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Rural Water Tenure in Kenya and Tanzania

Changing Tenure Patterns, Legal Regimes
and Community Responses

Christopher Huggins

OSSREA Development Research Report Series, no. 5



Organisation for Social Science Research
in Eastern and Southern Africa

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Organisation for Social Science Research in Eastern and Southern
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TABLE OF CONTENTS

<i>List of Tables</i>	v
<i>List of Text boxes</i>	v
<i>Acknowledgements</i>	vi
<i>Preface</i>	vii
INTRODUCTION	1
1. WATER AND DEVELOPMENT IN KENYA AND TANZANIA	4
1.1 Characteristics of Indigenous Water Management in Kenya and Tanzania	4
1.2 Consumption Patterns	8
1.3 Water Supply Infrastructure	13
1.4 Environmental Management	15
2. LEGAL AND ECONOMIC ASPECTS OF ACCESS TO WATER	19
2.1 Characteristics of Water Tenure	19
2.2 Global Trends in Water Resources Development and Management	22
2.3 State Intervention in the Water Sector in Tanzania	24
2.4 State Intervention in the Water Sector in Kenya	27
2.5 The River Basin Management System	29
2.6 Allocation of Water Rights	31
2.7 Land Tenure and Access to Water	34

3. INSTITUTIONS INVOLVED IN WATER MANAGEMENT	39
3.1 The Local Government System in Tanzania	39
3.2 Current Influence of Customary Water Management Institutions	42
3.3 Water Development Institutions: Responsibilities and Co-ordination	45
3.4 Water Conflicts	53
4. POLICY OPTIONS	60
4.1 Summary of Key Policy Issues	66
NOTES	70
REFERENCES	76

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Table 1:	Population and Water Availability Data, Tanzania and Kenya	9
Table 2:	Irrigation in Tanzania and Kenya (area in ha)	12

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Box 1:	Sustainable customs undermined by government policies	6
Box 2:	Some negative impacts of flood-control and irrigation	18
Box 3:	The importance of hydrological data	20
Box 4:	Private investment in rural, water supply	27
Box 5:	Controversial water rights	33
Box 6:	The Barabaig land case	36
Box 7:	Land tenure and conflict in Kenya	38
Box 8:	Rombo Irrigation Scheme. Kenya	39
Box 9:	Clarifying community roles	47
Box 10:	Information as a constraint to participatory Management	53

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This publication is on Rural Water Tenure in Kenya and Tanzania. It is a research report. It covers issues of water development and management and focuses on participatory and community water management. It deals with demand management approach to water management as related with rural water availability. The research report discusses potable water, water sources, river basin management system and water management institutions. It also raises issues of changes in land tenure and ownership patterns in the use and management of water. The legal and economic aspects of access to water are explained. The report shows that the role of the state is moving from a provider to that of a regulator or a facilitator. It links the availability of safe drinking water with that of poverty. In addition, the research report deals with national water policies of Kenya and Tanzania and discusses issues of rights to water and disputes over the use of water.

One of the issues that dominated world forums is the discussion on water. It has drawn the attention of many because it is so basic and it is getting scarce. There is limited water resource and there is competition on the use of water. Although many dimensions of water use in agricultural, industrial and for domestic or municipal purposes have been looked into, this publication is presented as a case study on two East African countries: Kenya and Tanzania. OSSREA hopes that the research report would contribute to the discussion in the area of rural water development and management and in poverty alleviation. OSSREA is thankful for the author and the African Centre for Technology Studies for conducting the

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Tegegne Teka
Regional Project Co-ordinator
OSSREA

INTRODUCTION

"The people from the government came and said, 'The water belongs to the nation, and you must share it.' But the villagers said 'No, the water is ours' and armed themselves in order to fight".

Anna Sembeo of Oldonyosambu village, Arusha Region, Tanzania

This research report looks at changing patterns in water development and management in Tanzania and Kenya, and examines the responses of government and other stakeholders to these changes. It focuses especially on recent attempts to move towards an integrated, participatory, demand-management approach to water management, as it affects rural water availability. The report focuses on rural water availability that is motivated by the fact that approximately 80% of the population of Africa is found in rural areas, and only about 37% of these people have access to "safe" water sources.¹ Issues surrounding domestic water supply are, therefore, of utmost importance for the majority of the inhabitants of the continent; however, these needs must be balanced with other water uses - for livestock, agriculture, and hydropower, for example. Both Tanzania and Kenya are attempting to juggle these competing uses through Integrated Water Resources Management (IWRM) systems. One of the major constraints to effective water development and management, as elsewhere in Africa, is rural poverty: 59% of people living in rural areas are categorised as "poor" and 44% as "very poor".² In Tanzania, about 85% of absolute poverty is located in rural areas.³

The report is based on field research conducted by ACTS⁴ in the Arusha Region of Tanzania in 1999 - 2000. and conducted in Kenya during previous years.⁵ This case study data is, then, set in the context of national water policies. The paper was first written in 2000 and updated in 2003. Water policies are undergoing rapid change in both countries, especially in Kenya due to a recent change of government.

This paper should, therefore, be seen as an attempt to express general trends rather than an accurate "snapshot" of the situation at any one time.

Research in Tanzania highlighted a number of latent and manifest conflicts over water. The availability of water during the dry season is diminishing because of erosive land use-patterns, poor management, population increase, and the rising number of commercial and small-holder irrigation systems. Conflicts range from potential legal disputes over incompatible requirements of different types of users, to acts of vandalism and violence. The disputes are rarely straightforward, but it is clear those management problems and disputes over water are often symptoms of uncertainties over "ownership" of water - indeed, there are fundamental differences in opinion between stakeholders (e.g., government and communities) over rights to water. In Tanzania (as in the majority of countries around the world) water is categorised as a national resource, to be allocated by the state on behalf of the people. Despite this, many water users see their historical, customary rights as paramount, and question why the government should require them to invest in water storage and conveyance infrastructure. Indeed, the government has in the past acted as a water provider, and has taken responsibility for such investments. The state is now repositioning itself as a regulator, rather than water undertaker, though the transition is not straightforward.

A number of aspects of water tenure are dealt with in this paper. While a narrow definition of "tenure" concerns legal water rights as granted by authorities, water use generally requires investment in infrastructure and management systems. For this reason, access to water concerns not just permitted rights, but also the capacity to install water related technologies, and relationships with other users of shared water sources. Stakeholders outside government should be

included in the decision-making processes that affect water use - participatory processes are being introduced in both Kenya, and Tanzania, but are yet to be fully operational. There is a need for the "hand-over" of responsibility for management of community water supply systems to be paralleled by increased community participation in decisions at the local and basin-levels. Community representatives will require training in principles of water management as well as organisational and negotiating skills. Currently it is possible for the powerful to bypass or dominate the allocation processes, resulting in inequalities in access to water. These include the lack of control over water sources often experienced by poorer communities, as well as downstream users who are worst hit by diminishing water flows. Within communities, individuals and households may be marginalized from local processes of water development and management because of gender bias, poverty: or other factors. Participatory means of assessing the needs of the community as a whole can reduce this tendency, although imposing "equitable" decisions on communities from outside may not be popular, ethical, or sustainable.

In 2001. an official Republic of Kenya report concluded that, "the downward spiralling conditions facing "Kenya are reaching critical and irreversible levels and need to be addressed urgently."⁶ Through Session Paper No 1 of 1999. the Water Act 2002, and the draft National Water Resources Management Strategy, Kenya has started to address these problems. In Tanzania, principles of IWRM. are being implemented. However, in both countries, the challenges are great and sustained, concerted efforts are necessary on the part of government, donors, water users and all other stakeholders.

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1.1 Characteristics of Indigenous Water Management in Kenya and Tanzania

Access to water is a prerequisite to human life, and naturally Kenya and Tanzania have long histories of evolving water technologies and governance mechanisms. In pre-colonial times, management of water was an integral part of the overall customary laws and behavioural norms of each tribal society. Sometimes water sources, particularly springs, were so highly valued that they were considered sacred.⁷ Some of these customs are still in operation, while others have been discarded or modified. In this section the indigenous water management regimes are described using the past tense; however, though they may have altered to accommodate changes in technology, governance regimes, and demographic factors, many of the systems described below are still operative across East Africa.

