6 Water Rights and Water Fees in Rural Tanzania

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Introduction and Background

Aim of the chapter

Tanzania is an agrarian country, which ranks 151th out of 173 on the Human Development Index (UNDP, 2002) and 80% of its 34 million inhabitants live in rural areas, where agriculture constitutes their primary economic mainstay. Agriculture contributes 48% to the gross national product (GNP). Physical water resources are relatively abundant in the coastal and highland areas, which receive well over 1000 mm of rainfall/year, but most parts of the drier interior receive less than 600 mm. An estimated 50% of all annual surface runoff flows into the Indian ocean and the large lakes (URT, 2002). However, temporal and spatial variability in rainfall and surface flows is high. Yet, Tanzania's level of infrastructural development to harness water and to mitigate nature's variability is still very low, primarily because of the lack of financial, technical and institutional resources to bridge the infrastructural gap. It is estimated that the naturally available land and water resources are sufficient for 2.3 million, 4.8 million and 22.3 million ha of high-, medium- and low-irrigation potential areas in the country respectively. However, currently, the total area under irrigation is only 191,900 ha, out of which 122,200 ha (64%) falls under traditional irrigation schemes (JICA/MAFS, 2003). The remaining 36% are medium-sized centrally managed irrigation schemes, owned by public and private institutions, primarily for sugarcane, rice and tea. More than 60% of energy produced in the country is from hydropower plants located in the Rufiji and Pangani basins, downstream of smallholder irrigators. Other economic sectors that utilize the underdeveloped water resources include livestock, forestry, mining, tourism, industry and fisheries (URT, 2002).

The priority in Tanzania's National Water Policy of 1991 was to further develop water resources for domestic and productive uses nationwide to boost socio-economic development. However, this changed drastically in the mid-1990s, when the Tanzanian government amended the national water rights system and, anticipating a redrafting of the entire water law, started implementing pilot experiments of this system in the Rufiji and Pangani basins. The amendment increased fees charged for the mere use of water, in addition to the fees users paid for service delivery through public infrastructure construction, operation and maintenance. The twofold aim of this new fee was cost recovery for basin-level water management services and fostering the wise use of what

 Irrigation Water Pricing (eds F. Molle and J. Berkoff)

was seen as a scarce 'economic' resource (World Bank, 1996). The new fees system concerns anyone who diverts and abstracts even the smallest quantities of surface and groundwater for productive uses and also includes all water users who invest privately in water infrastructure. In state-supported irrigation schemes, the fee is additional to the partial or full cost recovery of infrastructural construction, operation and maintenance – the latter type of fee is not further addressed in this chapter. Related to this fee payment is that all water users or groups are obliged to register with the Ministry of Water and Livestock Development to obtain a 'water right'. This is a certificate indicating the purpose and an annual volume of water resources to which the right holder is entitled. Water users have to pay an application fee at the moment of registration of the water right equivalent to $40,[1] plus an annual 'economic water user fee', proportionate to the volume allocated and depending upon the purpose of the water use. The minimum flat rate for uses up to 3.7 l/s for the annual economic water fee is $35.

In this new policy and law, the government also started advocating stronger user participation in the river basin Water Boards, which were fully governmental up to the mid-1990s. It further strengthened the establishment of Water User Associations (WUAs) at the lowest tiers, which were expected to manage water for multiple uses at village and ward level and were to be represented at higher levels, up to the basin level (World Bank, 1996).

With all ingredients present for what was then, at abstract level, seen as the best practice of integrated water resources management, but nowhere in sub-Saharan Africa really implemented as yet, the first results of implementation in the early 2000s appeared disappointing, at least among small-scale informal users, who constitute the large majority of water users in Tanzania. This was apparent in the Upper Ruaha catchment in South West Tanzania, the focus of this chapter. The Upper Ruaha catchment is a sub-basin of the Rufiji basin where, together with the Pangani basin, the amendment was implemented through the River Basin Management (RBM) project, funded by a loan from the World Bank. In the Upper Ruaha catchment, neither of the two goals of cost recovery for water management services by the government nor wiser water use to solve the water-scarcity problem has been achieved, at least among the majority of small-scale users. In contrast, fee payment by the few large users did contribute to achieving the goal of cost recovery for basin management.

This chapter analyses the implementation and impacts of the new water rights and fees system in the Upper Ruaha, which encompasses farmer-managed irrigation through river abstractions, the typical mode of irrigation in 64% of Tanzania's irrigated area. The second section analyses how the Tanzanian government, advised by the World Bank, suddenly abandoned its agenda of water development in the early 1990s. Justified by basin-specific, localized conflicts over water in the dry season, a water regulation agenda was introduced that put water scarcity and conservation nationwide at the centre stage. It describes how the new water administration that was put in place to effectuate that regulation agenda was grafted upon the formal legal framework that was inherited from the colonial powers since 1923. These colonial roots explain why water management has ever since been implemented by highly centralized water authorities. However, up till 1994, the administrative system of water rights remained rather dormant, and reached only few formal, large-scale users. The revival of that system, expansion of its implementation nationwide to also include the informal rural majority, and the drastic increase of the fees to obtain water rights were to generate revenue and self-finance government and the expanding basin-management institutions and activities. Payment and valuing water as an economic good were put forward as effective ways to stimulate water conservation and saving.

The three subsequent sections evaluate the implementation processes and impacts on the ground in the Upper Ruaha basin, distinguishing the three components of the water rights system: registration, cost recovery and water allocation. The third section discusses the strengths and weaknesses of

registration. As elaborated in the fourth section, the weaknesses of the registration render the system a shaky foundation for volume-based cost recovery among many small users. The fifth section highlights how the new water rights and fees system completely failed as a water allocation tool and aggravated upstream–downstream conflicts in the dry period. The sixth section concludes the chapter by identifying the adjustments required in the current water law in order to reach logistically realistic registration, cost recovery that generates net benefits for government, and government intervention in the water allocation issue that effectively support conflict mitigation during the dry season.

Background of the Upper Ruaha catchment

The Upper Ruaha catchment covers an area of 21,500 km^2 and forms the headwaters of the Great Ruaha river – itself forming a major sub-basin of the Rufiji river (Fig. 6.1). The catchment can be broadly divided into a surrounding high escarpment, the lower slopes and a central plain, named the Usangu plains. The plain receives 600–800 mm of average annual rainfall with a peak of 1500 mm observed on the high escarpment. There are five perennial rivers and a large number of seasonal streams draining from the escarpment. Most of the rain falls in one season from mid-November to May. The dry season is from June to November.

