Tackling Dilemmas for the Shared Use of Water Resources: Moving Towards IWRM in the Mkoji Sub-catchment, Tanzania

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ABSTRACT

Tanzania, like most sub-Saharan African countries is implementing integrated water resource management (IWRM) principles. Part of this process is the design and implementation of new institutional arrangements, both on the national as well as the local level. However, when it comes to local level institutional reforms, little guidance seems to be available to allow for successful implementation. On the local level, the implementation of new institutions and approaches for IWRM will require one to tackle various dilemmas and to make some difficult choices. Generally, these local dilemmas seem somewhat underrepresented or at least scattered in the existing literature. This paper brings together some of these institutional dilemmas, based on experiences in the Mkoji sub-catchment, which is part of the Rufiji Basin in Tanzania. Five institutional dilemmas are discussed in detail: (i) New versus existing institutions, (ii) neutral reforms versus actively reshaping power relations, (iii) long-term versus short-term objectives, (iv) incremental changes versus visionary master planning and (v) centralized versus decentralized management structures. Although there is no easy way out of these dilemmas, their mere identification can already help water professionals and policy makers to avoid certain pitfalls in future institutional reform processes.

INTRODUCTION

Since the early 1990s, the United Republic of Tanzania has been implementing various initiatives towards integrated water resources management (IWRM). Domestic challenges and growing concerns on water uses and users, water related conflicts and increasing demands among various sectors on the one hand, and the international challenges and developments on the other hand, are ascribed to have contributed to the various processes towards the implementation of IWRM.

A growing base of literature discusses the concepts of IWRM, its practice and implementation, and several publications provide recommendations and guiding principles for IWRM (GWP, 2000; Rogers & Hall, 2003; Jaspers, 2003; Bandaragoda, 1999). One of the important guiding principles is the use of a participatory approach that involves users, planners and policy makers at all levels in the management of water resources. In fact, facilitating stakeholder involvement is considered a *sine qua non* for designing and implementing IWRM processes (GWP, 2000; Kashaigili et al. 2003). The guidelines and approach described in the IWRM literature have influenced the development of water policies in various countries, including Tanzania (see e.g. URT, 2002).

While literature and national policy developments suggest the expediency of the IWRM approach, there is a paucity of specificity, as opposed to the generality about its implementation. The general and fairly abstract guidelines may be sufficient to start up a dialogue on IWRM on the national level, but the subsequent implementation of IWRM on the local level requires tailor-made arrangements that meet the situational and contextual specificity that characterizes local water resources management. A new challenge arises when IWRM has to be implemented on the local level, where specific actions with direct impacts have to be taken. Here, the general guidelines and recommendations found in literature are not a panacea for equity, sustainability and economic efficiency in water resources management. On the local level, various stakeholders with often conflicting needs have to be brought together in a participatory process, which is likely to uncover various dilemmas that need to be tackled in order to realize effective implementation of IWRM principles.

In this paper we discuss our experiences with implementing IWRM approaches in the Mkoji sub-catchment, Tanzania. We focus on some of the specific efforts that were undertaken to start up a participatory stakeholder process[1], while vividly acknowledging a series of interventions both before and after these efforts. Central are the identification and discussion of some of the dilemmas that we encountered throughout the process.

We continue with a short elaboration of some important concepts and notions on IWRM and the main approach that was used to introduce IWRM principles in

[1] Between July 2003 and January 2004, the Soil-Water Management Research Group of Sokoine University of Agriculture and FAO executed a participatory project aimed to start up a process of IWRM in the Mkoji sub-catchment, funded by the FAO- Netherlands Partnership Programme. The project included a comprehensive assessment as well as a participatory planning workshop with local stakeholders.

the Mkoji sub-catchment. This is followed by an introduction of the Mkoji sub-catchment and then the specific details of the dilemmas that were encountered during the efforts of starting up IWRM processes here, followed by some conclusions from the study.

CONCEPTUAL AND METHODOLOGICAL CONSIDERATIONS

IWRM concepts and principles

Water is a fugitive resource that is shared among different sectors. In any river basin there is more than one sector using water at any time in the year. The sectors range from irrigated agriculture, livestock, hydroelectric power generation, industry, domestic uses and environmental requirements, among others. Integrated water resources management (IWRM) refers to allocating and managing water among all sectors and at all levels, based on the underpinning idea of the *integration* of all sectors that impinge on a given water resource in the process of water resources management.

The integrative component is one key characteristic of IWRM; another important component is its characterization as a *process.* One of the most cited definitions of IWRM is provided by the Global Water Partnership, which defines IWRM as *"a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems"* (GWP, 2000, p.22).

In implementing this integrative process, the four principles known as the Dublin principles[2] (see GWP, 2000) have been particularly influential in shaping IWRM thinking and practice during the past decade:

- Water is a finite and vulnerable resource, essential to sustain life, development and the environment;
- Water development and management should be based on a participatory approach involving users, planners and policy makers at all levels;
- Women play a central part in the provision, management and safeguarding of water;
- Water has an economic value in all its competing uses and should be recognized as an economic good.

These concepts and principles give us a good impression of what IWRM should be in theory. However, they leave us with the question of how to support a

[2] The four Dublin principles were formulated through an international consultative process, which resulted in the International Conference on Water and the Environment in Dublin, 1992. The principles underscore a clear need to update and add specificity unto them through interpretation, experience and local practical implementation.

transition towards participatory and integrative processes that ensure that the IWRM requirements are actually implemented.

Methodology for starting IWRM processes in practice

When designing processes for the implementation of IWRM principles, a useful starting point is offered by the “strategic planning cycle” approach. IWRM is a process of participatory planning through which eventually improved water resources management strategies should be realized. Following the logic of (water) planning textbooks, strategic planning can be seen as a cyclic process, consisting of different phases that are implemented in an *iterative* way, with the participation of all the main stakeholders involved (LeMoigne *et al.*, 1994, p.8):

- Where do we want to be? Development objectives as platform to launch strategic planning
- Where are we now? Assessment and analysis of issues
- How can we get to where we want to be? Identification and analysis of options and choices to address priority issues
- Which way is best? Formulation of a strategy
- How will resources be allocated? Developing an investment plan to finance strategy implementation
- How do we ensure arrival at goals? Implementation and control, followed by monitoring, evaluation and reiteration of the process from step 1.

Although these general phases provide an indication of the steps to be taken, their translation into concrete actions and their actual execution is neither obvious nor likely to be without complications. Further challenges are evident here.