The influence of water systems in overall community governance can be very great, and shared water resources are incentives for good inter-community relations. Water tenure was so important to the Chagga people of Mt Kilimanjaro, for example, that their socio-political institutions followed the flow of irrigation furrows and streams.⁸

Water regulations varied considerably between different cultures, and it is difficult to make blanket statements about forms of water tenure. However, at the risk of generalising, it is possible to say that ownership of water sources was usually invested in the local community rather than the household. The nature of the community unit varied, and might include the clan rather than the village - for

instance, this is the case amongst many pastoralist groups, such as the Barabaig of Hanang District in Tanzania. Water was rarely "owned" exclusively even by these groups; however, access by others was often allowed, subject to permission being sought and reciprocal arrangements sometimes being made. Clan links can straddle large geographical distances, and are part of a system of mutual assistance (both grazing land and water) for households who share the same clan. Often a distinction was made between different water uses. Amongst the Sukuma of Tanzania, any water source, even those found on private land, were traditionally free for *domestic* use by anyone. Regarding water for cattle, however, permission had to be sought and it was possible to charge people for use of a private watering hole." Amongst the Barabaig, any local person could take water for domestic use from a well, but only clan-mates of the person who dug the well could water *cattle* there.¹⁰ Agreements over water use are particularly important amongst societies who are highly mobile, in order to plan migration-routes. Pastoral societies have developed wide-ranging kinship networks that allow negotiated access to water and grazing rights among the territories of their clan, tribe, and sometimes amongst other tribal groups. This is another example of political structures being shaped by the challenges and opportunities posed by the need to gain access to water. These kinship networks and mobility strategies have been altered in some areas of Tanzania by the increasing importance of settlements to pastoral livelihoods, the conversion of rangeland to agricultural land, and the "privatisation" of land in general¹¹ (see Box 1 for an example from Kenya).

Box 1: Sustainable customs undermined by government policies

In the arid Wajir District of Kenya's North-Eastern Province, the growth of settlements is encouraged by the Government, via an unwritten policy of demarcating even unsettled seasonal water points as administrative centres (locations or sub-locations). Once a site is demarcated in this way, a chief is appointed. The power of the chief lies in his ability to encourage people to settle and make his location significant. The total number of settlements thus increased from just four in 1940 to forty-six in 1996.

Customary controls, which for generations have prevented people from grazing their cattle close to wells in the dry season, were previously supported by the government chief. But the settlement policy has given the chiefs an incentive to disregard customary norms. To encourage settlement, they will for example fence water-pans previously used for watering animals during the dry season, for use exclusively by settled people and their animals.

Although settlements have brought benefits, such as improved healthcare and education, they have also had negative effects. Areas formerly reserved for wet-season grazing can also be utilised in the dry season, leading to overgrazing across large parts of the district. The key impact is the reduced availability of key fodder species, a situation that may be reversible, but is currently reducing nutrients available to herds. Consequently, although more animals are kept than in the past, their milk and meat yield is poorer, with associated human health impacts.

Sources: *Department of Livestock Production / Oxfam: (1996)*; Former District Officer. Wajir. *Pers. Comm.* October 2000.

Customary systems of water management were by no means static. Regulations and technologies altered over time, and innovations were introduced as a result of cross-cultural exchange between communities as well as experimentation within single communities. It is often possible to trace the historical patterns of dissemination of water technologies as they spread from community to community. One of the study sites near Mt. Meru in Tanzania, for example, is believed to have been introduced by hired irrigators from sites (at least 150 years old)¹² on Mt. Kilimanjaro. More recently, the fall of coffee prices has encouraged local people to imitate lowland farmers

who grow vegetables such as cabbages and tomatoes. This is an example of economic policies (liberalisation of national marketing structures) influencing water use. In other places, irrigation was introduced by immigrants and was not readily adopted by the "original" inhabitants. The Maasai of Rombo in Kajiado District, Kenya, for example, did not readily adopt irrigation as a means of livelihood when members of the Chagga, Gikuyu and other communities brought the technology to their area. The Maasai instead benefited from their role as landlords for many years, and it is only recently that some of them have started to cultivate or have taken an active role in water management. The balance of power between immigrants with farming experience and the less experienced landlords has resulted in local political conflicts.¹³ Irrigation in the "wetland-in-dryland" environments is to a large extent the result of population pressure in areas of high agricultural potential, as people migrate due to land fragmentation. However, it may also be the result of innovation amongst existing dryland communities.¹⁴

It is perhaps unwise to generalise too much about the nature of indigenous systems. Amongst some groups inhabiting high-potential areas, control of water was vested to a greater extent in the individual household. Amongst the Gikuyu of Kenya for example, water availability on inherited land is traditionally seen as "God-given". Thus a household with riparian access to water can often abstract large amounts for private use even at the risk of resource depletion or at the expense of the community in general. Such households will be tolerated by society, unless "the actual survival of members of the community is seriously threatened"¹⁵. Many Gikuyu have migrated from their traditional, well-watered homelands to more arid environments, where such an emphasis on private rights may not be appropriate.

To summarise, most indigenous systems of water management in Kenya and Tanzania were based on the concept that water for *certain, limited uses* was a free, open-access resource, while access for other uses was regulated and controlled by specific groups (whether chiefs, elders, clan leaders, or household heads). It is possible to generalise that, amidst the great variation found in water governance systems, the amount of control increases in proportion to the degree of labour invested in the water source. Of course, access to water is dependent on access to land, and the various systems of land tenure are also relevant. Indigenous land tenure systems range from communal systems with seasonal access agreements in rangeland areas, to individualised plots in farming areas: These have been considerably altered by Tanzania's land laws and policy of "villagisation" (see section 2.6).

This is the background upon which the modern interventions in water supply were superimposed. The survival of these customary systems, their relevance today, and their interaction with statutory law. will be discussed later in this paper. First, it is necessary to look at current consumption patterns, as changing economic systems, new technologies and increased populations form the context of water management regimes.

1.2 Consumption Patterns

Currently, water consumption is not adequately monitored in either country. In Kenya, for example, there is no systematic monitoring (e.g.. of surface flows, groundwater levels, sediment transport, water quality, land uses, and water uses) at the national level. Consumption must therefore be estimated - a situation which makes efficient allocation of water very difficult.¹⁶

1.2.1 Aggregate Usage

Population figures and usage data are shown below in Table 1. Water demand in Kenya is projected to rise to 3.096 million cubic metres (MCM) annually in 2010. compared to the total of 1.148 MCM in 1990¹⁷. This represents a 268% increase over twenty years, a huge challenge to a country, which is already suffering from "chronic water scarcity".¹⁸ The increase may also be concentrated in specific areas, posing particular management problems. Between 1990 and 1993 water use in Laikipia District increased by 500%.¹⁹

In the Tanzanian case, water demand in *rural* areas is expected to increase from 298.6 MCM in 2000 to 558.6 MCM in 2010. and to 736.3 MCM in 2020.

Table 1: Population and Water Availability Data, Tanzania and Kenya

	Tanzania	Kenya
Population growth rate	3% ²⁰	3.4%
Total population	32.3 million ²¹	28.6 million ²²
% of population living in rural areas	78% ²³	76%
% of renewable national supplies used each year	1.5% ²⁴	6% ²⁵ .
% of total population with access to water	66% ²⁶	62% ²⁷
% of rural population with access to water	38% ²⁸	42%. ²⁹
Agricultural water use as of total	97% ³⁰	Estimates vary between 62% - 97% ³¹
Total average rainfall p.a.	937mm ³²	750mm
Average rainfall p.a. per capita	2590cubic m	647cubicm ³³

Water demand far outweighs current supply. These problems are not simply due to a limited amount of surface water and groundwater resources. In addition, the national capacity to utilise existing water

resources is limited. Part of the reason for this is the extreme seasonal of rainfall, especially in the driest areas. In East Africa, most of the total precipitation comes in short rain seasons (frequently of great intensity) which make containment of the water a substantial engineering challenge. Currently, Kenya's water storage capacity per person is one-tenth that of South Africa, meaning that floods are largely uncontrolled and that water is not available during times of drought.³⁴ The National Water Master Plan indicates that for water demands projected for 2010 to be met, the current storage capacity should be expanded by a factor of 30. This calculation is based on water flows prior to 1990. When current deforestation rates and the resulting changes to river flows are included in the calculation, Kenya could need to increase its storage capacity by a factor of 80 - a massive task by any standards.³⁵

Rainfall in Kenya and Tanzania is also very unevenly distributed geographically. Half of the total area of Tanzania receives less than 750mm, which is under the 760mm threshold usually reckoned to signify potential for secure rain-fed agriculture (although this depends very much on evapo-transpiration rates, amongst other factors). Tanzania (like Kenya) also has areas of fairly high population concentration: almost two-thirds of the population live on just 10% of the land.³⁶ The well-watered central and western areas of Kenya, which represent just a fifth of the land area, support about three-quarters of the population. Thus even in the high-precipitation areas, competition for water is intense.

