than before in the dry season. This 'drying up of the Great Ruaha' was also assumed to profoundly negatively affect the downstream Ruaha National Park and the Mtera-Kidatu power plants.

The United Kingdom's Department for International Development (DFID) supported research from 1998 to 2004 to inform the water policy-makers of that period with hydrological and other scientific analyses on the causes of competition, and to advise on the drafting of the new policy and law, including environmental concerns. The research contrasted its empirical findings with the firmly entrenched views held by the various actors, who especially blamed small-scale and other irrigators. Instead, for example, it was found that the operators of the Mtera-Kidatu hydropower plants had been

too optimistic in releasing water in the wetter years, and had also miscalculated inflows from other tributaries. Further, it pointed at the existing feasibility studies for a dam that would provide sufficient water to the Ruaha National Park (Lankford et al., 2004). The World Bank appreciated this nuancing of its initial IWRM narrative, but the option of water development as a long-term and win-win solution, as this research also proposed, was still hardly discussed, let alone supported. The World Wildlife Fund continued with a project to organise smallholders in Water User Association and an apex organisation with the aim of conserving and fairly distributing the limited water resources.

In 2002, the third basin office was opened: the Wami Ruvu Basin office. The Basin Water Board consisted of eight government officials and two corporate sector representatives. As the Basin Officer summarised her role in implementing IWRM, IWRM was "a step-by-step and open-ended process of managing water resources in a harmonious and environmentally sustainable way by involving stakeholders" (Kalugendo, 2012; see also van Eeden et al., this Issue). As in other basins, the core of officers' work centred on the implementation of permits and waste discharge permits; the collaboration with the Basin Water Board; water resources monitoring; pollution prevention; awareness raising; and coordination of the basin's IWRM and development plan (Kalugendo, 2012). Building on their earlier work, Japanese consultants, funded by JICA, compiled a remarkably thorough and extensive basin development plan between 1994 and 2013 (MoW et al., 2013). Unlike the World Bank's narrative that shifted away from infrastructure development, JICA kept focusing on water development to meet the rapidly expanding water needs of all users, especially those of industrial and urban users in downstream Dar es Salaam. JICA found that earlier assessments of environmental flows in 2008 by USAID, IUCN and Florida University (Water Action Hub Wami Ruvu Basin, 2015) were overestimated and recommended a more flexible and context-specific assessment of environmental flows. The study identified and prioritised a range of project proposals. It remains totally unclear, though, who will finance and implement these projects.

The water sector status reports of 2010 (MoWi, 2010) and 2014 (MoW, 2014) evaluated how IWRM had fared since the water sector development plan of 2006. Based on these reports and further evidence from the above-described chronology of events in the name of IWRM, we now turn to answering our question: how did IWRM affect smallholders' irrigation? Who were the winners and losers?

WINNERS AND LOSERS OF IWRM

Losers

Stifling smallholders' access to water infrastructure

IWRM negatively affected smallholders' access to water in three ways. First, IWRM stifled Tanzania's water development agenda by shifting focus to the allocation of what was supposed to be a finite scarce resource. Winners and losers in this zero-sum game needed to be defined. Agriculture, largely consisting of smallholders, became the loser in this narrative – smallholders were the largest, most wasteful and, in the neoliberal economic model, most uneconomic water user. The water-sector reports reinforced the adverse view of smallholder farming as the thirsty overconsumer of 89% of water abstractions, complaining: "There are still a large number of traditional furrow irrigation systems that have not been improved and are responsible for high water losses because they are poorly operated and maintained" (MoW, 2014).

Competition was strengthened by adding the environment as a water user in its own right. The Water Resource Management Act (2009) consolidated a second priority to 'the environment', after domestic water uses. This is before "socioeconomic activities depending on the availability of water resources" (Water Resources Management Act 2009, Sub-section 6 (2)).

However, by the mid-2000s, the development of the country's abundant water resources was articulated again as primary goal: government's water sector reports added the 'D' of 'Development', to form Integrated Water Resource Management and Development (IWRMD). The World Bank and donors also returned to supporting irrigation development but now with stronger private-sector participation (World Bank, 2005). Indeed, the private-sector's investors in large-scale land- and water-deals were the main agents to take irrigation development forward.

While the water sector's overall budget also picked up from the mid-2000s onwards after the significant drop in foreign funding since the 1980s, the IWRMD component was marginal. Foreign funding by 19 Development Partners constituted 75% of the water sector's budget for the period 2006-2014. (Compare with 28% of foreign funding for Tanzania's overall budget (UNDP and URT, 2015)). However, the 2014 budget not only showed the marginal significance of IWRMD for government and donors, but also the continued lack of integration.