Dilemmas in implementing IWRM concepts and principles

In the majority of the developing countries, especially in sub-Saharan Africa and specifically in Tanzania, the participatory approaches that pro-actively involve users, planners and policy makers at all levels are still in their infancy or are missing altogether. Institutions that adequately incorporate gender aspects - reflecting the vital role that women play in the provision, management and safeguarding of water - are lacking. Furthermore, the existing institutional structures are not always adequately designed to ensure that water is managed in a way that reflects its full economic and social values (cf. Kashaigili *et al.*, 2003).

These imperfections in existing institutions raise the question of how to deal with these imperfections? How can we move towards a process of IWRM, even though some requirements for doing so might not be met at the beginning? The importance of finding ways to cope with imperfections should not be

underestimated, as in practice such imperfections will prove to be the rule rather than the exception.

It is evident that in moving towards IWRM, one is likely to encounter some difficult institutional choices or dilemmas which require a practical solution and that need to be balanced. Two of these institutional dilemmas have already received attention in the past: the dilemma of top-down versus bottom-up planning and the dilemma of public sector versus private sector leadership (e.g. GWP, 2000). In the top-down versus bottom-up dilemma, emphasis tends to be given to the "bottom-up" approach and local community involvement through the subsidiarity principle, to counter-weigh the traditional preference for technocratic top-down planning structures (cf. GWP, 2000; Jaspers, 2003). The public versus private sector debate has been moving in different directions over the past years and still seems unresolved, except perhaps for the insight that public and private sector involvement need to be balanced for effective IWRM. The latter has mainly been tried within the water supply sector, with increasingly mixed results, rather than in the agricultural and environmental dimensions of IWRM.

Besides the two dilemmas above, more institutional dilemmas are likely to surface in the process of moving towards IWRM, given the complexity of today's water systems. Some of these dilemmas are identified and discussed in the coming sections, using the experiences from starting up an IWRM process in the Mkoji sub-catchment.

INTRODUCTION TO THE CASE STUDY

The Mkoji Sub-Catchment

The Mkoji sub-catchment (Mkoji-SC) is one of the eleven sub-catchments of the Great Ruaha River system. The sub-catchment is located in the southwest of Tanzania, between latitudes $7^0$48' and $9^0$25' South, and longitudes $33^0$40' and $34^0$09' East, covering a total area of about 3400 km². The Mkoji-SC is the upper most catchment of the Ruaha system, situated just upstream of the Usangu Plains.

The Mkoji-SC is named after the Mkoji River, the main river draining the whole sub-catchment. The river originates from the northern slopes of the Poroto Mountains. From the mountains it flows to the Usangu Plains, collecting *en route* Makali and Itambo rivers before joining the Great Ruaha River. Other important rivers that drain the Mkoji-SC are Meta, Lunwa, Lwanyo, Mambi, Mswiswi, Ipatagwa, Mlowo, Mwambalizi and Gwiri. All the rivers draining the Mkoji-SC, including the Mkoji River itself, are perennial upstream of the Tanzania-Zambia Highway that runs about halfway through the sub-catchment. Figure 1 shows the map of the Mkoji sub-catchment.

The Mkoji sub-catchment has a population of about 146,000 people with an average annual growth rate of 2.4% (URT, 2002a). The highest population

density is found along the Tanzania-Zambia Highway and in the southern highlands. Scattered villages are located in the plains. The Highway also forms the principle marketing channel for the agricultural products of Mkoji-SC to the markets of Mbeya, Lusaka, Lilongwe, Iringa and Dar-es-Salaam. The larger part of the sub-catchment lies within Mbarali and Mbeya Rural districts, while smaller portions of the sub-catchment lie within Makete and Chunya districts in Iringa and Mbeya Regions respectively.

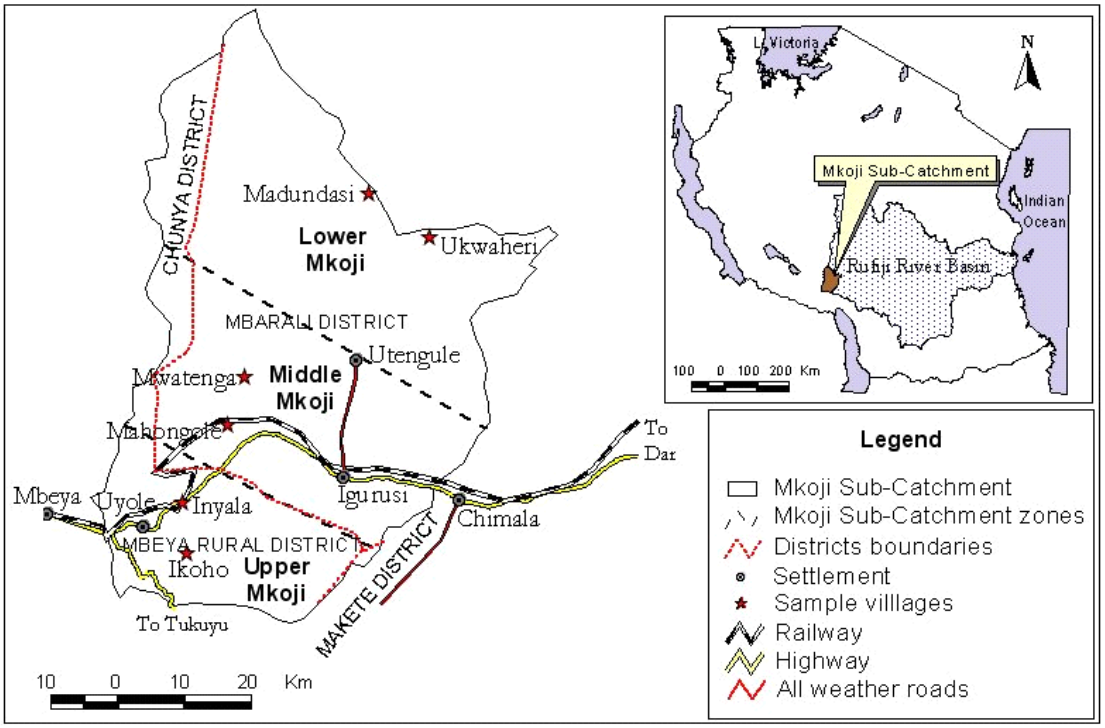

Figure 1 Map of Mkoji sub-catchment

The farming systems of Mkoji-SC are dominated by smallholders, whose livelihoods and household incomes predominantly depend on the water and other natural resources of the catchment. As shown in figure 2, the sources of household income are closely correlated to the agro (and hydro)-ecological opportunities available in the upper, middle and lower zones (see figure 1) of the catchment. In the higher altitude upper zone, the more temperate and moist climate provides for ample opportunities for rainfed agriculture in its upper part, and irrigated dry-season agriculture in its lower part. In the middle zone, the farming system is dominated by paddy cultivation during the wet season and start of the dry season. While livestock dominates the lower zone, in particular cattle, that depends on the access to suitable grazing grounds.