Groundwater is abundant in Tanzania and is especially significant in the central regions of Shinyanga, Dodoma, Singida, and Arusha. There are a total of 7,000 deep boreholes in the country.³⁷ However, the quality of groundwater varies, as high levels of minerals and salts affect some aquifers. In Arusha, some villages use water which is

extremely high in fluoride, but the authorities have been unaware of this until recently.

There are about 13,000 boreholes in Kenya, about 55% of which are believed to be operational. While the number of hand-dug wells is not known, they are estimated to represent a total abstraction figure of 10% of the total abstraction from boreholes.³⁸

1.2.2 Consumption by Different Water-Uses

i. Water for domestic use is crucial for good health. Unfortunately, only 31% of households in Tanzania have access to clean water within 15 minutes walking distance. In 1996 Tanzania was 7th lowest in a global league table of average domestic water use for drinking and sanitation per capita per day, with a figure of just 10.1 L.³⁹ A number of other studies have found that water use varies widely between households. This is far below the 50 L figure, which is recommended as a standard minimum by many water experts.⁴⁰ Despite efforts to increase domestic water supply coverage between 1970 and 1990, it seems that access to piped water actually declined during this period, by about 22%.⁴¹

All of the case study villages in Tanzania used piped or protected springs for their domestic water, which was generally free apart from ad-hoc repair charges. However, in some villages, people took water from irrigation furrows (which may be polluted with pesticide residues from coffee crops), because springs were too far from their homes. This is common in other areas too.⁴² In both Kenya and Tanzania, women and children generally take the responsibility for domestic water-collection and in-house management.

ii. Irrigation is the most consumptive water use globally and within the East Africa region. In terms of traditional schemes, water

efficiencies can be very low. Up to 70% of the water can be lost before it reaches the fields, through seepage and evaporation. In Arusha, projects such as the Traditional Irrigation Improvement Project (TIIP) work to improve the operation and management of small-scale irrigation, through technical advice and community institution-building. TIIP requires that at least 30% of the committee members are women. Often, women were not previously involved in decision-making, and they are frequently discriminated-against as regards water allocation: in one case, women were even forced to irrigate at night, despite security risks.⁴³ Smallholder irrigation schemes can improve food security and raise rural income levels. There is a total potential irrigation area of 1 million ha in Tanzania, of which about 60% is located in the Rufiji basin.⁴⁴

Table 2: Irrigation in Tanzania and Kenya (area in ha)⁴⁵

	Small-Scale	Private Commercial	Govt. Managed	Total
Tanzania	120,000	25,000	25,000	150,000
Kenya	34,650	40,700	9,000	84,350

iii. Hydroelectricity is significant in both countries. It is crucial to the Tanzanian economy, generating 90% of the indigenous commercial energy production.⁴⁶ The government's ultimate aim is to completely phase out thermal power plants and replace their input with hydropower. However, there are currently severe problems with siltation of dams. The Hale reservoir, for instance, has had its capacity reduced from 21 megawatts to 1.7 MW due to loss of storage potential in the silted reservoir. This siltation due to erosion of topsoil is ultimately caused, or at least exacerbated, by deforestation, especially on hillsides. Another problem is reduced water flows caused mainly by abstraction from surface water for irrigation.

Prior to the drought-related power crises of 2000 and 2002, about 70% of power in Kenya came from hydroelectricity. There are a number of issues complicating further development of hydropower, including controversy over reported environmental and social impacts as well as funding issues and siltation of reservoirs, exacerbated by poor management. Environmental impacts resulting from hydro projects on the Tana River and Turkwel Gorge, for example, were identified prior to construction, but inadequately addressed.⁴⁷ Implementation of the Sondu-Miriu Hydroelectric Power Project in Western Kenya is currently stalled - three-quarters of the way through the construction process.⁴⁸

1.3 Water Supply Infrastructure

Of the existing domestic water supply schemes in Tanzania, many were built during the 1970s or 1980s. Hand-pumps have limited life spans of generally 15-25 years. These schemes were also designed for a small population - the optimum demand may have been surpassed after just 5 or 10 years, and current levels of use increase the physical pressure upon the systems. It is estimated that around 30% of schemes are "malfunctioning".⁴⁹ Many of these problems are not taken into account when levels of water demand and supply are estimated, so that current estimate may be optimistically high. These problems are not just confined to rural areas - during the water crisis affecting Nairobi and other Kenyan cities during 2002, it emerged that water losses in supply systems operated by Nairobi City Council were in the region of 50%. due to lack of funds for maintenance and illegal connections.

In a number of towns in Kenya, such as Nairobi and Eldoret, water supply services are in the process of being privatised. This has already happened in Dar es Salaam, where Biwater International of UK has been granted a 10-year lease to manage water supply services

jointly with Gauff Ingenieure of Germany.⁵⁰ There has been considerable debate about the wisdom of privatisation in the developing world. Those advocating privatisation argue that only the private sector can guarantee efficient service delivery, whilst opponents counter that prices for water in some Latin American cities more than doubled after privatisation. They also claim that donor conditionality, especially those of the IMF and the World Bank, are the driving force behind such reforms.⁵¹ As yet, privatisation is a largely urban phenomenon, though of course small-scale informal (*jua kali*) water vendors do operate in a few rural settlements, particularly during times of drought.

Tanzania and Kenya cannot rely solely on new schemes to solve their water supply problems. Studies show that the costs of new water projects tend to rise in terms of construction costs per unit of water supplied. This increase is due to the increasing remoteness of sources being tapped, and the need for more complex supply systems. Therefore, it may prove more cost effective in the long run to invest in training and policy measures that help to make water distribution more efficient and equitable. At the same time, it is important not to underestimate the need for new water systems, especially in arid or semi-arid (ASAL) areas. Dryland areas that have minimal opportunities for groundwater exploitation require a combination of systems such as earthdams, sub-surface dams, and domestic rainwater catchment structures. These may not be especially expensive although the remoteness of some areas leads to high transport costs for materials. Arid areas also require in-depth strategic planning of water resource development because of the impacts of water availability on herd movements and settlements.

1.4 Environmental Management

There is great variation in the distribution of water resources across Tanzania and Kenya. Most of the water sources originate from forested highland "water towers", such as Mt Meru and Mt Kilimanjaro in Tanzania, and from Mt Kenya and the Aberdares, in Kenya.

A lot of water is often used in the foothills surrounding these areas, particularly by traditional irrigation schemes in Tanzania, as well as larger-scale commercial operation, in some instances. If water use can be managed efficiently, more water will be freed for people in downstream.

The continued availability of water depends on the conservation of forests and the use of soil and water conservation technologies in people's farms. Forests capture moisture from mist, increasing rainfall levels by up to 20%.⁵² As woodland areas are cleared for cultivation (sometimes without the benefit of soil and water conservation measures such as terracing) less water permeates the ground, and more is diverted away from the groundwater store as runoff.

Springs and other water sources provide diminishing dry-season yields due to catchment degradation. Downstream of degraded catchment areas in Kenya, cyclical drought periods which generally occur on a cycle of around ten years, are increasing in duration from the current 2 year average, and are projected to increase to 4 years if catchments are not protected in the near future. Global climate change may aggravate this trend.⁵³

In Arusha region of Tanzania, for example, boreholes that supply Arusha town are providing lower yields due to reduced groundwater

levels and the town suffers frequent water shortages: Some rivers in Arusha region have seen reductions of 90% in dry-season water levels over the past thirty years.⁵⁴ There are few man-made storage facilities to capture wet-season water supplies for use during the critical dry months.