The population in the Upper Ruaha catchment which stood at 1.3 million in 1996 in this area has grown extremely rapidly, mainly because of a continuous influx of migrants. By 1990, 55% of the population consisted of migrants from at least 20 different ethnic groups – especially cultivators from the southern highlands. In-migrating livestock herders from central and northern Tanzania constituted 18% of the population,

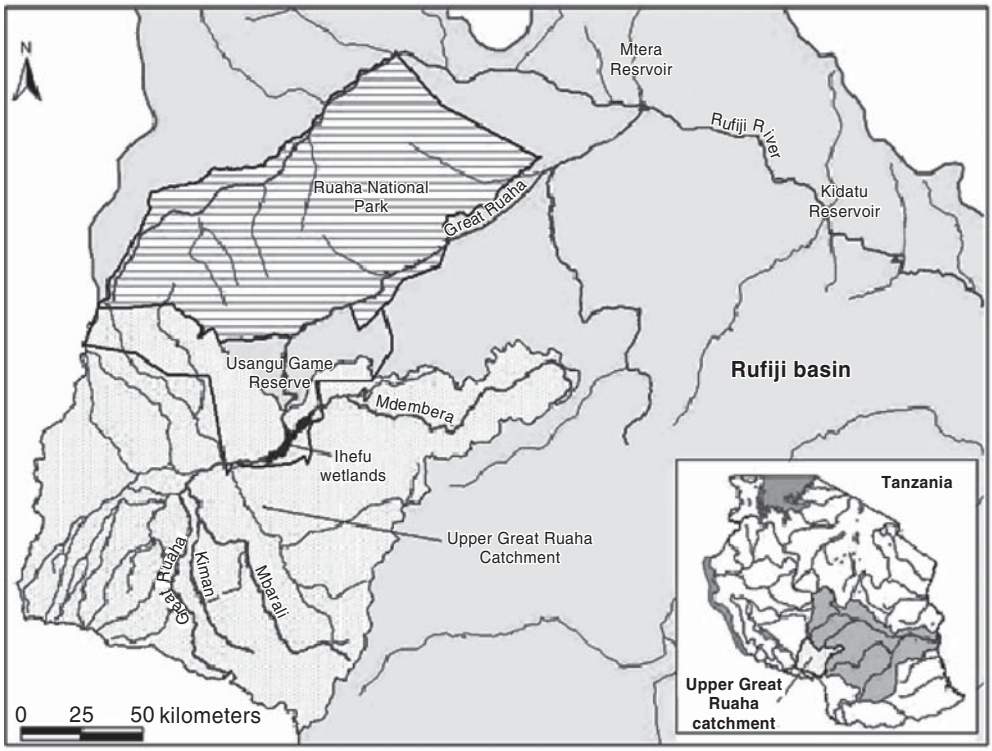

Fig. 6.1. The Upper Ruaha catchment.

and today they own the majority of herds in the area. They are concentrated in the downstream plains (SMUWC, 2000a,b, 2001). Since the government's gazetting (a notification of its legal status as a game reserve), and closure of the wetland area situated at the lowest point in the plains in 2002, pressure on land and water resources in the other parts of lower plains further increased. While the clans of settler-cultivators located upstream have kept their social structures somewhat intact in spite of Ujamaa villagization and the growing influence of local governments, the social cohesion among dispersed communities in the downstream plains is weaker.

Since the early 20th century, the original settler societies and the in-migrating cultivators started taking up irrigated agriculture in both the wet (paddy) and dry seasons (paddy and other crops, albeit in small areas) by abstracting water from the many streams. By blocking these streams with *dindilos* (seasonal weirs of wood and grasses), water is diverted into earthen diversion canals (Lankford, 2004). In the last two decades, external support was provided to replace some of these seasonal structures with permanent concrete structures. This saved the communities the recurrent efforts of rebuilding the seasonal weirs after the floods had washed them away. Unfortunately, these structures have not been made with a view of providing an easy and transparent way to apportion water between the canal and the river. Sluices are rudimentary and if it is not clear whether the maximum capacity of the intake is related to real needs, it is apparent that they have not been designed based on an analysis of the catchment overall supply and demand (nor on an idea of how to reduce diversions in times of shortage). In total, there are an estimated 120 offtake structures in the catchment, 70 of which are in the Mkoji sub-catchment. More than two-thirds of the intakes were constructed after 1970 (SMUWC, 2000a,b; Sokile and van Koppen, 2004). In the 1970s and 1980s, three state-owned rice schemes were initiated for smallholder cultivation at the lower slopes: Kapunga (3000 ha), Mbarali (3200 ha) and Madibira (3000 ha). In addition, 'valley bottoms' of small streams are cultivated in the high and medium catchment towards the south and west of the area. Recently, favourable markets for irrigated crops further increased demand for irrigated land and water. While prices for the original non-irrigated crops such as coffee and pyrethrum fell, prices and markets for irrigated vegetables and maize improved. Currently, the total wet-season irrigated area ranges from 20,000 to 40,000 ha depending on the annual rainfall. Most irrigated land is farmer-managed.

Farmers' own irrigation development has been accompanied by effective customary water management arrangements within and between schemes of a common stream. Community-based user groups govern the construction and maintenance of dindilos and diversion canals, and water distribution within the local schemes. Customary water management principles that contribute to this efficacy include water rights based on labour contributions, rotational water allocation within a scheme and, at times, some forms of rotation among upstream and downstream schemes, consensus building and conflict resolution before escalation, consideration for the weakest community members, and peer control with low transaction costs (Maganga, 1998; Sokile and van Koppen, 2004; Sokile, 2005). In the dry season, rotation between the respective schemes covers villages along long stretches of the common stream (Sokile, 2005).[1]

However, customary water-sharing arrangements between upstream and down-

[1]An example of customary interscheme water rotation (locally known as *zamu*, or 'turn') is the Mlowo tributary to the Mkoji river. At the beginning of the critical dry period, local leaders and canal committee members from four villages, other formal and informal water right holders, two private farmers, the government-owned Langwira seed farm, the NARCO ranch and representatives of pastoralists from four villages further downstream – Mahongole, Mhwela, Mwatenga and Kilambo – come together to agree on a weekly rotation. On Sundays, water is left to flow for domestic uses, including brick-making along the banks, and for the users further downstream that are not part of the *zamu*. The distance between the upstream and downstream participants is 24 km.

stream users came under considerable stress in the last two to three decades and they could not prevent the rapid growth in water abstraction in the upper catchment, and also by the three public schemes, which increasingly deprived the further downstream areas of the dry-season flows they used to have in the past. Some downstream dindilos and schemes have even been abandoned for this reason, while former perennial flows now dry up for some weeks in the dry season. Initially, village elders from the downstream areas organized official delegations to upstream communities and the public schemes, but without much effect (Video, 'Talking about Usangu', 2001). Some downstream farmers sought individual solutions and started to rentirrigable land in upstream farmer-managed irrigated areas.

Further downstream are the Ruaha National Park which requires a minimum flow of water for wildlife and tourists, and the Mtera and Kidatu hydropower plants. The Great Ruaha river fills these two dams with the floods during the rainy season; the contribution of the small dry-season flow is very limited. Hence, the remaining sections exclude the hydropower plants as stakeholders in the upstream–downstream conflicts in the Upper Ruaha catchment.

The Crafting of the New Water Rights and Fees System

Water legislation in Tanzania up till the 1990s

The system of water rights and fees designed in the 1990s and implemented in the pilot World Bank-funded RBM project builds on three key aspects of the formal water law and institutions introduced to Tanzania by German and British colonial settlers in the early and mid-1900s. First, the ownership claims to water by the state, rooted in the colonial origins of water appropriation, legitimize an even more far-reaching claim stipulated in the new water rights and fees system, which is that the government as owner of the nation's water resources is, therefore, also fully entitled to charge its citizens for the use of the resource. Initially, the settlers developed water rights systems in areas where they intensified their own agricultural water use, for example around Kilimanjaro. This enabled the regulation of their own local water use but, implicitly, this also entailed the exclusion of others without such water rights from formal entitlements. In 1948, the then colonial state enshrined this appropriation of water within the then prevailing colonial boundaries into formal law. The Water Ordinance of 1948, Chapter 257, stipulates in section 4 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'. After the independence in 1961, the new government under Julius Nyerere continued this principle, declaring that 'all water in Tanganyika is vested in the United Republic' under the Water Utilization (Control and Regulation) Act 1974, section 8.