The 2014 water-sector budget consisted of four components, which were divided along the conventional subsector lines. As the smallest component, IWRMD received only 6% of the total budget. The IWRMD budget was mainly used for strategic infrastructure (from boreholes to dams), and for water resource monitoring stations. The other sectors, urban water supply, rural water supply and capacity building/staffing received 55, 32, and 7%, respectively. Thus, in spite of the strong narratives of integration, IWRMD was a subsector even *within* the water sector. Irrigation continued to be funded through the Agricultural Sector Development Plan's basket. Integration across sectors, for example with the energy sector, was even less.

Already since 2010 (MoWI, 2010), there was no funding for setting up permit systems:

The WRM Act (2009) requires all unrecorded rights to be registered within two years of the Act coming into force (August 1st, 2009). This is a legal requirement whose implementation requires adequate resources to implement specific activities including: awareness creation, extensive water use surveys and verifications, inventory of water uses, stakeholder consultations and engagements (with those with rights and those without water rights) through participatory processes. To implement this requirement of the Water Resource Management Act (2009) it is estimated that a total of USD4.5 million is required for all nine basins. There is, however, no allocation for this vital activity within the approved Water Sector Development Programme financing framework (MoWI, 2010: 45).

Exclusion from basin-level water resources development planning

Second, smallholders were excluded from the new governance layer of basin institutions and their decision making about water resource planning and water allocation. Decision making about the actual implementation of the revived permit system had added a significant new mandate. While this was decentralised from the central Water Officer to nine Basin Water Officers, it represented new top-down powers.

By 2012, all nine Basin Offices and Basin Water Boards had been established, and had started water resource planning. However, while many studies were conducted, the only IWRMD plan that had been finalised by 2013 was the above-mentioned report for the Wami Ruvu Basin by JICA. American universities were leading the IWRMD plan for the Rufiji Basin. In any case, this public information fitted the needs of foreign and national investors to identify the most fertile and well-watered (and most mineral-rich) land.

Representation of smallholders in the new basin institutions was weak, if not non-existing. Basin Boards were powerful because the basin officers were accountable not only to their national superiors but also to Basin Water Board members. However, representation in the Basin Boards was more open to the corporate private sector than to smallholders. Local government remained just one of the members of the Basin Water Boards, and yet local government is both an elected bottom-up stakeholder representation and the state's most localised hub for actual investments in water

development and water conflict resolution. Tanzanian officials had repeatedly contested this sidelining of local government in Basin Boards, for example in a position paper in 2003, and also before and after the promulgation of the Water Resources Management Act. However, this all remained in vain (Mwaruvanda, 2013, personal communication).

Further decentralisation of basin-level decision-making was through three more institutional layers according to hydrological boundaries that had also to be established from scratch. The bottom-up establishment of water user associations (WUA) was a non-starter because Basin Officers' primary aim of organisation was to reduce transaction costs for the collection of water fees. For example, in the Wami Ruvu Basin, 12 WUAs had been registered between 2002 and 2014 primarily to reduce transaction costs for fee collection. As found by Sumuni (2016), the roles and responsibilities of WUAs other than fee collection, remain unclear. Farmers questioned whether any other service was to be delivered and refused to pay membership fees without such service. Moreover, local water users challenged the authority of these water user associations to interfere in their local water management (Sumuni, 2016).

Thus, the acclaimed 'decentralisation' to 'participatory Basin Boards' in accordance with the 'subsidiarity principle' seems a thin cosmetic layer to further legitimise new top-down powers of Basin Board members, especially in implementing a revived and transformed water entitlement and taxation system. Basin management by basin offices opened new doors for winners in the form of large-scale users at the top. Smallholders, by all accounts, are losers as they have no practical way of being meaningfully involved, in the near future, in the new parallel governance layers.

The power of the corporate sector in water management, even beyond basin boundaries, is further illustrated by the case of the Southern Agricultural Growth Corridor of Tanzania (SAGCOT). In 2010, this partnership was forged with the aim of investing in the Rufiji Basin's land with minerals or fertile lands with ample water and mineral resources for sugar cane, maize, paddy and cassava cultivation. The main initiators were the USA, Norway, Ireland, Alliance for a Green Revolution in Africa, FAO, IFAD, World Bank, African Development Bank, the Tanzanian Agricultural Council, Tanzania Investment Centre and the Ministry of Agriculture. SAGCOT covers one third of Tanzania: the Rufiji Basin and parts of the Wami Ruvu and Lake Rukwa basins. SAGCOT recreated RUBADA as its 5% shareholder, beyond the three basin offices, with even more power to directly compete with local people's land, water and markets (SAGCOT, 2011).