Flooding in the wet season becomes worse, with river flows increasing by 15-30% in degraded catchments. Run-off water also transports large amounts of topsoil, posing problems of siltation of dams downstream. Sedimentation in the Ewaso N'giro basin of Kenya is thought to have increased 15-fold since 1970.⁵⁵ As a result of topsoil erosion and the conversion of wetlands (which provide natural filters against sedimentation), irrigation schemes in the Nyando catchment in Western Kenya have increasingly been crippled by the sedimentation of canals. The Gem-Rae scheme, for example, constructed in 1985, was initially cleared of sediment every 2 years. By 1995, high sedimentation rates meant that it had to be cleared twice per week and after the 1997 El Nino floods it required daily maintenance. It was eventually abandoned, as farmers spent all their time in maintenance and could not invest time in cultivation.⁵⁶

Conserving wooded catchments is a very difficult challenge, as population pressure on the land in most of these high potential areas is high and is continuously rising. Hillside communities may need incentives in order to conserve resources that could, if harvested, bring considerable short-term profits. Eventually, water charges could be used to finance conservation of watersheds, although neither local people nor the Ministry of Water may want to "subsidise" catchment conservation. In the last years of the Moi administration, forest excisions (de-gazettement of protected forest areas, followed by allocation for development) affected the five major water tower areas.⁵⁷

The Pangani Basin in Tanzania illustrates the widespread challenge of competing water uses. The Pangani runs through Arusha region and supplies the Nyumba ya Mungu⁵⁸ hydroelectric dam, amongst others. Power production is regularly affected by abstractions of water for irrigation, leading to nation-wide power rationing.⁵⁹ Many of these abstractions are "illegally" performed without a water right. Indeed, a few years ago the Tanzanian Electric Supply Company demanded that "all irrigation projects upstream of the [Mtera] dam be closed down in order to promote power production."⁶⁰ However, the government made no move to do so, because so many rural people depend heavily upon irrigation schemes for subsistence food stuffs and/or cash income. This situation is common in the country because most of hydropower plants are located in the lower section of river basins, while significant water consumption activities are concentrated upstream.⁶¹

Anthropogenic pollution is also a grave problem. Dar es Salaam's water supply (which originates in the Morogoro Mountains) is affected by chemical pollution from commercial agriculture (e.g., sisal processing) and contamination from artisan gold mining. Faecal contamination of water sources may be common: one official source states that 95 percent of the surface water sources in Tanzania are bacterially contaminated⁶². In Kenya, only a small proportion of the urban population has access to modern sewerage systems, and sewerage plants in towns such as Kisumu have been poorly maintained to the point of being useless. This points out the need to enforce legislation on municipal council responsibilities, e.g. through the Environmental Management and Co-ordination Act 1999, in Kenya. Limit pit latrines to areas away from surface water sources, e.g., in peri-urban areas of Dar Es Salaam; and raise awareness of health issues at the community level. The use of pesticides, particularly on coffee and flower farms, is another serious threat and

current legislative and-enforcement instruments are inadequate to deal with the problem.

Box 2: Some negative impacts of flood-control and irrigation

Mto-wa-mbu, a small town in the Arusha region of Tanzania, benefited from a Hood control and irrigation project, implemented from 1979. While bringing many benefits, the scheme has also impacted negatively on some members of the local community. Drainage and flood-protection measures have ended flood-recession agriculture, which was practised by the poorest section of the community. In addition, because rice paddy has a high water-demand, it tends to raise the water-table in the vicinity, flooding pit-latrines. Bacteria may thus spread into irrigation channels that are frequently used for domestic water supply, leading to significant health problems in the area. The high water-table also rots the root-zones of banana plants. It is important that development practitioners do not assume that expansion of profitable paddy farming is necessarily beneficial to communities as a whole. Control of negative environmental effects requires effective bye-laws, but the effectiveness of these depends partly on the political abilities of various institutions within the town. The 'elite' that benefit from the paddy (traders and as well as farmers) may use their connections to block such local legislation.

Source: Fieldwork in Mto-wa-mbu; Raikes(1986)

To summarise, access to potable water is generally poor in Tanzania and Kenya, especially in rural areas. The rising cost of new schemes means that investment in water-saving technology (to limit seepage in irrigation schemes, for example) and wise management (allocation, watershed protection, pollution controls, etc.) are increasingly important. Unevenness in the enforcement of the Water Acts in each country is a particular problem that will be dealt with in the next section.

2. LEGAL AND ECONOMIC ASPECTS OF ACCESS TO WATER

"Even among some Ministry of Water staff, the current policy is not 100% understood. How can we then expect people in the villages to understand it well?"⁶³

2.1 Characteristics of Water Tenure

Water has unique characteristics and is crucial to every form of life and practically every human activity. Its key characteristic, from the point of view of management, is that it is a "fugitive resource". It is easily "lost" due to evaporation or seepage into porous substances, and has to be "contained". It flows as surface water, often crossing administrative (including international) boundaries, and it crosses such borders underground, in the form of large aquifers. Therefore, any alteration of water sources, in terms of quality or quantity, will have affects outside the immediate location of the changes. In the case of a river, "what happens at its source will reverberate all through its course until it reaches the ocean. Problems at the mouth may not be solved if you cannot control what happens at the source."⁶⁴ In the case of underground reservoirs, pollution at one point can make the source unusable by anyone for decades, or longer.

One difference between exploitation of rivers, lakes and aquifers and the exploitation of land resources (forests, pasture etc) is in the ease of access to quantities of water which "belong" to another community. If a number of villages have access rights to specific parts of a rain forest, for instance, any village, which wanted to exploit the resources of another, would have to physically enter its territory to harvest it. However, if a river or lake is shared by a number of riparian communities, one can easily abstract more than its

allotted share from its own territory: it may even be able to do so undetected. Upstream users are particularly privileged in this regard.

Box 3: The importance of hydrological data

An international NGO assisted the villagers of Olchorovus in the Arusha District of Tanzania to construct a \$137,000 gravity-fed water scheme, for domestic and livestock use. However, neither the NGO, nor Arusha Regional Water Office realised that the designated water source feeds an underground stream that supplies another village downstream. The Olchorovus scheme cut-off the supply to these villagers, who soon destroyed the scheme. Olchorovus now has no protected water source, relying on that of a neighbouring village.

Source: Fieldwork in Arusha Region.

The mobility and the resulting complexity of hydrological systems have resulted in a radical restructuring of water regulation institutions in most countries around the world. In the past, the mismatch between administrative boundaries (e.g.. districts) and the physical boundaries of water basins have resulted in some inter-agency conflicts and sustainability problems. Due to the way in which water resources are distributed geographically, some districts will abstract more water than is available within the district, by taking from other parts of the basin. The River Basin approach is intended to deal with this problem.

As well as its fluid nature, water is a problematic resource because of its bulk and weight relative to its "value". Of course, it should be noted that water is often grossly under-valued. This is a fact whether one is talking about water for irrigation, (which may be free or "subsidised" by the tariff system), or domestic supplies that are priced below the minimum for operation and maintenance and future development costs. When water becomes recognised as an 'economic good' and its value is re-assessed accordingly, the relative values of

water for different uses become important. The concept of the water market becomes more applicable. An example of private investment in *rural* water supply in Tanzania- one of few, it seems, to exist currently - is given in section 2.3.

In most parts of Sub-Saharan Africa examples of water markets with water rights that are transferable across institutions are few and far-between. However, examples can be given of water being sold and transferred from Uganda to Kenya.⁶⁵

Another key feature is the high capital costs of the infrastructure necessary to abstract, store, and transport water. This is part of the reason that governments have, in recent history, taken the lead in water development. When private investors become involved, there may be a risk of monopoly in water supply, as few individuals or institutions may be able to compete due to these large start-up costs. Large investments have to be recouped through sufficient fees. In the past, the costs have of course been paid for by the state, but are now being transferred to the consumer. Therefore, water vendors may be labelled as exploitative, even when their profit margins are minimal.

It is also important to note that control of water opens doors to many potential land-uses. The location of water sources can influence pastoralists' choices of grazing areas, opening up new pasture areas and thus improving the animals' nutritional status. Because of the need for water sources in dry areas, water access rights are the keys to control and utilisation of arid and semi-arid areas. The systems of access to such water sources may therefore be the most complex of all natural resource tenure systems in such an area. Interventions should be carefully located geographically and in terms of socio-cultural "ownership". Seasonal, as well as longer-term cycles of drought years, must of course be considered.