As becomes evident from figure 2, the access to the limited resources as water and suitable land, are important determinants in household income and wealth. The limited access of the poor to irrigation (upper) and suitable paddy land and water (middle), force them to diversify their livelihood strategies with the selling of their labour and other activities, often at the detriment of their own production

capacity. In the lower zone, the income is directly correlated to the size of the cattle heard and the access to suitable dry season grazing grounds.

It should be noted that the absolute wealth in terms of disposable household income in the smallholder community of Mkoji-SC is till relatively low when compared to the national averages. Average per capita incomes in the Mkoji-SC range between US$ 60 and US$ 120 (FAO, forthcoming) whereas the national average per capita income for 2002 is US $ 280 (World Bank, 2003).

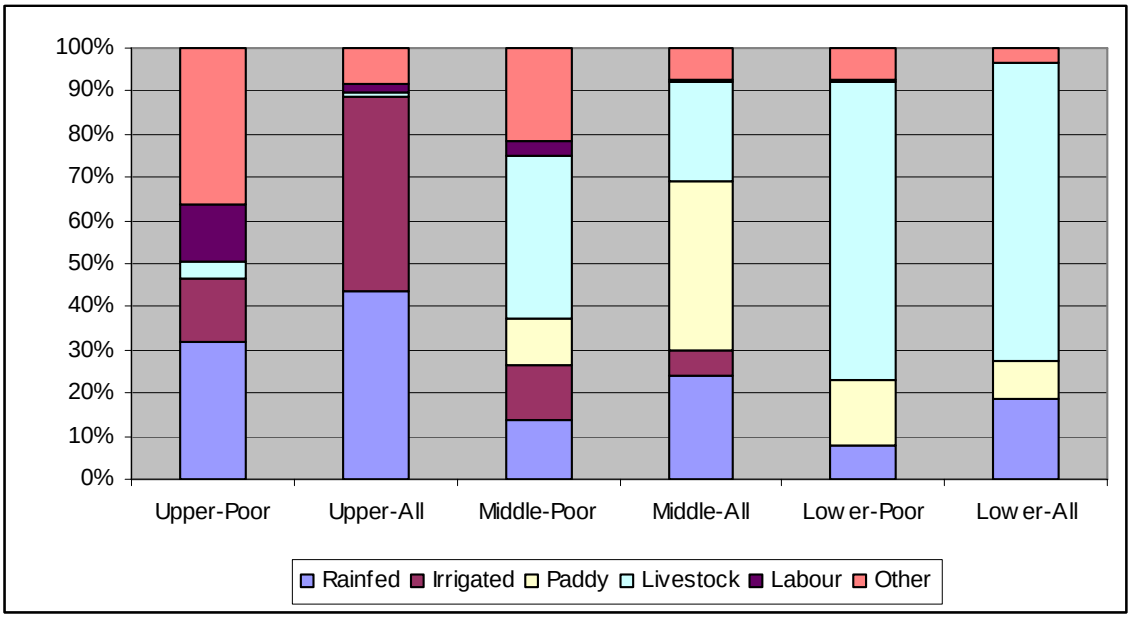

Figure 2: Sources of Household Income in Mkoji Sub-Catchment [per zone for poor and all households, in percentage] (source: FAO, forthcoming)

Water scarcity as an acute and central problem in Mkoji-SC

Water scarcity during the dry season (May – October) has become an acute and persistent problem in Mkoji-SC, affecting all stakeholders across the catchment, in different degrees of severity (see also the other paper on Mkoji presented by Hermans et. al. 2004). Dry season irrigation and paddy rice cultivation have proliferated over the past years to such an extend that all, the once perennial, streams of Mkoji-SC now run completely dry during the dry season, just downstream of the Tanzania – Zambia Highway. This seems to be a direct function[3] of the number and capacity of water abstraction points for dry season irrigation and early- and late season paddy cultivation along the

[3] Due to the lack of available current and historical data, we have not been able to: a) close the water balance for Mkoji-SC, nor b) determine whether significant changes have occurred in the upstream base flows of the streams due to changes in upstream land use (e.g. deforestation and erosion).

streams.[4] The total water abstraction capacity for irrigation has increased manifold over the past two decades, due to:

1. The construction or rehabilitation/modernization of smallholder irrigation schemes by projects such as those of FAO in the 1980s in the middle zone, the Prime Minister's Office in recent years in the upper zone and the River Basin Management and Smallholder Irrigation Improvement Project (RBMSIIP) during the last six years in the middle zone. An important characteristic of these projects has been the installation of permanent weirs an intake structures that have significantly increased the water abstraction capacity, especially during periods of low flow.
2. A proliferation, as of yet, of informal irrigation, in particular in the upper and lower zones. Either in the form of extended informal command areas of the formal irrigation schemes that prevent the return of excess or drainage water into the natural streams; or as separate informal command areas with their own, often seasonal, intake structures.

The current situation in Mkoji-SC is thus that the total water intake capacity for irrigation by far exceeds the total available dry-season flows. As a result, the lower zone and large part of the middle zone are completely deprived from access to surface water during the majority of the dry season, while the available flows are highly contested between upstream and downstream irrigation schemes along on stream, regularly resulting into serious conflicts of water allocation and distribution – both among and within irrigation schemes (see Hermans *et al.*, 2004). The total area under irrigation in Mkoji, wet season paddy cultivation excluded, is currently estimated at 30,270 ha (FAO, forthcoming).

The predominantly pastoralists of the lower zone are at present the hardest hit by the water scarcity, as is typical for "tail-enders". The severest manifestation is that downstream villagers have to fetch drinking water over a distance of up to 12 kilometers during the dry-season.[5] The livelihood strategy of the lower zone pastoralists has recently also come under a serious threat, due to a recent government decision to gazette their traditional dry-season grazing grounds – the Uhefu permanent wetlands, just outside Mkoji-SC in the Usangu plains – as a protected game-reserve. As a consequence, the stakeholders of the lower zone will have to find new pasture for a livestock herd equivalent to almost 175,000 tropical livestock units (TLU) during the dry season, which currently cannot be accommodated within Mkoji through natural pasture areas.

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[4] Paddy cultivation in the middle zone is predominantly based on rain- and floodwater. However, its season has been prolonged through the creation of water abstraction and diversion capacity, which is not always formally part of the irrigation schemes in the area.

[5] The geology of Mkoji is such, that no shallow ground water tables are available during the dry season, not even at the downstream plains. Some wells are available that draw up water between a depth of 20 to 60 m, but with average low yields that are only adequate for drinking water supply.