Criminalising informal smallholder irrigators

Third, smallholders lost in the permit system. By 2014, 3680 water use permits (and effluent discharges and drilling permits) had been allocated across the entire country (MoWI, 2014). Thus, the overwhelming majority of informal water users in Tanzania were *de jure* criminals. Since 1974, their failure to apply for a permit can, in principle, result in imprisonment, set at a maximum of six months in the Water Resource Management Act (2009). However, even if the hundreds of thousands of smallholder irrigators had been informed about the law and had applied for a permit, state capacity would have been too limited to process even a fraction of their applications. The Water Resource Management Act recognises this by asking Basin Officers to also maintain an Unauthorised Abstractions Register (URT, 2009a).

Smallholders protested that God gave water for free to their ancestors (van Koppen et al., 2004; Mdee et al., 2014). Basically, they contested what had become a reality: the colonial 1948 Water Ordinance, which dispossessed all 'native' non-formalised water rights arrangements, in favour of a handful of colonial settlers; the 1959 Regulation which brought everyone under the principle that water uses are only lawful with a water right; and the independent State's continuation of dispossession of non-statutory legal regimes. IWRM not only revived this paper principle and enforced its implementation across the country among informal water users, but the transformation of this legal

system into a taxation tool pushed its enforcement even further. At best, smallholders can invoke living customary law that they see as legitimate. Obviously, the illegal status of such local arrangements erodes any bargaining position vis-à-vis water users with permits.

The weak and unfair bargaining position of water users invoking informal and customary water rights regimes vis-à-vis permit holders plays out within communities and between small and more powerful large-scale users. We discussed the possibility that permits could be introduced in an area with extensive development of community-managed canals in the Uluguru Mountains (van Koppen et al., 2013). The ward councillor reflected on the first-come-first-serve principle of permits and the type of ad-hoc organisation required for collective permits, which would undoubtedly be led by the more powerful male elite. She predicted: 'permits will create chaos'. The villagers did consider the risks of outside 'big investors' in land and water, and proposed a solution: vest permits in local government as an already legitimate mediator in any local conflicts and as the most local, legitimate organised representation of communities and their land and water resources vis-à-vis outsiders. However, IWRM's top-down governance layer denies this authority to local government. In sum, smallholders who irrigate informally are the pertinent losers of IWRM, for the moment mainly on paper and in discourse, but with continued enforcement, increasingly in reality as well.

Winners

The winners of permit systems, which are issued on a first-come, first-serve basis, are the formal, powerful, better-connected, administration-proficient water users, both foreign and national, including state officials. The formal approval procedure of an application through the Basin Water Board is usually administrative only. The corporate sector's informal contacts with Basin Water Officers, if not their formal representation in Basin Water Boards, ensures approval. No evidence was found of a genuine public participation process in which those affected by a new water abstraction were heard to negotiate benefit-sharing arrangements, although permits formally require such a process before approval. In any case, there are only limited data about water availability for the affected downstream users and Basin Water Officer to check. So access to first-class entitlements is relatively easy.

Moreover, permits are tradable, and there is ample scope for applicants to speculate and apply for larger volumes than those immediately needed. Unused water can later be sold to another new user. Or, in case the state needs to expropriate those waters again for public interest, as the Act allows, the permit holder might well demand monetary compensation from the state. The prevailing norm that 'investors should have enough security in order for them to make the investment' further legitimises such speculative behaviour. Yet, the big promises about major land-based investments are notoriously rarely realised in practice.

Is Government empowered to better regulate water use?

Is government with its Basin Offices a winner or loser of IWRMD? Government also lost, especially as a result of permit systems as supposedly effective tool for three goals at the same time: water allocation, revenue collection, and regulation in other fields, such as pollution prevention. In allocation water resources, permits created new problems, while no existing water-sharing problem was solved. This emerged from the evidence of the specific projects that sought to implement permits among small-scale informal water users, for example in the Rufiji Basin (van Koppen et al., 2004; Sokile, 2005; Mehari et al., 2009) and Wami Ruvu Basin (Mdee et al., 2014; Sumuni, 2016). The government's promise that permits would give better entitlements vis-à-vis competing neighbours, was attractive for small-scale users who heard first about it, in the logic of 'first come first serve'. These were usually men with close contacts with public institutions. However, this incentive disappeared once neighbours had also obtained permits. Without water control structures, and even without water monitoring structures, permits neither helped the Basin Water Officers nor the communities to mediate in times of conflict.