A second aspect of the new water rights and fees system that has its roots in the colonial design of water management is the highly centralized, top-down nature of government institutions for water management. This absolute central state authority is delegated and expanded to lower tiers of regional- and basin-level water management institutions and Water Officers who are only accountable upwards. Since the Water Ordinance of 1959, the Minister has been appointing national Water Officers, vested with the almost absolute authority to make decisions regarding the allocation and changes of water rights. The Water Ordinance of 1959 and the Water Utilization (Control and Regulation) Act of 1974 prescribe regional officers below the national Principal Water Officer, all to be appointed by the Minister. From 1981 onwards, basin boundaries have been introduced to gradually replace the regional boundaries (URT, 1981). In the Pangani basin a Water Office was opened in 1991, supported by NORAD of the Norwegian government. In the Rufiji basin, the Water Office started in 1993 with government funds. These two basins were selected because of their importance for the

nation's hydropower generation. Over the years, the central Principal Water Officer and his delegates at regional or basin level had almost absolute powers in carrying out their key tasks of assessing whether new entrants applying for a right could be approved or not, and of issuing these water rights with or without attached conditions. Up till 1997, a Water Officer had only to 'consider', but was 'not bound to follow the advice'[2] of regional- and later basin-level government-appointed (Advisory) Water Boards. From 1997 onwards, the duties of the Water Officer became more specified and uniform (Water Utilization (General) Regulations of 1997).[3] Also since 1997, members of the Central and Basin Water Boards were to be drawn from public, private, NGO and women's organizations, instead of exclusively from governmental bodies. The National Water Policy of 2002 expresses the intention to further devolve authority for water rights allocation to Basin Water Sub-Offices at the 'catchment' level or even to local WUAs (URT, 2002), but this has not been implemented as yet.

Third, the core of the administrative water rights system through which government seeks to manage water has hardly changed either since the early 20th century. Registration to obtain a paper water license, permit or right from the recognized water authority of the area was already practised under German law, and then stipulated in the Water Ordinance of 1923 and every revision thereafter. With each legal revision, registered rights under any former Water Ordinance were continued in one form or another. Besides white farmers since the early colonization, other water users seeking registration included large-scale governmental and often foreign private-irrigated farms and forestry estates, and the Tanzanian Electricity Supply Company (TANESCO). Urban water supply was 'protected' under other specific legislation. Thus, 'water rights' strengthened the claims of large-scale rural and urban governmental and private enterprises of a predominantly colonial rural and later urbanizing formal economy, at least on paper.

The obligation to register played an important implicit role in the legal recognition, or not, of small-scale rural water uses under customary arrangements by the inhabitants of Tanzania. In the colonial era, the law gave some legal status to these existing uses, albeit a secondary status with specific conditions. Sections 3 and 5 of the Water Ordinance of 1948, Chapter 257, recognize earlier rights including those 'under the 1923 Water Ordinance, lawful mining operations, some claims under the Indian Limitation Act, and native law and custom'. For the latter, however, only the 'duly authorized representative' of natives is recognized (section 13 (9)). Moreover, under some conditions, natives are only recognized in addition to the District Commissioner (section 33 (9)).

This secondary status shifted into 'illegal use' once registration for water rights was made compulsory for all those who 'divert, dam, store, abstract and use' water. In the next Water Ordinance of 1959 (sections 11, 12 and 14) the option of registration was also extended to native water users, leaving the legal status of those who did not register their water use somewhat undetermined. However, the Water Ordinance (Control and Regulation) Act No. 42 of 1974 (section 14) rendered registration obligatory. It stipulated that registration for a right was the only way for any Tanzanian to ensure that his or her water use was considered formally legitimate (Maganga *et al.*, 2003). Hence, any de facto unregistered customary small-scale water use became de

[2]Water Ordinances 1959 5–(4); Water Utilization (Control and Regulation) Act 1974 6–(2).

[3]From 1997 onwards, through the Water Utilization (General) Regulations of 1997, the obligation to check comments about new entrants among those affected was further formalized, e.g. by stipulating that the Water Officer has to announce new applications through the Gazette, by notifying those who may be affected and those who are nominated in the Water Boards, and through announcements at the District Commissioner's office. This law also harmonized criteria and registration by promulgating uniform water rights application forms, which specify the purpose of water use and also the volumes allocated (not the volumes used) and annual or, if further detailed, half-yearly averages.

jure illegal and susceptible to legal prosecution (Kabudi, 2005). On paper, the formal water law declared the large majority of mostly illiterate rural 'traditional' small-scale water users, who were completely ignorant of the law, as offenders.

In practice, though, up till the 1990s, this water rights system remained largely dormant and served primarily as an incomplete register. Even though registration was formally obligatory, there was a silent consensus among water professionals that it was meaningless to impose the bureaucracy of registration designed for a few large-scale users on many small-scale users whose water use was fully legitimized under customary arrangements. For them, registration would hardly serve as a water allocation tool and certainly not as a fee collection tool. There was hardly any link between the registered use of water and actual state intervention for water allocation and conflict management, even for the larger users who did register. The certificate usually only mentioned the purpose of water use and conditions, if any, attached to the right such as water quality or obligatory return flows. The assessment of any volume of water allocated, if stipulated at all, was typically the Water Officer's best subjective guess of an average annual volume as measuring devices were virtually non-existent. Water Officers could regulate new entrants and stipulate conditions to be attached to certain water rights. They also had the formal power to curtail excessive water abstractions by title-holders and manage water-scarcity situations. Evidently, average annual volumes were of no use to regulate the low flows during the dry season, when scarcity problems are most acute. Underdeveloped infrastructure in most areas implied that there were hardly any devices to control water according to any agreement. Hence, Water Officers' intervention in water allocation and conflict resolution itself was subjective and largely based on top-down state authority. There was no formal accountability either, as the water law mentioned that 'nothing in any such water right shall be deemed to imply and guarantee that the quantity of water therein referred to is or will be available' (Water Ordinance, 1959, pp. 16-4; Water Utilization (Control and Regulation) Act 1974, pp. 15-4).

Similarly, up till the 1990s the colonial and post-colonial governments had never used the authority ascribed to itself to 'prescribe the fees payable in respect of any application or other proceeding under this Ordinance' since the promulgation of the Water Ordinances Chapter 257 of 1948 (35(d)). This authority was reproduced in the Water Ordinance of 1959 (38-2b), and the Water Utilization (Control and Regulation) Act of 1974 (38-2) but actual fees for registration were absent or nominal and they were only charged at the moment of registration in order to cover some of the administrative costs. No other fees were applied.

In sum, for decades this water rights system had remained a rather dormant administrative measure. The few large-scale rural and urban water users who registered could declare their own existing and expanding water uses as more legitimate than that of all (potential) water users who failed to register: typically the small-scale water users and the original rural inhabitants of Tanzania.

Legal reform in the 1990s

Blanket revival of the system with new fees

In 1994, a Subsidiary Legislation (Government Notice No. 347 of 1994 under section 38 (2) of the Water Utilization (Control and Regulation) Act No. 42 of 1974) was promulgated. This new piece of law not only revived the dormant registration system but also used the formal authority to charge fees and introduced, at once, a fixed once-off payment for registration of $40, plus the 'economic water users fees'. The annual economic water user fee was proportional to annual volumes of water allocated (in absolute volumes [m^3] or flows [l/s]) and depended upon its use. Three years later, in the Water Utilization (General) Regulations of 1997, a Schedule of Fees for much higher

amounts was promulgated. The tariffs were slightly revised in the Water Utilization (General) (Amendment) Regulations, 2002 (see Tables 6.1 and 6.2 in the Annex). The main difference with the list of tariffs of 1997 was that for small uses below 3.7 l/s, charges were not volume-based anymore. Instead, a flat rate of $35/year was applied, irrespective of the actual flow or volume used. The motive for this decision was that one uniform legal system for all was pursued, while the majority of water users in Tanzania fell under this category and 'one cannot exempt a majority from cost recovery' (senior water manager, Iringa, 2004, personal communication). Charging a flat rate for those who would otherwise be exempted from any payment would increase tax collected while avoiding the hassle for the Water Officers of setting rates for lower amounts than the minimum flat rate – but at the expense of the small users who now had to pay disproportionate amounts. Besides including these drastic new fees in the national administrative water rights system on paper, implementation of the full-fledged system was effectively taken up in the Pangani and Rufiji basins.