This decision was taken in a direct response to the wider Rufiji Basin concerns; in particular with regard to the drying up of the Great Ruaha river flows in Ruaha National Park, which has become increasingly a threat to the wildlife over the past six years. The restoration of the dry-season flows in Ruaha river, and the protection of Tanzania's environmental and wildlife patrimony have become national priorities set by the President (SMUWC, xx). As a consequence, the upstream catchments of Ruaha river, including Mkoji, are increasingly put under pressure by national policies and policy makers to reduce their water use.

The institutional context

Water

The concept of river basin management has been adopted in Tanzania from the late 1980s throughout the 1990s. This has resulted in the (administrative) creation of nine Basin Water Boards on the mainland of Tanzania, of which Rufiji Basin constitutes the largest (see figure 3). Of all the nine basins, the Rufiji and Pangani are the most contended, where water is becoming increasingly scarce during the dry season.

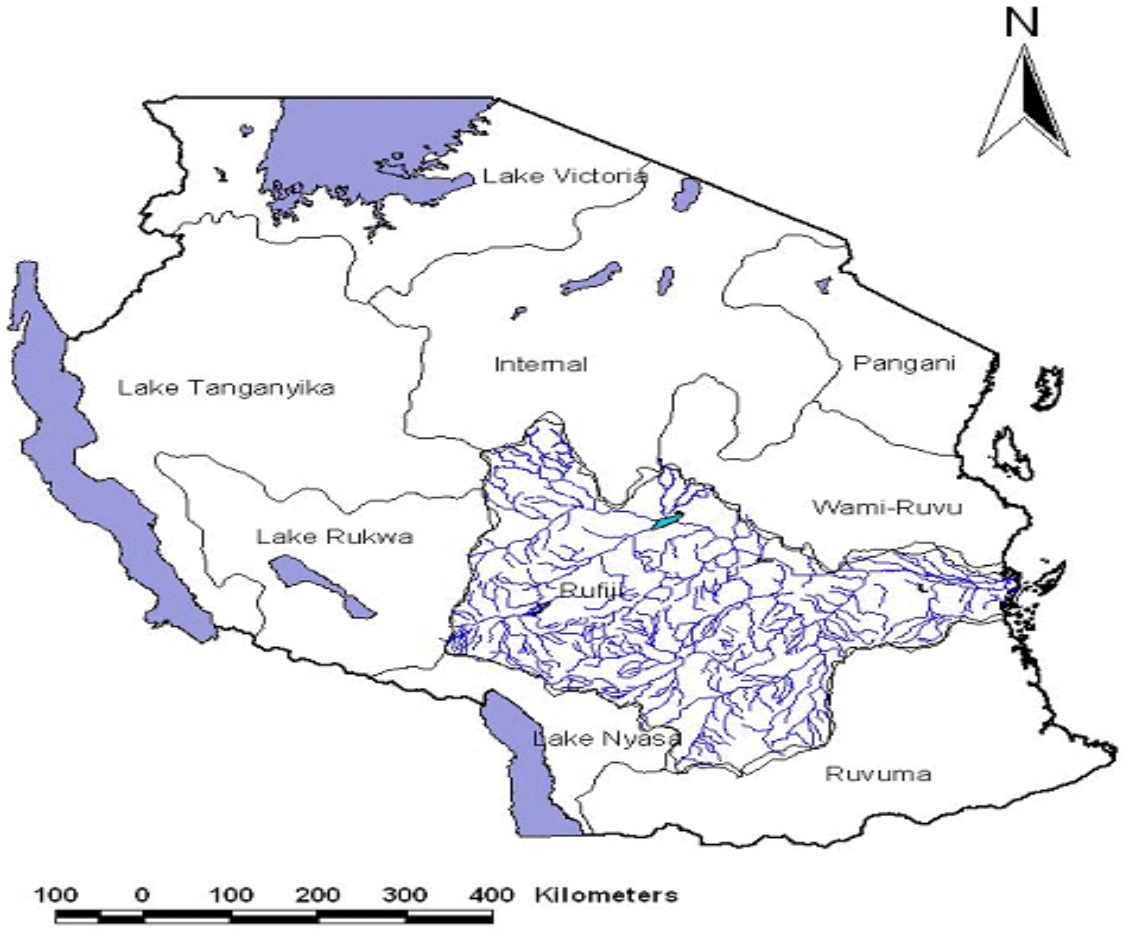

Figure 3 Location of Rufiji Basin and other river basins in Tanzania

The 1991 National Water Policy has been revised recently under the auspices of the newly created Ministry of Water and Livestock Development (MWLD), with support from the aforementioned RBMSIIP, to stronger incorporate the concepts of IWRM. The new National Water Policy (2002b), among others, underscores the importance of equity, water supply, environmental priorities and sustainability, polluter pays principle, gender and cost-recovery, reflecting as such the general guidelines and principles of IWRM as propagated by GWP. However, the role and place of agriculture and food security is not strongly reflected in the current policy. These latter issues, and in specifically the development of irrigation, still fall under the Ministry of Agriculture and Food Security (MAFS). The new policy does, however, clearly reiterate the central role of stakeholders, and water users associations as the nucleus of water management.

The accompanying new legislation to the new Water Policy (2002b) is still pending before parliament. Three sets of legislations have, however, already been formulated for submission to parliament: the Water Resources Act (URT forthcoming a), the Rural Water Supply Act (URT, forthcoming b) and the Urban Water Supply Act (URT, forthcoming c). These Acts, as read in tandem, recognize community contributions and joint efforts towards a concerted water management.

In the case of the Rufiji basin, the Basin Water Board with its head office in the Iringa and a regional office in Rujewa (the latter neighboring Mkoji-SC), has received support from the RBMSIIP to increase its capacity in its new roles in water resources allocation and regulation in the Rufiji basin. Particular emphasis is hereby given on: measuring and monitoring of water resources, registration and administration of water rights, and charging of water abstraction fees.

Agriculture

With the adoption of the Poverty Reduction Strategy Paper (PRSP), the government of Tanzania has placed a high emphasis on the development of agriculture as a growth engine of its national, and primarily agriculture based, economy. The specific priorities and targets of the government have been defined in the Agriculture Sector Development Strategy (ASDS). One of the corner stones of the ASDS is the dual strategy of decentralization and the provision of an enabling environment for agricultural services and private sector involvement, rather than the provision of central government services.