2.2 Global Trends in Water Resources Development and Management

Against this background, global water development efforts during the last few decades, including the UN International Drinking Water and Sanitation Decade, 1981-1990, were to a large extent focussed on technical, supply-driven aspects. The emphasis was on increasing supply by implementing as many water schemes as possible. This approach tended to de-emphasise management issues⁶⁶. When there is pressure to achieve high construction rates, issues of handing over operation and maintenance responsibilities to local people are de-emphasised. One contractor working in Tanzania stated: "the minute you start with participation your targets fall to pieces... our targets were pretty tough."⁶⁷

However, one lesson learned by most water agencies during the 1970s and early 1980s was that technology should be appropriate to its purpose. There was a movement away from "high-technology" (with its difficult requirements in terms of spare parts and expertise) towards simpler hardware. Agencies also recognised the need for increased training in health and sanitation in order for people to fully value water schemes, and in order for the maximum benefits to be gained by communities. This approach paved the way, to some extent, for more community participation in more fundamental aspects of the project.

During the last few decades, especially the latter half of the 1980's onwards, the need to conserve water for the welfare of ecosystems as well as communities has increasingly been emphasised. Pollution has also been recognised as a major threat to water supply, and the profile of pollution-control legislation, as well as sanitation, have increased as a consequence. These environmental aspects encouraged the idea of "holistic" water-management units. By the early 1990s, many

countries in the world had started to develop a system of water-basin management, rather than using provincial or sector boundaries. As will be discussed, Tanzania established its first functional Water Basin Office in 1991, although only two of nine basins identified currently have such an office.

There was also an increasing realisation that different communities - and different interest groups within communities - have different priorities and requirements. This led to emphasise on providing beneficiaries with greater control over the planning of the schemes. The last ten years or so have seen issues of participation in water supply gaining recognition not just at the project level but also in terms of water allocation at the local and basin-level. Community-based organisations such as water users' associations are seen as an important part of civil society that is part-and-parcel of a truly democratic system. The *1992 Dublin Principles*, which were developed at a conference of water specialists, stress that water development and management should be based on a participatory approach, involving users, planners, and policy-makers (including women) at all levels.⁶⁸ Chapter 18 of *Agenda 21* of the Rio agreement, to which both Kenya and Tanzania are signatories, asserts that "Water resources should be managed at the lowest appropriate level". In most countries, water authorities view the water users association as the lowest appropriate level for the management of water schemes, but have failed to adequately include water users in questions of water allocation at the meso- and macro-levels.

Most recently, some observers have argued that the water supply sector, with its emphasis on clean water for domestic uses, has dominated the water management field. On the other hand, users may have different priorities (centred around income-generating potentials, for example) which could involve rather larger amounts of water, possibly of less high quality.

These policy trends outlined above have generally been assimilated in the first instance by donors and NGOs in the water sector, who have then disseminated their views to (or imposed them on) state agencies in the developing world. The reality of policy *implementation* in Sub-Saharan Africa has often been different.

2.3 State Intervention in the Water Sector in Tanzania

Systematic state intervention in the water sector in mainland Tanzania began around 1930, when the government started to use public money to build water schemes⁶⁹. The beneficiaries were towns and townships as well as a few private estates and missions, and the beneficiaries would pay for all post-construction costs. The Department of Water Development was founded in 1945. It constructed schemes for local authorities, private estates and Native Authorities. Beneficiaries paid for operation and maintenance costs and some or all of the capital (construction) costs. There was thus an unequal level of coverage across the country, because of communities' varying capacity to pay for water development. Many Water Rights that were allocated during the pre-Independence period allowed for very high rates of abstraction, sometimes on a 24-hour basis. The allocations were made during a time when the population was much lower than at present, and when industry and urban centres were less developed. Some of these are still valid today.

Tanzania has undergone huge changes in political outlook since Independence. From 1964, the government moved towards socialist social policies, which pledged to prioritise basic needs and to encourage equitable development, especially in rural areas. During the mid to late 1970s, the government relocated millions of people into nucleated settlements, to facilitate service provision and the practise of communal labour. These "*ujamaa*" villages were given priority in water development, but there was otherwise no clear

prioritising mechanism. Generally, the most geographically marginal people were most likely to be neglected. From 1965, the central government provided funding for all capital and maintenance costs of water distribution development. Focal Authorities continued to pay for operational costs. In 1969, however, even these operational costs were covered by the central government. Thus, by 1970, only those who had private water connections were paying for water.

There has been much direct involvement of foreign NGOs. By 1986, the ratio of external to internal funding of the rural water sector was 80:20 - Tanzania has received more foreign aid per capita than any other sub-Saharan country - and donors had a corresponding amount of power in programme planning and project design. Through 'direct financing' of projects implemented by NGOs or private contractors, rather than government departments, donors could control funds. In general, donor-funded projects that didn't involve Ministry staff were completed more quickly than those that did, partly due to superior access to equipment. However, there were a number of problems with this approach, including the tendency to use Tanzania as an experimental testing-ground for new strategies, possibly at the expense of best practice.⁷⁰ Some donor countries supply technical staff, and do not emphasise capacity-building elements. Sometimes expatriate experts use state-of-the-art methods in surveying and planning, and as these are beyond the present capacity of Tanzanian staff, the process tends to collapse once the technical assistance ends.⁷¹ Indeed, some donors may have commercial interests that influenced their choice of personnel and technology, which may not be ideal for the partner country.

The first national water policy was formally adopted in 1991. It reintroduced charges for water services, so that the water sector could attempt to recoup all costs except major capital investments. Government funding was also to be specifically limited to "basic

needs facilities". In rural areas, non-monetary payments were intended to reduce the costs to local people. Currently, the State is continuing to hand-over responsibility to existing water supply schemes to communities. This is an example of the demand-responsive approach to rural water supply.⁷² Agencies intervene in the sector only when approached by a community, and communities participate in choosing the scheme design. Most importantly, communities must take full responsibility for operations and maintenance costs (in terms of time and money), and must also pay a proportion of the capital costs. The Tanzanian Ministry of Water supports these principles, but they are acted upon to varying degrees. Many rural schemes are heavily subsidised (indeed, it may be necessary to subsidise capital costs for the poorest groups for many years to come). More importantly perhaps, the paternal, "top-down" philosophy remains amongst some government officials, which limits the participation of communities.⁷³

Despite some limitations, since the late 1980s, the Ministry of Water has "shifted from providing services to-being an enabler, regulator, controller, and monitor."⁷⁴ There are a number of reasons for such changes. Firstly, Tanzania's economy has suffered badly over the last two decades, and the government can no longer afford to provide free services. The second reason is that donors have become less willing in recent years to channel funding through the government. Independent status has been granted to many organisations, such as women's groups that were previously absorbed into the government, and there is now some space for the private sector in service provision. It is becoming more common for wealthy Tanzanians, individually or in small groups, to hire contractors to construct private wells, and some NGOs are converting themselves into private companies to take advantage of this trend. At present in the Arumeru district of Tanzania, the beneficiary community will usually pay for 15% of the initial costs of a rural water project.⁷⁵ However, the cost

sharing mechanism has not been made obligatory in rural areas as yet.⁷⁶

Box 4: Private investment in rural water supply

There are few examples of 'privatisation' of rural water sources in East Africa. However, one example from Mpwapwa district in Tanzania may point to future trends. A diesel-pumped well had been poorly managed by the village water committee. A wealthy local individual had shown previous commitment to the water committee and had sufficient capital to repair the pump. By agreement with the village assembly and village council, he became the "shareholder" of the scheme, managing operation and maintenance and finance. The water committee takes all other decisions in consultation with water users and the "shareholder". A contract was drawn up specifying financial commitments, to avoid irregularities. Water charges per litre are higher than the average in the area, but the record of service delivery is better than average. This illustrates the potential benefits of 'privatisation', although the potential risks to equity should not be forgotten. In addition, the entrepreneur faced hostility from local water vendors who sold water transported by donkey. To avoid conflicts and vandalism, such interest-groups could, if feasible, be brought into the scheme as secondary share-holders or be given similar incentives for a 'win-win' situation.

Source: Boydell (1999).