Drivers of the reform: from water development to water regulation

This change of a dormant administrative system for a few large-scale water users into a blanket cost recovery system for water management fell in a period in which Tanzania also introduced cost recovery for many other government services, such as domestic water supply, health services and education – radically breaking with the socialist past, in favour of structural adjustment and privatization programmes. Similarly, a much larger portion of operation and maintenance costs of irrigation schemes was transferred to the irrigators, although investments in capital costs are still seen as at least a partial government responsibility. The new water fees were one of the several new financial burdens for Tanzania's citizens. The simultaneous decrease in government's own financial resources increased the attractiveness for the government to explore options for raising money out of 'its' water resources.

A driving force behind the transformation in the water sector was the Rapid Water Resources Assessment in 1994/1995 supported by the World Bank and DANIDA (URT, 1995). Findings of this mission were used as inputs into the Staff Appraisal Report (World Bank, 1996) for the formulation of the River Basin Management and Smallholder Irrigation Improvement Project (RBMSIIP) that started in 1996 with a loan from the World Bank. The design and pilot-testing of the legal reform under the RBM component is implemented by the Ministry of Water and Livestock Development.[4] The drafting of the new National Water Policy of 2002 is part of the same project and reflects the same assumptions.

The diagnosis in these various documents is that there would be an urgent need, nationwide, to shift away from the water

[4]The River Basin Management component 'would fund interventions designed to improve water management both at a national level and in the two target basins. Activities to be funded include: (i) strengthening national water resources management by reforming the regulatory framework to improve stakeholder participation in basin management, strengthen the water rights concepts and management, increasing penalties and raising fees for water use and improving information gathering and analytical capabilities at the national level; (ii) improving both the regulatory capabilities and the information and resource monitoring capabilities at the basin offices in Rufiji and Pangani; and (iii) rehabilitating the hydrometric network in the Rufiji and Pangani basins' (World Bank, 1996, Section 2.8). The loan disbursed for the River Basin Management and Smallholder Irrigation Improvement Component to the Tanzanian Treasury under the Development Credit Agreement amounts to $18.2 million Special Drawing Rates (equivalent to $26.3 million) to be reimbursed within 30 years after the first payment, due in October 2006. Till 2016, the interest rate is 1% and after that, 2%. The RBM component comprised slightly more than $10 million. The latter was to support the national Water Resource Department and office of the principal Water Officer through specialized equipment, vehicles, training and technical assistance. The two basin offices were to be provided with equipment, training and technical assistance (Section 2.18). After project closure in 2004, part of these costs is to be borne by the basin inhabitants.

resources development agenda of the National Water Policy of 1991, which the Government of Tanzania had just adopted. Instead, a regulatory agenda would be needed, because in two of the nine basins, the Pangani and Rufiji basins, 'there are serious user conflicts, deterioration of resources due to misuse and lack of comprehensive planning and management mechanisms' (URT/MOW, 1995). In the Rufiji, upstream water use was believed to have reduced electricity delivery by the Mtera–Kidatu power plants, which caused electricity rationing in Dar es Salaam in 1993.[5] Hence:

> [A] framework is needed for preventing and resolving conflicts among competing users and for regulating demand. The conflicts surrounding the inflow and use of water in the Mtera reservoir crystallize the issue. With . . . an emphasis on drainage of wetlands, so land can be used productively and other water development and flood control structures, the 1991 National Water Policy may result in actions which further degrade environmental quality in Tanzania. The Bank and the Government would collaborate on the refinement of the National Water Policy under the project.
>
> (World Bank, 1996, section 1.27)

'The conflict in the demand for water can only be resolved through more transparent, structured allocation and control mechanisms for basin water resources' (World Bank, 1996, section 2.1). Even though only two of the nine basins are mentioned as having water-scarcity problems, the shift from the water development agenda to the water regulation agenda was seen as a matter of new national policy and a new uniform nationwide framework, without any explanation.[5]

[5]Recent studies by Machibya *et al*. (2003) and Yawson *et al*. (2003) show that the reduced electricity production in 1993 had no relationship with upstream water flows, but had been caused by deviating from the originally designed management arrangements of dam storage within the stretch between Mtera and Kidatu.

Fee payment to recover costs and deter water use

The solution to this growing competition over water proposed in the RBM project was to further increase the 'economic water users fees' that had been introduced in 1994 and 'which is recommended to be redefined as a tax on water use assessed to cover the costs of operation and maintenance of basin monitoring and regulatory facilities' (World Bank, 1996). According to the Staff Appraisal Report, the key weakness of the existing law had been that neither the economic water users' fees for all productive water uses nor the service charges only for those using public infrastructure cover the true cost of managing the resource. According to the report, this had caused two problems:

> In both the water supply sector as well as in irrigation, insufficient revenues are generated to cover operation and maintenance costs. The quality of the service and of the water received is undermined. A second problem is that the low tariffs encourage inefficient use of water and waste by industry, consumers and irrigators.
>
> (World Bank, 1996, section 1.28)

The introduction of economic fees was expected to solve these two problems at the same time. First, such fees would enable self-financing of basin and catchment Water Offices and Water Boards. In other words:

> With regard to the 'economic water users fees' to be collected by basin Water Officers, it is proposed under this project that these rates be raised to a level which would provide sufficient funds to support the administration of basin Water Offices, including the collection of information on water quality and availability, the enforcement of pollution standards, and the administration and monitoring of water rights.

Functions of Basin Water Boards encompass:

> the issuing of water rights and registration, regulation and enforcement, but also water resources exploration, assessment,

> pollution control, monitoring and evaluation, environmental protection, basin planning and development and other cross-sectoral activities.
> (URT, 2002, p. 50)

Second, payment of fees was expected to contribute to managing water as an economic good. Volume-based fee payment would enable 'the allocation of water as a public good and as an economic good with a value in all its competing uses and the use of a water user fee as a means of encouraging efficient use of the resource and for meeting the cost of regulatory functions'. The National Water Policy expresses the same expectations of fee payment for cost recovery. 'Economic instruments include water pricing, charges, penalties and incentives to be used to stimulate marketing mechanisms, and serve as an incentive to conserve water, and reduce pollution of water sources' (URT, 2002, p. 7). Further, 'decision making in the public sector, private sector and in civil society on the use of water should reflect the scarcity value of water, water pricing, cost-sharing, and other incentives for promoting the rational use of water' (URT, 2002, p. 21). 'Economically, trading of water rights, application of economic incentives and pricing for water use, shall be gradually built into the management system as a means or strategy for demand management and water conservation' (URT, 2002, p. 30).

The practical implementation of the proposed 'enhancement of water fees and pollution charges as incentive for water conservation and pollution control, and as a source of funds for water regulation activities, catchment conservation, and water resources monitoring' (World Bank, 1996, annex A) would be via the Water Officers.