The district councils are henceforth to play a primary role in defining and implementing the rural development plans in Tanzania, including agriculture. Since 2004, the district councils are required to submit a District Agricultural Development Plan (DADP) to the central government, who on its turn disburses the agricultural development funds for its implementation by the districts. The DADPs are to be formulated through a process of stakeholder participation and consultation, at the village (village plans) and ward (ward plans) levels, and finally compiled at the district level by the District Agriculture and Livestock

Development Officer (DALDO), and his supporting staff of extension and irrigation officers. The DADPs should contain a prioritization of agricultural development plans, including that of irrigation, livestock and natural resources development at the district level, on the basis of which the allocated funds from the central government can be spent.

In this new set-up of decentralized agricultural development, the district should draw upon the support of the Training and Research Institutes, as well as the specialized Zonal (Irrigation) Offices of the Ministry of Agriculture, that can provide specialized services for the implementation of the DADPs. In addition they should draw more support from the civil (NGOs) and private sector as partners in decentralized development.

The ASDS thus represents and important and significant recent change in institutional set-up and responsibilities, where the district councils and their officers have been transformed from primarily executers of centralized programmes and directives, to the core definers and implementers of decentralized and participative rural development programmes.

The institutional context in Tanzania, particularly within agriculture and water, can thus at best be characterized as being in a flux of change, where new institutional roles and responsibilities are being given shape.

Facilitating a shift towards IWRM in the MSC

To support the local stakeholders to cope with their growing water concerns, an effort has been made to start up a process towards the implementation of IWRM principles in the MSC. The strategic planning cycle approach was used as a framework to guide this process, focusing on an iterative application of the first steps of the cycle. The first two phases of this cycle, developing objectives and assessing the current situation and priority issues, were covered by a comprehensive assessment and focus group discussions and were once more reiterated during a participatory planning workshop. During this workshop, also a start was provided for the identification of options, strategy formulation and implementation aspects.

In implementing this process towards IWRM, certain institutional dilemmas surfaced. The coming sections cover the following five institutional dilemmas in more detail:

1. New versus existing institutions
2. Neutral reforms versus actively reshaping power relations
3. Long-term versus short-term objectives
4. Incremental changes versus visionary master planning
5. Centralized versus decentralized management structures

INSTITUTIONAL DILEMMAS IN MOVING TOWARDS IWRM

Dilemma 1: New versus existing institutions

Existing institutions are usually not equipped to facilitate decentralization and water management on hydrological boundaries, which means that working towards IWRM requires new institutional structures (See also Sokile & van Koppen, 2003; Shah, Makin, & Sakthivadiel, 2000). Noteworthy, however, is the understanding that there already *is* an institutional structure in place, often emphasizing centralized planning on the national level combined with traditional arrangements on the village level. Although these institutions may or may not be working to the satisfaction of the stakeholders involved, they do provide a basis that can hardly be ignored in designing and implementing new institutions for IWRM. The result is a dilemma of using new versus existing institutional structures to facilitate the transition towards IWRM.

The dilemma at work in the MSC

The recent institutional developments in moving towards IWRM have established two new institutional layers to manage water: the River Basin Water Offices and Water User Associations. These new institutions are an addition to the traditional geo-location approach where local administrations, such as district, ward and village councils would spearhead the task.

The Rufiji Basin Water Office

The Rufiji Basin Water Office is now operational, with a sub-office in Rujewa, the district capital of the geographical coverage of the Mkoji sub-catchment. The Rufiji Basin Water Office has been set-up with a specific set of tasks and roles in mind that are based on the centralized water allocation and regulation functions typically of a river basin authority (see also dilemma five). The basic tasks of the basin office are then, to:

- Measure and monitor the available water resources;
- Allocate and regulate the existing and new water rights within the basin;
- Issue, administer and collect the water abstraction fees associated with the issued water rights;
- Mediate and resolve water conflicts within the basin.

The capacity of the Rufiji Water Basin Office (RBWO), in terms of its human and financial resources, however, is extremely limited with regard to the extensiveness of these tasks in the largest basin of Tanzania. As a consequence, the RBWO depends on the collaboration of number of existing and new institutions in the execution of these tasks on the ground. This in particular with regard to the regulation and distribution of river water flows during the dry season; the collection of water abstraction fees; and most importantly, the mediation and resolution of water conflicts.

Within Mkoji-SC, the most important partners of the RBWO among existing institutions are the District Authorities of in particular Mbeya-Rural, and the

recently newly established District of Mberali (see figure 1). In particular with regard to the mediation and resolution of water conflicts between up- and downstream water users, resulting from aggravated shortages in river supply during the dry season, the collaboration between district commissioners and RBWO are instrumental in finding practical resolutions that are: i) in line with common needs and interests of the stakeholders of the district; and ii) reflect the principles of water rights in practical water rotations.

Water User Associations

The new Water Policy recognizes the Water User Association (WUA) as the lowest level of water management institutions. WUAs are to play an important role in the allocation and administration of water rights, in the collection of water fees and in the operation and maintenance of local water infrastructure. Simultaneously, with the onset of increased water scarcity and water conflicts during the dry-season – between up and downstream irrigation schemes, and between upstream irrigators and downstream pastoralists – the need to regulate the water use and water distribution between the different water users and uses has become ever more evident, among water users, district officials and RBWO.

Recently, the attention of the RBWO and the Mbeya-Rural district has gone out towards the establishment of a WUA Apex that could function as a catchment organization for Mkoji-SC. This WUA Apex will become a federation of the lower level WUAs, to take care of cathment wide tasks as:

- The implementation of rotation schedules and water distribution plans in the catchment along its streams and rivers, and among its WUAs;
- The planning and development of land and water use in the catchment, in particular with regard to better use and regulation of its scarce water resources;

The institutional role of the WUA Apex is thus to fulfill the tasks and responsibilities that presently cannot be taken up, or fulfilled, by either RBWO or the districts. In the case of Mkoji-SC, the district of Mbyea-Rural has taken the initiative to establish a WUA Apex among the villages and irrigation schemes within its administrative boundaries, thus restricting the Apex to the upstream water users for the moment.

Within the formation of the Apex itself, the dilemma of new versus existing is already manifested. In Mkoji-SC the village councils were used by the district of Mbeya-Rural to establish the WUAs that would form the WUA Apex. Through a PRA process, the village councils have established 23 village water committees, which are represented in the WUA Apex, and which bring forward their water plans and needs – ranging form irrigation, domestic water supply to restoration of the water retention capacity through forestation. On the one hand, this constitutes a cohabitation of the traditional existing institutions, as the village councils have traditionally played an instrumental role in natural resources management when land and water resources were “ owned” by the village, rather than individuals. On the other hand, the mere formalization of

land and water rights into formal, and in case of land[6], individual entitlements is eroding to a large extend the village councils' role in allocation, distribution and management of the natural resources. Furthermore, the formally established WUAs or village committees all are built around the *irrigation* committees, which only takes care of a small part of the water users.