2.4 State Intervention in the Water Sector in Kenya

In the past, the Ministry in charge of water management has generally been focused on water development - especially for domestic use (to some extent, this mirrors an international trend). This has been prompted by the fact that access to water, even for domestic use, is still limited in Kenya. In 1972, only 9% of the total rural population was supplied by 'safe' water schemes. This had risen to approximately 20% by 1989, and the current figure is around 42%.⁷⁷ There is obviously a need to improve water supply infrastructure. However, broader management objectives have until recently been almost ignored. The Ministry of Water Resources Management and

Development is now moving away towards a role as a regulator rather than water undertaker, and views water as a catalyst for socio-economic development and poverty alleviation.

The water allocation system was based on inadequate data due to lack of monitoring networks. This has resulted in ad hoc decision-making⁷⁸ and over-allocation of water and conflicts between water users. Information on water flows, water consumption, water rights and other important issues has not moved freely between government departments, and the system was highly bureaucratic and centralised. For example, applications for water permits could take up to 2 years to be processed, going through several stages of dubious value, and politically-connected individuals tended to benefit while the poor did not. The Ministry in charge of water has been constantly under-funded, never being allocated more than 2.5% of the GDP, and about 90% of the budget was spent on salaries.⁷⁹ The combined effect of these problems, in a context of an ever expanding demand for water and a rising number of abstractions, led to the "near collapse" of water resources management from about 1990 till the late 1990s.

The last few years have, thankfully, seen a great improvement in the regulatory environment for water management (supported by the Environmental Management and Co-ordination Act 1999, and reversals of forest excision notices). Kenya has many qualified experts in engineering, hydrology, management and other relevant fields. The improvements in the "enabling environment" will, if sustained, bring a better situation "on the ground" in due course.

Naturally, many challenges remain. As mentioned earlier, one of the most controversial aspects of current policy changes is the move towards privatisation of municipal water supplies. Some Ministry officials also believe that opportunities exist for rural water schemes to operate on a commercial basis, although little evidence for the

commercial viability of such schemes is currently in existence.⁸⁰ This issue is further discussed later in this paper.

2.5 The River Basin Management System

Another big shift in policy in both Kenya and Tanzania is the use of hydrological boundaries - the river basin concept - rather than administrative boundaries, as a unit for key decision-making unit for water management.

In Tanzania, nine river basins have been gazetted, and five River Basin Offices are operational. "Pangani (formed in 1991) and responsible for water sources in part of Arusha region; Rufiji (formed in 1993) and by far the largest basin in Tanzania; Lake Victoria Basin (formed 2000); Wami/Ruvu (2001) and Lake Nyasa'(2001). Each has a Water Board and a Water Officer, "who implement water allocation, water rights administration and control of pollution."⁸¹ The use of the basin system is intended to result in more rational water control based on a unit of hydrological-integrity, so that each office is working on a "contained" water-balance within its jurisdiction. By using one office to co-ordinate water development and management in the basin, the Tanzanian authorities hope to avoid the problems of fragmented planning that have afflicted many other countries.

In Kenya, there are six Catchment Boards across the country. (Lake Victoria North, lake Victoria South. Rift Valley, Tana, Athi, and Ewaso N'giro North) and about 65 District Water Boards. The Catchment Boards are functional, but lack resources to operate very effectively. They also, in many cases, lack the political support as well as legal power to have their decisions implemented. The District Boards currently follow the administrative District boundaries, and this has led to a conflict between them and the Catchment Boards.

which naturally have a weaker affiliation with District or Provincial apparatus. Water Catchment Boards approve water permit applications from within their catchments, and also formulate recommendations on water use and conservation, and monitor and enforce water use in the catchment area. The formulation of the River Basin conservation plans should be, according to the participatory principles of the Water Act, essentially a bottom-up process. The District Development Committees and District Environmental Committees, as well as the opinions of local stakeholder groups should therefore inform policy formulation.

While Kenya has established institutions to co-ordinate information (such as the number of consumptive uses and potential sources of pollution) it has experienced considerable problems. At present, the direction of the flow of information is from the districts and Ministries to the River Basin Development Authorities - but rarely in the opposite direction. An improvement in the flow of information could especially benefit district-level linkages. These are particularly important because District Water Boards make important decisions regarding the allocation of inter-district water resources. If each district lacks information on downstream users in other districts, the decisions taken over permitted water abstraction levels may be very inequitable.

Because of the shift towards participatory planning and implementation of water projects, many international donors and NGOs which previously worked mainly with non-state organisations, now also support the work of government departments. A dialogue is developing between state agencies and civil society. However, the fact remains that governance in Tanzania frequently remains "top-down and directive", partly due to the high costs, in terms of both money and time, of consulting with all stakeholders.⁸² Therefore, the

most important task is to turn the 'participatory' rhetoric of policy statements into reality.

2.6 Allocation of Water Rights

Even when demand is reduced through conservation, recycling, and voluntary moderation in use, trade-offs between potential uses still have to be made. Tanzania's draft water policy recognises that "future water allocation should be done in an optimal and equitable manner to promote food self-reliance and food security." In Kenya, the Ministry of Water Resources Management and Development is taking on a primarily regulatory role, in which allocation of water is a key responsibility.

Under Tanzanian and Kenyan law, as already stated, all water in the country is vested in the government. In theory, "Tanzania citizens have equal right to access and use of the water resources".⁸³ However, access depends on many factors. Indeed, the statutory laws are just one of a variety of systems which have *de facto* influence on water management. In both Kenya and Tanzania, there is a situation of legal pluralism, where land and water resources are regulated according to a range of institutions and agreements, including customary laws, and religious injunctions. Despite this reality, when faced with potential conflicts over water, it is often the case that, "the authorities pretend that the only prevailing law is state law".⁸⁴

In Tanzania, any abstraction from surface waters, other than minor water collection using buckets rather than pumps or fixed structures, requires a Water Right, as does groundwater extraction of 22,700 L per day or more (thus a well fitted with a hand-pump will not require one). Water Rights are allocated by the River Water Basin Offices, or in areas lacking an Office, the Regional Water Engineer, the District Executive Director and the District Agricultural and Livestock

Development Officer. It costs a significant amount of money to apply for a Water Right.⁸⁵ Previously to the 1991 Water Act, only people who held leases for their property were eligible to apply for water rights for irrigation purposes or private use. but since 1991 those with customary or "deemed" rights to land can apply. This fits with legal precedents that give deemed rights a legal basis.⁸⁶

In the Pangani River Basin, research conducted in 1994 indicates that of 2265 abstractions, only 171 had Water Rights.⁸⁷ Unpermitted abstractions have not been inspected by Ministry of Water staff, in order to set maximum permitted levels of water use. The situation in Kenya is similar: in the Ewaso N'giro North catchment in Kenya, some 90% of abstractions are "illegal".⁸⁸

Furthermore, insufficient funding for the Ministries in charge of water in the two countries means that staff cannot travel to inspect all *permitted* abstractions, both before and after required infrastructure is installed to keep help to water Hows within the set bounds. Water users may pay bribes, or pay for the transport of staff so that they arrive at a time of high water volume, so that the appropriate amount for abstraction is over-estimated.⁸⁴ Some legal requirements such as the requirement that a storage facility be on-site at every abstraction, which are conditions of obtaining water permits, are regularly ignored by the authorities. Many people cannot afford to construct adequate storage facilities, which would allow better management of water during drought periods, as users could fill the tanks at night when demand is low.⁹⁰ There is an urgent need to address this issue.

The current Tanzanian water policy recommends that those abstracting without legal rights be given two years to apply, after which time abstractions will be treated as a criminal offence. If this approach is taken, an extensive public information campaign will have to be mounted, and support services will have to be provided to

communities. Many of the rights granted before Independence in Tanzania are still legal, and provide for very large abstractions: clearly these need to be re-assessed. However, "it is very difficult for [the state] to alter water rights, no matter how unfair they may be, as we need to pay compensation for. lost access to water".⁹¹

In Kenya, water permits are rarely granted to individuals because the main institution for water management at local level should be the water user association (WUA), comprising a group of users of a water supply scheme, or an irrigation scheme, for example.