> The basin Water Offices will be mandated to collect revenue such as fees and charges and to be used to meet the cost of regulatory functions and financing of water resources assessment services. The Minister of Finance has already authorized the basin Water Officers to collect user fees and operate a bank account for the use of such funds. The basin Water Offices and basin Water Boards will be required to account for the use of these funds, which will also be audited annually by Government auditors as is occurring with other public funds.
> (World Bank, 1996, annex A)

Thus, by 1996, referring to the economic water fees, 'plans were in effect to progressively increase water tariffs throughout Tanzania and to be continued under the present project' (World Bank, 1996, section 1.29), and 'it was agreed that Government will, by December 1996, revise existing regulations so as to increase the water user fee to a level sufficient to cover operating costs of the river basin offices' (World Bank, 1996, section 2.17). These plans led to the above-mentioned schedules in the Water Utilization (General) Regulations of 1997 and its amendment of 2002, and were also reflected in the National Water Policy which seeks to 'ensure financial sustainability and autonomy of Basin Water Boards' (URT, 2002, p. 26), especially 'by charging water use for productive purposes' (URT, 2002, p. 50).

Water use registration system as the basis for fee payment and water allocation

The existing administrative water rights system was welcomed as a good and readily available basis for fee payment and also actual allocation and regulation. The system was expected to perform well; it just needed to be implemented.

> The conceptual framework for integrated river basin management is already laid out in the 1974 Act, as amended in 1981. However, the legislation has never been effectively implemented. The Government has submitted a letter of Water Resources Management Policy outlining measures to be taken to update the legislation and improve management of this resource.
> (World Bank, 1996, section 2.13)

The expectations regarding the effectiveness of the existing administrative water rights system as a water allocation and regulation tool were also high:

> The administrative system, centralizing information for the river basin, should: (i) be in a position to control withdrawals of surface and groundwater by issuing and revoking water rights; and (ii) know at all the times the quantity of water available in the basin, and its use, by monitoring both the sum of water rights granted, and physical availability.
> (World Bank, 1996, section 2.24)

Similar optimism about the existing system as an effective tool to curtail water use was expressed in the National Water Policy of 2002. The key legal instruments to be adopted would 'include restrictions and all prohibitions imposed by the regulatory body and the Government. These are individual licenses for abstractions and their revisions' (URT, 2002, p. 7). Yet, some problems in implementing the new legal framework were anticipated. It was recognized that 'water rights applications required a fairly lengthy procedure' (World Bank, 1996, section 1.24) and that 'data on precipitation, hydrometric data and actual abstractions for irrigation is inaccurate and sketchy' (World Bank, 1996, section 1.25). Six years later, the problem is still serious. 'Currently the data collection networks are in a state of near total collapse due to lack of adequate resources and tools' (URT, 2002, p. 35).

Problems in registering, charging fees and managing water allocation among many scattered small-scale water users under customary water management arrangements were also foreseen. Three possible solutions were mentioned. First, long-term government measures would include 'encouraging smallholders to form groups, especially smallholder farmers, which will make it easier to collect the fee from the groups, rather than from individual users' (World Bank, 1996, annex A). Second, a review of the institutional framework was foreseen that would address:

> the strengthening of the water right concept by: (i) clarifying how the vesting of all water in the State, with the Government sanctioning all uses, affects customary water rights, exercised by riparians or livestock owners or other traditional users, who have not sought, nor been given water rights under the law; (ii) clarifying the cases in which the State is entitled to modify or withdraw this water right (now very broadly defined, and permitted whenever water is required for a public purpose).
> (World Bank, 1996, section 2.15)

A third solution was to introduce fee payment in a phased manner.

> The actual user fee will be levied first on economic activities such as hydropower production, and large farms, followed by levies on smallholder farmers. The related fees will gradually be built into the management system that touches all users with the ultimate objective of promoting conservation and minimizing abuses.
> (World Bank, 1996, annex A)

The Water Utilization (General) (Amendment) Regulations of 2002 already include all water users as proposed for this last stage.

'At the start, we thought it would be easy', commented a senior Tanzanian staff member of the RBM project in 2003. The findings of the factual implementation of the new water rights and fees system in the Upper Ruaha catchment demonstrate that none of the above-mentioned assumptions are valid with regard to small-scale water users in that area, and most probably elsewhere in Tanzania. However, among the few large-scale water users, the new system appeared to work for fee payment for cost recovery.

Registration Tool: Limited Information

Available data: names and uses

The Rufiji Basin Water Office in Iringa has started to compile a considerable list of names of water users and the purposes of their water use. By mid-2003 the database contained 990 water rights issued in the entire Rufiji basin, with 40% of the titles held by governmental agencies, 12% by Brooke Bond Tea Company and 8% by various Catholic dioceses. The

remaining 40% of registered users include private irrigation schemes, such as those belonging to Baluchistani and other Asian immigrants who were brought by the British colonialists (Sokile, 2005).

Of all water rights 14% were issued between 1955 and 1960. The number steadily increased over the years. From 1995 onwards, registration intensified with more than 29% of the rights administered under the new Rufiji Basin Office, though these are largely still in the stage of application or with a provisional status. The right holders utilize water mostly for domestic purposes, followed by irrigation, but often also in combination. Livestock is sometimes explicitly mentioned, and sometimes considered under domestic purposes. Water rights for hydropower constitute 3% of rights, while industrial use constitutes only 2%. The cadastre of the Rufiji basin also stipulates the status of the water right, which includes those who abandoned the use of their water right. As many as 47% of the registered rights are 'not operated' any more. The proportion is highest for the oldest rights, and may be related to the outflow of Germans, Baluchis, Greeks after independence in 1961 and the Arusha Declaration in 1967, which announced further nationalization. However, even in the most recent applications, abandonment of the water right occurs (Sokile, 2005). Probably, other cases of abandonment of water rights, e.g. by people who have died or moved out of the region, have not been notified as yet.

In the Upper Ruaha catchment, requests for water rights are first processed in the catchment sub-office, before being brought to Iringa, 300 km away, for final approval by the Basin Water Officer and incorporation in the register. In this catchment, more than 100 water rights have been issued, including water rights for individual farmers and farmers organized in Water User Associations. Slightly more than half (56) of the water rights are in the Mkoji sub-catchment, and are mainly issued for irrigation purposes. Most rights in this sub-catchment, especially those among smallholders, were issued in the late 1990s or recently under the RBM project, especially since the opening of the Rufiji Basin Water sub-office for the Upper Ruaha catchment in Rujewa, Mbarali district, in 2001 (Sokile, 2003).

An inventory in the whole Rufiji basin of the 990 names of the individual or collective water users, their main uses and the operational status of the right are an obvious first step for any cadastre. However, many actual water users have not been registered as yet. Recently, an inventory of unregistered water users in the Rufiji basin was conducted, which estimated that the number of unregistered users is 573, so more than half of the registered users (Msuya, 2003).

Estimates: Sites

Any information other than names and purposes of water use becomes much more problematic. Information about the sites where water is used is only documented in the register by mentioning names of the larger streams and the nearby villages and wards. There are no detailed maps, coordinates or map references to provide more precise information attached to the cadastre. While water rights would still allow estimating water availability to some degree at aggregate levels, this lack of clarity of the sites of water rights renders formal water rights a meaningless, if not a counterproductive tool, if it is used in localized water disputes. Indeed, in one dispute, the issue at stake was the location of the water right, which, according to the disputant, differed from the site mentioned on the certificate (Maganga *et al.*, 2003).