Besides the village water committees also other local water groups have been established recently, but under different laws and regulations. Irrigation associations and cooperatives have been formally established and registered[7] in those irrigation schemes that have received project support in the modernization of their infrastructure. In those projects, the establishment of the irrigation association (IA) and the registration of a formal water right has become a conditionality of the support received.

The IAs have received support from the programmes of MAFS with support of the District agricultural staff and village extension officers, but will increasingly become dependent on the Districts. In Mkoji-SC the formally established and registered IAs represent only the irrigators in those schemes that received previous project support. The majority of these IAs are situated within the administrative boundaries of Mbeya-Rural District. They may overlap or have gone up into the more recent WUAs or village water committees, but this is not necessarily the case.

In the downstream part of Mkoji-SC, there are no formal water resources management institutions at all. This is partly due to the specific characteristics of this area. Here, livestock keeping and rainfed agriculture are the dominant livelihood activities, and these produce very little interdependencies among water users, thus eliminating the need for collective water management institutions. However, the situation in this zone has changed recently, with interdependencies growing between users in the lower parts and in the upper parts of the Mkoji-SC.

The result is that there is now a somewhat confusing diversity of local water management institutions in the Mkoji-SC. Moreover, despite this diversity, these local water institutions only represent a small minority of all the water users, i.e. the upstream irrigators. Hence a mechanism has to be found to incorporate other users, as households, rainfed agriculturalists, pastoralists etc, which do not tend to be as formally organized as irrigators.

The consequences of the dilemma

The consequences of the dilemma are in essence intrinsic to a process of institutional reform and modernization as initiated with the IWRM process and new agricultural policies. As such they are to a certain extent inevitable. However, it also highlights the need for a cautionary approach. As the case of

[6] Also in case of land, this is a relatively new process, where the new land act has only recently been enacted that formalises the individual entitlements. The registration of individual and formal land entitlements is under way, and by far complete.

[7] Registration is taking place under various acts and ministries, either as cooperatives, credit and savings associations or water users associations.

Mkoji-SC illustrates, it is very easy and convenient to concentrate on those entities, such as the already established irrigation associations and village committees, to initiate the reform and modernization process. The risk, however, is that other users such as the pastoralists or informal irrigators fall behind in the formalization process and enter into a viscous cycle of under-representation, lack of resources, and lack of development activities.

IWRM requires the formation of new institutions within an existing institutional landscape and this introduces a dilemma that we can now rephrase more sharply: If, on the one hand, one tries to shape the new IWRM institutions with a minimum of external support, the risk is that the new institutions essentially build upon the existing ones, with the institutional reform resulting in a mere "cosmetic" operation of changing labels. If, on the other hand, one provides explicit support to initiate and form institutions that are really new, ignoring the existing structures, one risks a failure of the institutional reform, as new institutions will be inadequately integrated in, and accepted as part of, the existing institutional landscape.

Dilemma 2: Neutral reforms versus actively reshaping power relations

Power and institutional reform

Institutional development is all about allocating and distributing power among stakeholders, and therefore the power factor is central to institutional reform. Institutions channel power and are a source of power, for instance through administering formal authority or granting parties access to the official circuits where policies and regulations are developed. Changing institutions will therefore also affect the existing balance of power. The full implications of this "power-factor" are rarely discussed in IWRM publications, although at the same time there seems to be an ideologically motivated drive to empower local stakeholders. However, the latter will be only possible if one is consciously aware of the power factor in institutional reforms.

The dilemma at work in the MSC: Reshaping power structures

Creating new institutions means creating new structures to channel power and this will benefit some stakeholders more than others. This is reflected in the institutional reforms and the formalization of water rights and water management institutions in the MSC.

Formalization of water rights

Ever since its establishment, the RBWO is progressively formalizing all existing (irrigation) water uses in formally issued and administered water rights. These water rights are issued in absolute terms (e.g. in l/s), differentiating between a wet and dry season allocation, which is accompanied by a water abstraction fee payable to the RBWO. In general, the water rights are not issued to individuals, but to the Water User Associations or Irrigators Associations of smallholder irrigation schemes, in line with the general principles of IWRM. These

associations are then responsible to collect the fees from their members, and for the operation and maintenance of their irrigation scheme.

Formal water rights are currently being issued to water users when they register their use with the RBWO. This requires all existing water users to register in order to obtain a formal water right, leaving users who do not register their water uses excluded from the legal system, turning them into illegal water users.

Since everyone who registers for water rights gets a formal water right allocated that is issued in *absolute* terms, the new system strongly favours those water users that register first. As water rights are currently registered by WUAs or IAs, which are only present in the upper parts of the Mkoji-SC, the upper zone irrigators benefit most. Furthermore, this new system is likely to result in over-allocation of water rights, which in fact is already occurring in the Mkoji-SC in the dry season, when available water supplies in the streams are falling short of the formally granted water rights.

In sum, the current formalization of water rights gives more power to those that register early - which are likely to be the upstream irrigators who are organized in WUAs, as well as some of the traditional elites. This clearly favors the stakeholders located upstream in the sub-catchment at the detriment of the downstream water users, who are traditionally the most vulnerable ones.

Formalization of water management institutions

Also in more general terms, the institutional process is towards formalization of new water management institutions. At the local level WUAs are formally established, which are then represented and federated at the higher level in a WUA Apex that represent water users in the communication with the RBWO and District Councils. An important aspect herein is getting access to the decision making processes in the RBWO and the District Councils.

Those stakeholders that are already formally organized have a clear advantage. They can be considered the institutional elites, who have power thanks to their existing institutions and the access to natural resources and production means that those institutions provide. In the Mkoji-SC in particular the irrigators that have received external support in the past can be considered to be the institutional elites. The establishment of WUAs is currently limited to the villages in the uppermost part of the sub-catchment where the existing village committees and irrigation associations provide a useful basis to start from and where there is active support from the Mbeya Rural District office. In the lower zone by contrast, there are no existing local water institutions to build on and external support is generally absent.

This means that the current institutional reforms actually increase the vulnerability of the lower zone’s agro-pastoralists. Not only do surface water stream not reach their villages in the dry season, they also do not have a voice to represent them in the WUA Apex organization and in negotiations with the Rufiji Basin Water Organization.

Consequences of the dilemma: Reinforcing existing power structures?