Box 5: Controversial water rights

A coffee estate in Arusha District holds a water right for a local source, allocated in 1958. Local people do not hold an individual right to any water supply. The farmer is obliged to supply the* people of the neighbouring village with a set amount stipulated in his water right document, and actually supplies them with more than this amount. However, the local population and livestock numbers (livestock are the main consumers of water) have risen greatly since 1958. The tank and trough built by the coffee estate for the villagers is also used by livestock-keepers from surrounding villages, and arguments can arise between herders in the dry season because demand outstrips supply, and because community management regimes aren't strong. Villagers from a second village resent the control of water by the estate. An additional scheme to supply the first village from the source controlled by the farm was vandalised by villagers from this second village, five of whom were imprisoned. Local people threatened in the presence of the Regional Commissioner that they were, if need be, "ready to go to war" over the issue. Other farms in the area with similar 'monopoly' water rights are handing over water systems to local communities, but there are concerns that they are 'offloading' responsibility for infrastructure that has very high maintenance requirements.

Source: Fieldwork in Oloitushula and Olchorovus villages, and Monduli Coffee Estate.

The water availability situation is so critical that since 1994, Pangani Basin Water Board has had a policy of granting no new applications,

except under special circumstances.⁹² Once a provisional or permanent Water Right has been granted, water user fees must be paid annually. The current water user fees are Tanzania shilling 300 (about \$0.41) per 1000 cubic m for domestic/livestock use, and just Tanzania shilling 30 for the same amount for small-scale irrigation, going up to Tanzania shilling 60 for large-scale irrigation and Tanzania shilling 1000 for "commercial" or industrial purposes. Since water for irrigation is very often from the same source as domestic water (and is thus the same quality) there is clearly a policy of subsidizing water use in the small-scale irrigation sector.

Water rights have no time limit, and are thus effective in perpetuity. Because of the mismatch between the changing water demand contexts to the unchanging water rights, the current draft of the Tanzania National Water Resources Management Policy recognises the need to implement fixed water right duration. A 5-year duration (as used in Kenya) may discourage investment, as people will feel that their water use regime is insecure. South Africa's new policy, which is regarded by many as a "model" of best practice, sets a 40-year maximum duration for Water Rights. Certainly, the process of reforming the current situation must be handled carefully. Commercial farms in Tanzania provide employment for many local people as well as vital foreign exchange earnings.

2.7 Land Tenure and Access to Water

Legally, in Tanzania, "Access to [domestic] water is a constitutional right".⁹³ However, access to water for domestic use without a water right is limited to "any person having *lawful access* to any water on, adjacent to, or under *that land*".⁹⁴ It is useful, therefore, to briefly examine the land tenure context.

There are a number of different types of land tenure in Tanzania. Legally, all land is "public land" vested in the state (under the governance of the President) which holds it in the public interest.⁹⁵ Legally, land cannot be owned by individuals or institutions but can rather be leased for specific lengths of time. Land is divided into categories including village lands, urban lands, public lands, and protected public lands.

Village lands are demarcated and include communal areas as well as areas for individual use. Generally, water sources in village lands will be used only by the members of that village. (However, in villages that are essentially pastoral in character, the transhumant lifestyle means that water access may be more open to those outside of the village.) In villages that have a number of water sources, each may be used predominantly or exclusively by the households in the immediate area. This has given rise to sub-village water committees being extremely common.

The legal regime described above does not entirely fit with the *reality* of land tenure in Tanzania. Customary tenure and "sale" of land without the transfer of leases is common in many areas. However, in the rural areas, the psychology of "collectivity" lives on from the days of villagisation, and private monopoly of water by an individual household, on the basis of land ownership, is to some extent unthinkable. However, considerable private investment of money or labour to develop water-collection infrastructure may legitimise "privatisation" of some of the water, at least.

2.7.1 Individualisation of land

Individualisation of land is becoming more common in Tanzania. The main impact of this trend may be in terms of easements, allowing access by people, or the transport of water, across private land.

As regards acquisition of land by the state, the President is empowered to acquire any area of land, regardless of tenure arrangements in operation, "for public purposes or redevelopment". Examples of land acquisition can be found in the Arusha area: common grazing land was allocated to companies that established large flower-farms around Mt. Meru.⁹⁶ Negative impacts on water and land access of local people may be significant. In recent cases, where land laws have been ignored (see box 6).

Box 6: The Barabaig land case

In the Hanang District of Tanzania during the 1970's, tens of thousands of acres of pasture to which the Barabaig pastoralist community had customary rights were allocated for wheat production. The Barabaig contested this decision in the courts. After an involved process it was eventually ruled that "a deemed right of occupancy [customary title] is as good as a granted right of occupancy [leasehold title]", although the government, remarkably, tried to circumvent this ruling by rushing the Regulation of Land Tenure (Established Villages) Act, 22, through Parliament. This Act extinguished all customary rights to land which were incorporated between 1970 and 1978 in all villages nation-wide. The Act was, however, ruled to be in conflict with the Constitution. The Barabaig individuals representing the community were eventually compensated with an almost insignificant amount of money, and the land remained under the control of the Wheat Company.

Source: Lane (1996).

Land "parcelling" may involve expropriation of water sources that are used by local communities, although they may not have rights according to statutory law. There is a case, in situations where custom has dictated access to water, for customary law to challenge the statutory water law system. At present, however, this is largely impossible, and decisions over such contested sources are made by the Water Allocation Board in Kenya or, in the case of Tanzania, the various Water Offices listed above.

In Kenya, around 50% of all legal cases are directly about land ownership issues, and 20 -25% of the rest have their roots in land or natural resource-related issues.⁹⁷ To avoid potential conflicts over natural resource use that develop into actual conflicts and to facilitate conflict resolution, it is important that organisations which undertake research on land-use issues are supported by donors and governments. Their work may involve providing an information-base for courts and legal bodies.

The Kenyan government has recommended the use of traditional conflict resolution mechanisms,⁹⁸ which may be effective. However, examples exist of the elders being controlled by a wily chief or other powerful individual, although where the traditional systems are credible they can be more effective than the statutory legal system.

Box 7: Land tenure and conflict in Kenya

According to research by Dr. Patricia Kameri-Mbote of ACTS, land tenure in Kenya has been affected by a number of radical and controversial processes. These processes include the imposition of western land laws and large-scale expropriation of land during colonial times, the conversion of some communal lands into group ranches and other experimental forms of tenure, and widespread illegal allocation of land ('land grabbing') in recent decades. Land and natural resources are limited in quantity, and are increasingly contested due to a decline in land quality in some areas, as well as population increase. There are increasing concerns over sustainable environmental management, with conflicts between advocates of 'conservation' and advocates of 'sustainable use'. Conflicts centre on control over and access to land, competing land uses, multiple historical claims to land, and gender- and inter-generational relations. At the family level, absolute legal rights are often vested in one individual - typically an older man - and the customary rights of other members of the family are not recognised in law. Women are particularly disenfranchised, but younger men are also affected. At the community level, there are gross inequalities in regard to access, with some communities such as the Ogiek and many coastal people lacking land rights. The situation has been complicated by the politicisation of land issues by the previous government regime. Particular areas were identified as pro- or anti- government and received preferential or unfair treatment as a result. The 'undemocratic and ubiquitous' state manipulated the land rights system for political ends and individual enrichment. These injustices have yet to be addressed.

In order to address these problems, the principle of subsidiarity should be followed to allow local solutions to emerge. There is a need to fundamentally rethink the relationship between the government and the governed, and to allow greater public participation in land management structures. If reforms are done in an *ad hoc* manner, unintended consequences can result, leading to greater dissatisfaction and full-fledged conflicts. There is a need for an over-arching framework to guide conflict management through land tenure reform. The Constitution, the supreme law of the land, must inform this process.

Source: Huggins (2003).

Hox 8: Rombo Irrigation Scheme, Kenya

In Kenya there is a "systematic migration of people with farming backgrounds"¹ in high-population, high-potential areas to sparsely populated areas. Such movements can be beneficial to the receiving area in terms of diversification of economic activities and transfer of skills. However, conflicts can arise. In Kajiado District, in-migration of non-Maasai groups introduced irrigation to the area. Over 80% of the agriculturalists are leaseholders, with Maasai Group Ranch members owning the land. This insecure tenure has dissuaded them from investing heavily in technical improvements to the system which would offer long-term benefits. Indiscriminate use of agro-chemicals and salinization of the soil are other problems. Conflicts over water allocation are common, and although these are often resolved at the micro-level (by canal committees), disputes between upstream and downstream users have required the formation of an 'umbrella committee'. Rights to water generally depended on an individual owning or leasing land adjacent to irrigation canals, or being granted a share of the water as a result of providing labour to maintain the scheme. An informal water market existed, which allowed water shares to be sold (water was 'free' when allocated according to the regular schedule). This could in theory allow water to go to the areas where it is deemed most valuable, thus improving the overall 'use value' of the available water. However, the market is outlawed by by-laws in all the furrows, because the corrupt nature of much of the reallocation impacted negatively on the poorest farmers.