Lack of data: volumes

An even weaker part in the registration system concerns the figures for annual volumes of water use. Only 28% of the rights registered have any specified volume at all. However, even for this portion, the variation in annual volumes allocated shows that mistakes have been made, for example, in registering and entering the place of the commas and the number of decimals. As yet, there is hardly any registration of half-yearly average volumes, differentiating the rainy and dry seasons (Sokile, 2005). This lack of reliable

and accurate data on volumes of water allocated, let alone volumes of water used, is inevitable. The high seasonal and annual variability of runoff, streams, and water abstracted and the general lack of any measuring devices render any estimate a subjective guess. Even if the few permanently constructed intakes that divert water from the streams were fully operated according to their technical design, which is never the case, fluctuations of abstractions during flooding and dry spells cannot be captured in half-yearly and yearly average abstractions. Moreover, water abstractions vary with the quantities of direct rainfall on farmers' land, evaporation rates, cropping patterns, changes from grazing land to cropland, etc. Return flows are equally variable. In fact, even the most sensitive hydrological models, based on information from ample flow monitoring devices, can only generate rough estimates for aggregated annual uses in major streams, and certainly not for each individual along such streams, especially in the dry weeks. Therefore, there are no grounds at all for the assumption that the administrative system – or even hydrological models – would 'know at all the times the quantity of water available in the basin, and its use, by monitoring both the sum of water rights granted, and physical availability' (World Bank, 1996). It is only if water resources are fully developed into highly (large-scale) controlled systems that volumes can be sufficiently known and manipulated – a rare situation even in developed countries.

Costs of maintaining cadastres

While the current computerized spreadsheets of the water register only include names of some of the water users and approximate streams or communities where they are located, the costs of maintaining even this simple system in rural Tanzania are much higher than in most other places in the world. This is due to the generally low levels of literacy among small-scale users, the distance to many scattered hamlets, bad roads especially in the rainy seasons, expensive vehicles and fuel, the lack of affordable telecommunications, no way of writing to water users, and minimal computer and software facilities. The costs of compiling and maintaining an administrative cadastre may be justified when it only concerns a few large users. However, among all water users in a basin, costs of just noting the names of users and updating changes are extremely high. The question is whether the costs of blanket registration are justified in light of the limited benefits of the registration system as a basis for water resources planning, charging fees, and allocating water and water conflicts (see elaborated next).

Cost Recovery Tool: Subjectivity by Design and Costing Public Funds

Subjectivity by design

Before the 1990s none of the water lawyers drafting the administrative water rights system had ever thought of using the system for charging volume-based fees. Indeed, insurmountable problems arose as soon as this administrative system became the foundation for volume-based blanket tariff setting and fee collection to finance the government's water management services. First, the lack of objective and transparent procedures incorporates 'subjectivity by design' into the new system of water rights and fees in at least four ways: in rate setting; enforcement of fee payment; handling of public funds; and in discouraging genuine organization of water users. Second, among small users, the system appeared to drain public funds, instead of generating funds. Third, it met with fierce protest on the ground.

Arbitrary rate setting

Volume-based rate setting may seem objective and fair. However, in the absence of any objective basis to assess the volumes allocated and, thus, to set volume-based rates, Water Officers can only rely on their subjective judgement. Even setting tariffs relatively by ranking structures according to their sizes appeared difficult. In the Mkoji sub-catchment, for example, the volumes and related fees for the larger structure

of Inyala A were initially set at lower rates than for a nearby smaller structure of Inyala B. The water users complained. In this case, the Water Officer accepted the complaints and changed the fees the other way around. However, generally there is enormous confusion among small- and medium-scale users in the Upper Ruaha about the amounts to be paid (Sokile, 2003).

The recently introduced threshold below which a flat rate has to be paid may mitigate the problem of rate setting along some range of volumes, but it hits the smallest, often poorest, users hardest. Punishing small water users by charging disproportionately high rates because of administrative problems is difficult to justify on social grounds and, once they have paid, would certainly fully justify that they start using as much water as possible. Significantly, among private larger water users, rates were not set on the basis of water volumes used, but rather negotiated with the Water Officers. Payment followed promptly (Sokile, 2003). So willingness and ability to pay seem a sounder basis for rate setting than highly contestable hypothetical water volumes.

Arbitrary and weak enforcement

Significantly, 92% of private companies/estates, such as Brooke Bond Tea Company Ltd or Tanzania Wattle Company Ltd, appeared to fulfil their duties (Sokile, 2003). In fact, enforcement of payment appeared most difficult vis-à-vis other government agencies. Only 38% of the government agencies holding water rights (e.g. local government for domestic supply and state farms) regularly pay fees. In the Mbarali and Kapunga State Farms, in particular, the arrears in payment are among the highest and the cash instalments paid during each trip are typically small. In these schemes, where the Water Officers have control over scheme operational devices to cut water use, enforcement still remains extremely difficult. These and other government agencies use the argument 'why should the government pay the government?' to justify their refusal to pay the water fees, but this jeopardizes the goal of cost recovery for the functioning of the basin offices.

The degree of payment varied among smallholders, livestock keepers and other water users. The main threat that the limited staff on the ground can use is intimidation that defaulters will be brought to court, which mainly works in the case of the least powerful. However, in case of reluctance to pay, time and transport costs of repetitive reminders are high, let alone the costs of initiating a court case. The threat to cut access to water in case of non-payment can hardly be implemented because there are hardly any sluices, gates or other water control structures that the Water Officer can operate. And even if he locked any of the few improved intake structures, farmers would break them as soon as he left the village.[6] Obviously, subjectivity by design, combined with strong delegated state power, invites corruption and abuse of power.

Arbitrariness in water user associations as tax collectors

As already proposed in the RBM project Staff Appraisal Report, the remedy to high costs for individual registration and fee collection was to promote the formation of new WUAs by smallholders who were irrigators. As water rights can be either individual or collective, any number of water users sharing a common water source could apply collectively for one water right, for example, as an existing farmer association or by forming a WUA. The water users would save on individual application fees, while the government would win the most by shifting most transaction costs for fee collection to these local bodies.

[6]Collecting and transfer of public money is a new task for Water Officers. Water Officers are accountable by writing receipts for taxes received. Further, when submitting the collected funds from the subcatchment office to the basin office in Iringa, the accountant notes the amounts in the books. A public auditor is supposed to check the various amounts, but, for the moment, the public auditor's key interest is in the publicly allocated funding from the government, and not parallel funds for basin offices. This administrative system for fee payments is separate from the computerized spreadsheet of registered water users. An alternative is to include water cost recovery in the mandate and implementation channels of the Tanzania Revenue Authority, which has much more experience in these matters.

More than 24 new WUAs have been formed in the Upper Ruaha catchment (Sokile, 2003). Although the WUAs are still too young for impacts to be assessed, the risks are real that the rapid 'organization' into some form of committee revives the same type of rent seeking that existed under government-imposed villagization and cooperative building, as also prevailed in the Upper Ruaha sub-basin. Committee leaders have more power than government officials to effectively cut water of those who do not pay their share of the government taxes. If seen as powerful, they can more easily interfere in the customary irrigation arrangements or threaten to do so. Thus, the commonly shared water resources risk becoming a source of income for the few more powerful – again hitting the most powerless the hardest. Moreover, the incentive for organization is low indeed if it mainly implies that one has to pay fees.

Draining public funds

Contrary to expectations, charging fees for cost recovery among small users appears to be a drain of scarce government human and financial resources. Government officials from the lowest to the highest level with whom this issue was discussed admitted that the transaction costs of charging scattered smallholders in farmer-managed irrigation schemes without telephone, e-mail, post office or bank account facilities are considerably higher than any net revenue gained from this category. A simple calculation illustrates this point. For an immediately paying small-scale water user at only 15 km distance from the sub-basin office, the income of $35–40 breaks even with the estimated fuel costs, according to government tariffs, which are 2 × 2 × 10 km × $0.75/km = $45. However, the Water Officer typically needs to make two or three trips to smallholder areas, one for announcement, one for the collection of fees and, often, one trip as a reminder. Moreover, the distances in the Rufiji basin from the Water Office to the water users, even if one can reach various water users within the same trip, are much longer. The average distance from either the Iringa or the Rujewa basin offices is estimated at 87 km (Sokile, 2004). So, the fuel costs for collecting taxes from small-scale water users typically requiring three trips/year amount, on average, to $392, divided by the number of water users that can be reached during one trip. Evidently, there are many more costs than fuel alone, such as the costs of the four-wheel drive vehicle purchase and maintenance, the salaries and per diems of the Water Officer, driver and assistants, plus all other administrative costs.