The above example shows not only how new institutions create new power structures, but in fact also indicates that the existing institutional elites are likely to seize most benefits of the changed power structures. This is true on the catchment level, as discussed above, but also within communities, where the traditional elites are the most educated, have most time and resources available to participate in new organizations and to adapt to new institutional rules and procedures. Furthermore, the elites are well represented in the old institutions, which often provide a basis for shaping the new ones.

Merely proclaiming new institutions does not change the de-facto power balance and therefore does nothing to create an enabling environment for more fair and equal water allocations.

Lessons learnt

Looking at the “power-factor” in institutional reforms raises the question of how we see these reforms - as a tool to empower the underprivileged or as a tool to facilitate improvements in water use efficiency without aiming to reshape existing power structures? Moreover, one should also consider what the answer to this question means for the chances on success and sustainability of the new water institutions. Institutional reforms that maintain or improve the status quo are most likely to get the support of those in power, providing an important leverage for success. However, reforms that aim to redistribute power and to strengthen the position of the underprivileged may create opposition from the traditional elites, who might effectively block reforms that reduce their power, whereas the underprivileged generally lack the resources to make reforms a success on their own.

The experiences in the MSC suggest that if aspects of power are not consciously discussed, new water institutions are likely to provide just another vehicle for past elites to exercise their power. Although this in fact makes it easier to implement institutional reforms – those in power are of course in the best position to make reforms a success – it does not help much to improve equity and fairness in water uses.

Therefore, if one wants to improve equity and fairness and empower the underprivileged, active interventions are required. Special attention and means should be made available to capacitate those that are not yet organized. To organize them, represent them in the new institutions, and provide them with new means to make better use of their resources. In the Mkoji-SC this clearly applies to the pastoralists, domestic water users, rainfed agriculturalists, and others.

Dilemma 3: Long-term versus short-term objectives

Effective IWRM, including institutional reforms, requires a long-term perspective. It takes time to establish new institutions, to ensure that they are properly functioning and to allow both new and existing institutions to find new roles and working modalities in the changed institutional landscape.

Furthermore, sustainability in IWRM essentially implies a long-term perspective, ensuring that IWRM strategies do not have negative impacts on future generations. However, existing water problems may be pressing and may not allow one to wait until new institutions are in place and functioning well. Focusing only on long-term institutional processes and the needs of future generations, while ignoring the immediate problems, is likely to leave local stakeholder disappointed. It would mean asking them to invest precious time and energy into processes that they cannot see the benefits of. In reality, short-term results are necessary to ensure long-term commitment of stakeholders.

The need to combine long-term institutional reforms with short-term results means that one has to start building institutions around real problems and solutions – if stakeholders do not see within a reasonable period of time how institutional reform benefits them, they will not support it.

The dilemma at work in the MSC

In the more recent efforts to introduce IWRM in the MSC, attempts have been made to strike a balance between long-term and short-term objectives by discussing the actual water management problems and possible solutions throughout the process, even though the process itself should support the long-term objective of institutionalizing local participatory planning and management practices. The participatory planning workshop hopefully contributed to the creation of a shared platform for communication and plan development by local stakeholders, but at the same time, it resulted in very concrete proposals for actions that could be undertaken on the short term[8].

The workshop participants identified not only long-term institutional actions, but also actions such as training local stakeholders on rainwater harvesting techniques and the construction of small charco-dams. These alternatives offer a path towards relatively rapid implementation, before the official institutions are fully operational and functioning. However, also here care has to be taken that both the short- and the long-term processes that were initiated are adequately followed-up by local and national institutions.

Lessons (being) learnt

Long-term institutional reforms and short-term technical improvements, or “software” and “hardware”, need to be intertwined (Steduto et al., 2004). However, doing so requires a delicate balance. In past projects where links between long-term institutional reforms and short-term technical improvements have been incorporated in the project design, this sometimes resulted in cosmetic operations by local beneficiaries who formed “paper” institutions and organizations only to gain access to the “hardware” components of these projects. Getting the balance right requires careful project design and

[8] During this stakeholder workshop, an interactive problem analysis was done, identifying priority problems as well as ways to address them. In addition to the long-term solutions and actions needed from external stakeholders, also specific actions that the participating stakeholders themselves could implement on the short-term were discussed as part of the workshop.

monitoring of developments, as well as the means to accommodate both short-term and long-term actions and processes.

Unfortunately, the MSC experiences cover a too short period to draw substantive conclusions on the balance between long-term and short-term objectives, but one important observation is that developing long-term institutional development and addressing immediate water problems reinforce each other. Institutional development has to serve the improvement of water management practices, and water management practices require an adequate institutional environment for their sustained implementation. Without visible results on the short run, the long-term institutional objectives are not feasible. Moreover, without visible results, the practical adequacy of institutional reforms should even be questioned. If new institutions cannot deliver at least some results on the short to medium term, one should seriously reconsider why they would be expected to show an improved record on the long term.

Dilemma 4: Incremental changes versus visionary master planning

Water master planning and the science of muddling through

Water resources management has a history of “master plans”, “comprehensive strategies” and “blueprints” that aim at the implementation of encompassing packages of measures. Such comprehensive strategies and blueprints are easily associated with far-reaching changes and large scale infrastructures, such as privatization of water services, dam construction and associated large-scale reservoirs or irrigation schemes. However, in the policy sciences, it is known since long-time that in practice, the implementation and formulation of most policy plans is characterized by incremental changes rather than drastic new steps (Lindblom, 1959). If this theory already applies to the majority of planning processes on the national level, it seems even more applicable to the local level. Locally, there is often little room for dramatic changes and visionary master plans. Resources to realize them are simply not available and the resistance to far-reaching measures is often more felt on the local than the national level.

Therefore, focusing on a comprehensive strategy, a blueprint or a master plan is likely to result in a disappointing experience, designing plans that look good on paper but bad in practice. However, without such strategies or master plans, one is left with an incremental process of “muddling through” based on the existing situation (cf. Lindblom, 1959). For rural communities in developing countries this would provide a rather grim outlook when it comes to realizing sustainable and significant improvements.

The dilemma at work in MSC

In the MSC, the case of water right reforms once more proves illustrative to show how the ideal of comprehensive planning might conflict with the limited possibilities for drastic change locally. Although the new system of water rights undoubtedly looked good and fair on paper, practice shows that it is not so easy to implement (see also Van Koppen *et al.*, 2004).

Formal water rights are currently being issued to water users when they register their use with the RBWO. This requires the RBWO to administer the distribution of water and the recovery of funds in line with the individual water rights. If done for all individual water users, this would be a very time consuming and costly procedure, requiring the RBWO to deal with a large number of individual water users in the Rufiji River basin. In the original plans, the WUAs would act as an intermediary between RBWO and local water users, but, as discussed above, the establishment of WUAs is not going as smoothly as one might wish.