Moreover, an average annual volume, or even a seasonal average volume is useless in periods of water scarcity when nobody can get that average. Hence, over time, Basin Water Officers wisely toned down any promise of water security. They referred to the Water Resource Management Act that repeated the same as its contents in 1959: a permit is no guarantee that water is actually available. As found in the Pangani Basin, Basin Water Officers increasingly left the thorny water-sharing issues to farmers themselves (De Bont et al., 2015). Komakech et al. (2011) also found that large flower growers avoided invoking their formal power of a permit and, instead, negotiated with upstream and downstream local users for sustainable conflict resolution and labour relations.

The new goal of permit systems as water taxation tool created further losses.. Enforcement of permitting is vital for the basin offices to raise sufficient revenue to be able to carry out its functions, and probably the major incentive to implement. However, the government lost in taxation, first because the transaction costs to collect volume-based revenue among many small-scale uses were excessive and bound to lead to net revenue losses, certainly compared to the few large-scale users. For example, Sumuni (2016) found that 960 permits had been allocated in the WamiRuvu Basin. The 30 largest permits used 89% of the total volume of water allocated. These included five permits for Mtibwa sugar estates, and two for the biofuel company SEKAB. The other 930 permit holders only used 11% of the total volume of water, corresponding to a comparable proportion of revenues raised. Net losses could have been avoided by designing a lean, well-targeted cost-effective taxation tool that could have been enforced in many ways (as other forms of tax enforcement).

Second, in demanding fees, Basin Offices lost legitimacy among small-scale water users for two more reasons than those mentioned above. When permits were introduced in the Mkoji sub-catchment (Usangu Plains) smallholders did not oppose payment, anticipating that a public service would be delivered to them in return, in particular more secure access to water. However, as explained above, that failed. When the Basin Water Officers realised their practical inability to ensure access to water through permits, they allocated temporary permits only. Holders of temporary permits had to pay but could not claim any water (Mehari et al., 2009). When smallholders realised that their fees were 'disappearing in a black hole' they stopped paying.

A second ground for disgruntlement that weakened government's legitimacy was that permits were only partially implemented (as will remain the case). As Sumuni (2016) found, those who had paid for water found it unfair that others did not pay.

Last but not least, the government lost because providing entitlements in return for the payment of fees weakened the power of the state as regulator. Again, large-scale users won: the higher payments of large-scale users to the Basin Office became a strong but perverse incentive for the officers to generously allocate water entitlements to large-scale users. This not only jeopardised any effort towards wise water use, but it lawfully 'bribed' officials to protect the water rights of the already powerful large-scale users, at still a fraction of the profits that can be made from water. It even further weakened Basin Water Officers' already limited power to impose regulatory measures, such as pollution prevention.

CONCLUSION

The case of Tanzania confirmed the significant neglect of Equity aspects compared to the other two Es in the narrative of IWRM (Economic efficiency and Environmental sustainability). 'Equity', which focused on access to water by smallholders to contribute to poverty alleviation and to broad-based agricultural and economic growth, was far from being realised in the IWRM dispensation. IWRM got a life as national policy and law for basin-level planning (taking forward the master plans and basin plans of the pre-1990s); as (new) basin institutions according to the (pre-1990) basin boundaries; as a (revived and transformed) colonial permit system; and as (new) environmental flows. There was no deliberate well-thought-out strategy to ensure equitable water use. After 15 years of IWRM, the

government recast the concept as IWRMD to reintegrate infrastructure development in water policy discourse. After 25 years, IWRMD had only a tiny budget that was still isolated from other water-sector budget lines, and even more from other ministries and funding streams.

The water permit system perhaps epitomises inequitable water use. The design and early implementation of the transformed permit systems and basin institutions further marginalised informal smallholder irrigators. For the moment, this marginalisation is still largely discourse and paper policy and law. Yet, the evidence from the past 25 years raises new questions to address this marginalisation.

One question that needs to be addressed relates to the existing local and customary arrangements, including current and potential roles of local governments, as a starting point of rural water governance. How to protect and reconcile interests of existing local and customary uses with large-scale investors? Would local government be a good place? At higher aggregate scales, questions centre on democratic representation and lean regulation that strengthens basin offices' authority vis-à-vis powerful users. If permits are to be taken forward, questions would focus on their redesign for effective targeting, establishment of thresholds below which water uses are authorised without permit and possibly prioritised, and removal of unjust entitlements.

The more fundamental and broader question regards the rapidly growing majority of smallholders, who, often at no cost to the tax payer, invest in infrastructure to better provide for their own food security and to feed the nation. How can their potential as an engine of growth be unlocked not only by prioritising their existing water uses but also by investing in their accelerated water uptake?

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