This stands in sharp contrast with the very minimal transaction costs of taxing large users. For example, TANESCO pays an annual Royalty Fee directly to the Ministry by bank transfer. After billing, large users such as the Brooke Bond Tea Company, Kilombero Sugar Company, Kilombero Valley Teak Company, District Governments and the Dioceses normally pay by cheque or bank transfer. For the rare payments in cash, one trip to such large-scale users is usually sufficient. The Rufiji Water Office estimates the negotiated average fee paid by large-scale users at $100, which is three times the minimum flat rate (Sokile, 2004). This amount is negotiated independently from any water volume allocated or used in reality as those volumes are not given in the registers.

Currently, the annual fees for basin management collected in the Rufiji basin amount to $50,000, as estimated by the Basin Office (Sokile, 2004). TANESCO's royalty payment of $165,500 for the hydropower works in both the Rufiji and Pangani basins is not included in this because it remains at national level. Overall expenditures of the Rufiji basin office are estimated at nearly $225,000 (see Table 6.3 in the Annex; Sokile, 2004).

In sum, taxing scattered small-scale water users has not contributed to achieving the goal of self-financing of the Rufiji basin office. The huge implementation costs of taxing this majority of water users were insufficiently anticipated during the design of the new water rights and fees system. Promoting WUAs and Water Officers merely as tax collectors is no solution either. However, collecting a net income appeared feasible among large-scale water users. This is also justifiable on the

ground that small users are primarily subsistence farmers with limited land, while large-scale companies are undertakings with large water abstraction and considerable benefits.

Lack of legitimacy

The government's new water fees for basin management have met with fierce local opposition among smallholders and livestock keepers in the Upper Ruaha catchment. The well-intended explanations of the Water Officer that money is needed for the vehicles, fuel, construction and office costs of the Rufiji Basin Water Office did not impress the protesters. Their main complaint was that there has been no improvement in services delivered in return for what they perceive as taxation and rent-seeking. Rural water users contest the government's claims of ownership that would also entitle them to charge for water use. According to their customary notion of property claims, water is given by God, and use rights are only established on the basis of their own efforts to build infrastructure. Given this widespread opposition, one could have expected a categorical rejection of the new system. Ironically, the reason for its partial acceptance can be found in the new conflicts and divisions that emerged between upstream and downstream users, where the former use the new system to strengthen their own claims to water at the expense of the latter, as described below.

The legitimacy of the new taxation system has also been questioned at national level. In the budget speech of June 2003, the government abandoned the proliferation of rural cost recovery, realizing that the costs for collecting small, rural taxes are often higher than the amount collected; that they tend to discourage economic activity; and that they often meet with widespread resistance, among others by opposition politicians (O-H. Fjeldstad, e-mail, 2004, personal communication). The trend of abolishing existing taxation is diametrically opposite to the efforts of the Ministry of Water and Livestock Development to introduce new rural taxes. Last but not least, charging up to $35 or $40 from individuals or groups of organized poor people earning a dollar or two a day merely aggravates poverty.

Conclusion

Imposing a blanket fee payment system on small-scale water users failed to achieve the expected goal of self-financing governmental basin management. Instead, it cost the government its scarce resources. The new system lacks legitimacy at local and national level because there is no improvement in government service delivery and because fee payment for basin management is at odds with both national poverty eradication and rural taxation policy. Government credibility is further weakened by the arbitrariness of the new system. At the same time, the ability and willingness to pay fees for basin management services of large-scale private users who derive considerable benefits from water use appeared effective.

The straightforward implication is to continue taxing the large users who make the highest profits from water and can easily be reached logistically. However, for informal, small-scale users the lose–lose scenarios for both water users and government is to be avoided. Taxation of these users should, in any case, be phased according to logistical capabilities – as also proposed by the designers of the RBM project. However, the real challenge for the government is to deliver tangible services in return to the taxes, in order to achieve willingness to pay and reduce transaction costs for fee collection in a sustainable way. As discussed below, the oversimplistic connection between claims to water and payment is certainly to be thoroughly revisited. This is even likely to *save* water.

Water Allocation Tool: Increasing Water Use and Inequities

The expectations of the RBM project and the National Water Policy of 2002 that an

administrative water rights and fees system would, by itself, serve as a tool to allocate water and mitigate conflicts and 'be in a position to control withdrawals of surface and groundwater by issuing and revoking water rights' (World Bank, 1996) were high. While the registration and taxation component of the new water rights system worked at best partly, issuing water rights and making people pay for water failed completely as a water allocation tool, and even aggravated downstream water scarcity.

The above-mentioned lack of water measuring and control devices that prevented Water Officers from effectively controlling access to water and the lack of implementation capacity to enforce state authority undermined the obligatory registration and fee payment. Moreover, water certificates with, at best, an average annual volume specified appeared to have no meaning at all for the key water problem in the Upper Ruaha, which is the dry season in which fractions to be used are much smaller than any average, certainly for downstream users. These implementation weaknesses are the Achilles heel for any water rights system that solely depends on the government's authoritative and practical ability to curtail water use.

Ironically, the newly introduced payment of water 'as an economic good' even exacerbated water scarcity downstream during the dry season. The Water Officer had started issuing water rights to the upstream irrigators. They were somewhat wealthier and already quite well organized. In that area, irrigation expanded rapidly, for example up to 40% as in the Inyala village, where land values doubled as well. This rapid expansion was triggered not only by market and other opportunities but also by the newly constructed intake structure under the RBMSIIP project, which increased water security in the dry season. Reluctantly, these irrigators registered and paid fees. The Water Officer hardly contacted and informed the more distant and largely unorganized livestock keepers and the fragmented in-migrating communities in the plains downstream. Not a single WUA has been established in that area. In the initial days of implementing the water rights system, the promise of the Water Officer that those who registered and paid the new fees would be better supported in water conflicts than those who had not paid as yet helped to convince them and others. It certainly facilitated the Water Officer's job of achieving quick registration and fee payments.

As a result, the irrigators in the Inyala village argued that 'since 2000 they had bought water for $100' – in their perception of water as an economic good – to strengthen their claims to exploit this precious resource to the maximum. So contrary to the assumption of the RBM project and the National Water Policy of 2002 that paying for water leads to reduced water use, it increased the water use of upstream users. This was with immediate detriment to the downstream users as registration and tax payment did not generate any extra drop of water in the zero-sum game of dividing a limited pie during the dry season in the Upper Ruaha catchment.

Significantly, in 2003 the Water Officer of the Upper Ruaha realized the likely repercussions of 'selling unrealistic expectations', and started emphasizing how the water law itself stipulates that the government does not provide any guarantee that issued water rights, for which taxes are paid, are actually delivered (Msuya, 2003), as mentioned earlier.[7] The Water Officer protected himself by emphasizing the disconnection between fee payments and water allocation. Recently, the Water Officers stopped issuing water rights altogether. They now first finalize the identification and registration of all significant users that should have taken place at the onset. Crude and unmonitored water rights are inadequate tools to regulate upstream–downstream water conflicts in such a context.