Also, water rights are presently issued in absolute terms and linked to a fixed water fee to be paid to the RWBO. This process leads registered water users to claim the full share of their formal water rights, to which they consider themselves to be entitled because of the water fee they are paying. This aggravates downstream water shortages during times of real and acute water scarcity. In fact, for a robust allocation of rights, the RBWO needs to have an idea of the availability of water resources in the basin. Currently such insight is lacking, which makes a fair allocation of the available water resources an almost impossible task.

The difficulties with the existing system of water rights allocations are reflected in the strong need expressed by the local stakeholders for a revision of this water rights system (FAO, forthcoming).

Lessons learnt

With some exceptions, the only changes that can be made successfully on the local level are incremental changes. This is important to realize, because it has serious consequences for what can be done and for what water management institutions should aim for. Even though comprehensive strategies and long-term visions can provide useful guidance, the actual way forward is likely to be one of piecemeal progress, shifting towards adaptive management rather than implementing blueprints. Therefore, care has to be taken to incorporate realism and attention for immediate challenges in local planning. In making an impact, it seems more practical to focus on the facilitation of adaptive management, “learning by doing” and on realizing incremental changes in the right direction rather than on the elaboration of detailed master plans.

Dilemma 5: Centralized versus decentralized management structures

An “old” friend revisited – (de)centralization

IWRM requires *integration* across scales, meaning that it needs to carefully balance the roles of water governance bodies at different administrative levels. In most cases this implies further decentralization, as the majority of past water management institutions can be characterized as centralized, hierarchical and technocratic (see Ravensteijn *et al.*, 2002). Subsidiarity[9] and decentralization

[9] Subsidiarity refers to the principle that all water resources management tasks and activities should be executed at the lowest appropriate level (cf. GWP, 2000)

thus have become an important part of the new approach to governance under IWRM.

However, one should not be blinded by the need for more subsidiarity or decentralization, only to find out that the integrative roles of centralized institutions have been neglected. On the one hand, decentralization is often needed to improve the functioning of existing institutions, but on the other hand, an important part of the water management problems may be the result of national level developments, which require a national rather than a local solution. Although this dilemma has in fact been identified and discussed before (see e.g. GWP, 2000), we belief that the experiences from the MSC add some useful empirical insights to the existing literature.

The dilemma at work in the MSC

Local WUAs and the WUA Apex organization may help to address some of the problems in the MSC, such as the conflicts over water within irrigation schemes or the generally low water use efficiencies in the area. Still, an important part of the problems is located on the level of the river basin rather than the sub-catchment, with the downstream drying up of the Great Ruaha River generating an important pressure on the MSC stakeholders to realize significant water savings. However, if water savings are realized in the irrigation schemes in the upper parts of the MSC, these savings will not automatically benefit downstream users, as illustrated for instance by past experiences with irrigation improvement projects (Lankford, 2004).

Likewise, competition for water between irrigators and livestock keepers has increased considerably recently due a national level decision to gazette some of the traditional dry season grazing grounds for MSC livestock. This national level decision forces local livestock keepers to look for other grazing grounds in the MSC, driving the livestock keepers into conflict with irrigators (see Hermans *et al.*, 2004).

Finally, the national policy to promote privatization has led to the decision to privatize the state-owned Kapunga rice farm that that supports the livelihoods of a significant amount of smallholders in the MSC. It is rather unlikely that this situation can continue once the farm is run by a private company.

All these examples show there is an important connection between national and local level processes, thus indicating that decentralized institutions cannot formulate equitable and sustainable water resource management strategies without some degree of higher level co-ordination.

Lessons learnt: the critical role of the intermediary institutions

In striking a balance between centralization and decentralization, the “intermediary” institutions have a key role to play. For the MSC, these are the RBWO, the Districts and the WUAs. They provide the institutional linkages between the local community practices and national policies. There is relatively little experience with the new roles of these intermediary institutions in water management in Tanzania, but nonetheless the way in which these new

institutions can and will take up their roles is critical to the success of moving towards IWRM in the MSC.

If establishing these intermediary institutions is one thing, making them work is quite another. Here the existing national government agencies and training institutes should provide support through knowledge transfer and process facilitation, to ensure that the intermediary institutions can take up their roles in translating national policy visions to local realities and vice versa. The importance of external support is for instance illustrated in the process of WUA establishment in the MSC, where lower zone water users seem to be incapable to form these new institutional entities without some external support.

CONCLUSIONS

In this paper, we have discussed some of our experiences with the local implementation of IWRM processes in the Mkoji sub-catchment in Tanzania. Whereas most literature on IWRM discusses general principles and guidelines, implementing those guidelines on the local level is not straightforward. When moving towards IWRM on the local level, dilemmas arise that are often difficult to handle.

In the Mkoji sub-catchment there are several drivers that support change towards IWRM. There is a general awareness and willingness among local stakeholders to address IWRM problems and the nation-wide institutional dynamics favour the start of new processes. Nevertheless, even in this generally supportive setting, the implementation of IWRM principles requires one to tackle various dilemmas. This paper has discussed five of these dilemmas in more detail: New versus existing institutions, neutral reforms versus actively reshaping power relations, long-term versus short-term objectives, incremental changes versus visionary master planning and centralized versus decentralized management structures.

These dilemmas are not completely independent or separated, but they are often linked to some degree. For instance, the dilemma between incremental changes versus visionary master plans is often linked to the dilemmas of a short- versus long-term focus and the dilemma between centralized versus decentralized management. Therefore, addressing institutional dilemmas requires and integrated approach and some strategies might help to counter multiple dilemmas.

We identified dilemmas in the Mkoji sub-catchment but we stopped short of an in-depth discussion of the strategies to address them. From our experiences it is clear that there are no easy ways to tackle these dilemmas and probably each situation requires another approach to balance the two extremes of a dilemma. However, simply pinpointing these dilemmas can already be very useful for the implementation of IWRM processes; before one can define strategies to cope with dilemmas, one should first identify them. Pinpointing dilemmas helps to identify pitfalls that should be consciously addressed rather

than ignored to make IWRM a success. We hope that this paper provides a step in that direction.

ACKNOWLEDGEMENTS

This paper is based on work that has been done for the project “Integrated Water Resources Management for Vulnerable Groups in the Mkoji sub-cathment”, which was funded through the FAO – Netherlands Partnership Programme. We would like to acknowledge the contribution of all people involved in the execution of this project to the results presented here. Thanks are especially due to the members of the Soil Water Management Research Group in Igurusi and Morogoro and the local stakeholders in the Mkoji sub-catchment that participated in focus groups discussion and stakeholder meetings.

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