In order to address water scarcity during the dry season in the Upper Ruaha catchment, the government does not rely anymore

[7]As mentioned in Section 2, the Water Ordinance 1959, Part IV 16 (4) and its literal repetition in the Water Utilization (Control and Regulation) Act 1974 Part IV 15 (4) stipulate: 'Nothing in any such water right shall be deemed to imply any guarantee that the quantity of water therein referred to is or will be available.'

on paper water rights but catalyses the formation of negotiation fora. The newly established Rujewa Sub-catchment River Basin Water Office, supported by the Sustainable Management of the Usangu Wetlands and Its Catchment (SMUWC) project, brought the managers of the three smallholder irrigation schemes, TANESCO and the Ruaha National Park together into what is now called the Planning Group. In 2003, the River Basin Water Office supported the introduction of a 'River Basin Game', developed by RIPARWIN (Lankford *et al.*, 2004a,b) to foster dialogue between upstream and downstream users, to raise awareness about downstream deprivation during the dry season, and to elicit remedial options, such as the further exploitation of groundwater or construction of small dams to hold storm water and floods during the rainy season for use during the dry weeks. For example, a small dam is proposed in the Ndembera river in the Upper Ruaha catchment, which would provide the minimum flow required for wildlife in the Ruaha National Park during the dry season. Significantly, FAO already proposed this in the 1960s, but the plan was shelved ever since because the discourse shifted away from water development to water regulation for the reasons mentioned in this chapter. Rotations along streams and building upon customary practices are also elaborated. Also, an encompassing legal infrastructural framework for catchment apportionment is proposed. This allows rebuilding the concrete intakes in the upstream part in such a way that, during the dry season, less water is diverted upstream in order to leave more water in the flows for downstream use. Water fees for the respective irrigation schemes would be based on abstractions during the wet season as concretized in the technical design (Lankford and Mwaruvanda, 2006).

Conclusions and Recommendations

The foregoing analysis illustrates, above all, how well-intentioned reforms that are governed by ideological principles in vogue (centralized formal water rights and cost recovery for water as an economic good) and an unsound scientific analysis of the complexity of the real world, combined with a lack of meaningful prior consultation with stakeholders, can get it wrong.

Grafted upon a dormant colonial system of water rights, Tanzania supported by the World Bank, introduced increased water fees with two objectives: managing water resources and cost recovery for water resources management functions. Relative failure to achieve the first goal of water resources management was primarily due to the heroic assumptions on the regulation capacity of the state. However, in the Upper Ruaha, as in many rural areas in sub-Saharan Africa, the state manages only a few of the structures, reservoirs and large public schemes. It has only direct control over the water regime through the canal regulation programme on two out of more than 150 intakes. This lack of 'reach' was compounded by the hydrological complexity of many catchments, high resource variability and unpredictability, the lack of hydrological knowledge, the multitude of small unorganized users, and the inaccessibility of the dindilos. Moreover, the concrete structures to replace the indigenous dindilos were built without full acceptance of the hydrology and uses, and without a view on how dindilos and dindilo-type structures could practically and technically apportion water. These new structures now hinder water-sharing arrangements even more. The cart was put before the horse again by distributing 'rights' *before* knowing about use, users and resources. So, managing water appeared illusory. However, even if the state had been able to sufficiently control and manage the streams and registers would have been well maintained, water rights based on registered average annual volumes are of little help in sharing and prioritizing water resources during dry-season scarcity. Not only was the goal of improved water management not achieved at all, but new upstream–downstream conflicts were created. These experiences suggest that it is more reason-

able and effective to entrust management of water to sub-catchment decision-making networks, building on already existing customary arrangements. Their tasks would be, first, to regulate allocation in times of low flows, with constraints to ensuring downstream flow determined by the RBO and, second, to find arrangements for the increasing demands by new users. For example, a 'catchment water master' could be appointed and paid by the catchment users. This could also start a mechanism of fee collection with a clear objective and benefit, which can be extended to a wide range of basin and water services once benefits are received from that level. For managing water in a case like the Mkoji sub-catchment and the many similar sub-catchments, formal collective rights rather than individual rights would be most appropriate.

The second objective, raising net revenue for the River Basin Water Office, was not achieved in the Mkoji sub-catchment because of the disproportionate costs of registration and cost recovery from many small users compared to the amounts gained. Moreover, users had little incentive to pay from the perspective of water assurance or service in exchange though they had more incentive from the perspective of the ill-defined threats of not being legally entitled to the water. In contrast, taxation of the few large users in the Rufiji basin did generate net revenue for the Basin Water Office. From these experiences, it can be concluded that cost recovery should be limited to the users who derive large benefits from high water diversions and allow the government to recover costs. The national government would considerably support the process if government schemes were also forced to pay and if the TANESCO contribution stayed at basin level instead of going to the central government. Given the different state interventions at stake, especially in informal settings with limited physical water control, water allocation and water taxation, a clearer separation of the goals and means to reach the goals of both measures, would contribute to the rationality, transparency and effective implementation of both. Above all, water allocation would recognize and build upon the many strengths of existing customary practices.

Last, Tanzania is a country still with a very low per-capita storage capacity. In many instances, the option of year-round storage development for improving the water supplies to all is still open. Instead of suggesting that localized and temporal absolute scarcity issues are the nation's key concern, more resources should be allocated to solve the primary issue: economic water scarcity.

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Annex

Table 6.1. Fees according to Water Utilization (General) Amendment Regulations (2002).

Item of water use	Application fees ($)	User fees ($/year)	
		Flat rate	Increment rate
Domestic/livestock	40	35	0.035/100 m^3 above 3.7 l/s
Small-scale Irrigation	40	35	0.035/1000 m^3 above 3.7 l/s
Fish farming	40	35	0.035/100 m^3 above 3.7 l/s
Large-scale irrigation	150	70	0.070/100 m^3 above 3.7 l/s
Industrial	150	35	0.035/100 m^3 above 1.11 l/s
Commercial	150	35	0.15/100 m^3 above 0.94 l/s
Mining	150		0.17/100 m^3

Table 6.2. Non-consumptive water use fees in Tanzania.

Use	Charge ($/year)
TANESCO – Power royalty	165,500
Power royalty fees per 1 MW installed capacity	300
Transport in inland water bodies (less than 5 t)	10
Transport (above) for every additional tonne	2.2

Note: Exchange rate (2004): $1.00 = TSh 1000.

Table 6.3. Estimated costs of the Rufiji Basin Office. (From Sokile, 2004.)

Cost element[a]	Estimated amount ($)
Remuneration – Basin Officer	8,640.00
Remuneration – Resource Management staff (2)	7,200.00
Remuneration – Quality Management staff (2)	6,000.00
Remuneration – Operations staff (5)	4,800.00
Remuneration – Corporate services	5,000.00
Remuneration – Casual labour	13,860.00
Institutional support (including resolving conflicts)	11,900.00
GIS data capture	12,100.00
Water quality analysis/hydrology sampling and analysis	9,200.00
Fixed overheads	4,500.00
Travel and subsistence	37,000.00
Printing and photocopies	8,700.00
Communication	11,000.00
Bills (electricity, water)	3,900.00
Consultants	–
Sundry and contingency	6,700.00
Interest and finance costs	5,000.00
Total	155,500.00
Other expenditures (occasional)	
Improvement of intakes	37,300.00

Continued

Table 6.3. *Continued*

Formation of WUAs	7,800.00
Water resources analysis	5,400.00
Board meetings	6,240.00
Water resources management strategy	11,200.00
Total	67,940.00
Grand total	223,440.00

[a]Costs exclude assets such as buildings, furniture, computers, photocopiers, motor vehicles/bikes and laboratory equipment.

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