Source: Krugmann, Hartmut, and Torori (1997)

3. INSTITUTIONS INVOLVED IN WATER MANAGEMENT

3.1 The Local Government System in Tanzania

The administrative system in Tanzania is based around the structure of sub-villages, villages, wards, divisions, districts and regions. At the village level, the Village Assembly, which consists of all persons aged 18 and over, elects members of the Village Council. While the lowest administrative unit is the "ten cell leader", who represents the

interests of ten households in village affairs, the ten cell leader is often "co-opted" by the village council.⁹⁹ Thus, they have often been perceived as "watchmen" for the village council, rather than as a conduit for expressing the interests of individual households. Each village has a number of committees, some of which are "mandatory", but all of them may be more or less active. At present in Arusha, about 50% of villages have an active water committee.¹⁰⁰ In some cases water user associations may exist outside the committee system, and these may or may not have strong links with the Village Council. The official Ministry of Water policy is that a village is ineligible for state funding for water projects unless it has a water user association or water committee. Another requirement is the existence of a water fund, with money available *before* projects are implemented.¹⁰¹

The next step in the administrative "ladder" is the Ward Development Committee which generally includes a Ministry of Water employee. However, it is possible that poor monitoring and intermittent links with the District Water Office combine to reduce the morale of the Ministry of Water representation at this level. The few existing examples of "catchment committees" in Arumeru region are generally organised through the Ward Development Committee, rather than through water user associations.¹⁰² There is also a divisional level with a divisional secretary who represents approximately eight wards. This level does not seem to be particularly involved in water issues in Arumeru district, though its influence will vary widely. At the District level, there is a District Development Committee which receives reports, proposals, and requests from the Ward Development Committee, or directly from the Village. The District Development Committee, like the District Water Engineer, report to the District Executive Director.

There is general optimism in Tanzania that the village structure provides "a unique and viable institutional basis for locally based

management of natural resources".¹⁰³ This optimism is somewhat muted, however. Many respondents commented during ACTS research that the responsibilities or development goals of the village leaders are frequently poorly defined. In addition, councils may attempt to take control of development projects - in order to control resources and gain status, for example - against the wishes of the section of the community that have initiated them.

Men dominate in many of the village committees. The Water Act states that at least half of all Committee members must be female, but this isn't always followed. Some Ministry of Water staff are of the opinion that if 65% - 100% of the Committee members were female, they would run along more equitable lines, with water for domestic use being prioritised above other uses such as irrigation.¹⁰⁴ However, "often [women's] involvement is limited to mandatory representation, for example, on user committees, with the inherent danger of increasing demands on women's time without actually giving them a voice."¹⁰⁵ To avoid this trap, women need to be in key positions. Because they tend to contribute more labour-time to water-related activities than men, they are more likely to press for improvements to water systems. However, it is important that water committees are not seen as "women's, business", in case men withdraw their support, which can be crucial especially in terms of financial contributions. As regards the involvement of the village councils in water committees, opinion is divided over the amount of control that the local authorities should have. The Village executive may be "too closely linked to local politics" to be impartial.¹⁰⁶ Some experts point out that a water source may not be used by the whole village, and thus a water users association, rather the village council, has legitimacy in controlling it.

3.2 Current Influence of Customary Water Management Institutions

"There's a very high problem between traditional leaders and the village councils. There's no demarcation of boundaries, so that some people support one type of leaders while other people undermine them. There's a lot of confusion in these villages."

Mr. Amani Saning'o Lukumay, Kammama Integrated Development Trust Fund, Arusha Region, Tanzania

With the widespread surge in interest in community-based natural resource management over the last decade or so has come a debate over the viability of local "customary", "traditional", or "indigenous" institutions.¹⁰⁷ With over one hundred and twenty ethnic groups in Tanzania, the nature and power of indigenous local institutions vary considerably from place to place. Before the colonial period, there were many different indigenous land tenure regimes in place, varying between different ethnic groups. These customary arrangements covered every extreme from common pool regimes to feudal bonds between landlords and landless peasants.¹⁰⁸

Existing social structures have proven their ability to organise and motivate people in order to fulfil the aims of those institutions, and evidence shows that building upon existing customs, laws, and authority structures is more successful than attempting to impose new, "alien" structures. For instance, in parts of Tanzania, *kualika* labour (agricultural work-sharing involving a local group that farms each member's farm, in rotation), may form the basis for other institutions, such as water groups. The group consisted of extended family and close neighbours.¹⁰⁹ Furthermore, indigenous institutions can provide useful local mechanisms for the resolution of land- and water-access conflicts, although they may require legal support to ensure enforceability.¹¹⁰ In Tanzania, some village-level indigenous

systems have been so successful at dealing with local conflicts that the state courts have been moved to another area due to lack of demand.¹¹¹

However, most observers are in agreement that across East Africa, "indigenous" management institutions are being undermined. Perceived reasons include the influences of government structures (such as the village councils in Tanzania and the chief system in Kenya), commercialisation of production systems, increasing population pressure, and "individualisation" of land tenure. Furthermore, the migration of young men - who are usually at the forefront of population movements - means that the elders have fewer people to enforce the decisions that they make.

In addition, Tanzania's *ujamaa* programme in the late 1970's "led to the undermining of traditional village leadership"¹¹². However, the capacity of indigenous social structures to resist these influences and to evolve into new forms is a contested area of research. It is possible, for example, that a "water committee" with a "modern" structure - an executive, a bank account, a constitution, etc. - could in fact be a continuation of a traditional institution's values and methods. It is particularly relevant in this context that traditional systems are often "subject to constant revision and adaptation"¹¹³ and are noted for their "dynamism".¹¹⁴ Alternatively, it can be difficult for "outsiders" to identify the "survival" of traditional systems.

Despite this difficulty, some policy documents are apt to make sweeping statements about the degradation of such institutions; the Tanzania National Conservation Strategy for Sustainable Development Proposal, for example, asserts that "traditional land management systems are... no longer viable."¹¹⁵ By assuming the degradation of indigenous systems of natural resource management

without empirical evidence, development practitioners can ignore existing systems and further damage them.¹¹⁶

It is also possible, however, to make the mistake of assuming that all indigenous systems will bring sustainable resource use. There are a number of problems affecting traditional resource management and conflict resolution mechanisms within the Tanzanian context. The location and extent of village lands are not always in accord with cultural boundaries, so that: "In the context of the modern village committees (which are frequently ethnically heterogeneous) appropriate [indigenous] models for management of common property are not widespread."¹¹⁷ In other words, if a village consists of more than one cultural group the various different indigenous institutions (e.g. customary courts) may have ceased to be effective, as none had power over more than a segment of the village population. This is the case in a documented example of land and water tenure conflicts in the Ruaha River Basin.¹¹⁸

Neither is it the case that successful community management regimes *have to* be based on indigenous regimes. Analysts who have looked into common property theory assert that while existing indigenous institutions can provide useful "social capital" - "common understandings" between people, which enhance cooperative activities - successful management institutions can also be "crafted". When "crafting" institution attention must be paid to the perceptions and interpretations of rules at the local level. Lack of such attention has led to a mismatch between local demands in natural resource management and "top-down" policies which embody the "command and control" philosophy. A good example of an inappropriately "hardline" approach is the failed de-stocking policy of Arumeru District Council in Tanzania, that attempted to set the maximum legal herd size at an inappropriately small number. This

policy alienated pastoralist and agro-pastoralist groups to the extent that violent conflicts resulted.

3.3 Water Development Institutions: Responsibilities and Co-ordination

In both Kenya and Tanzania, the new regulatory and facilitator roles of the Ministries involved in water issues are supported by policy, but have yet to be fully defined. The framework for partnership with local communities has several "grey areas". To take the example of Kenya. The Ministry of Environment and Natural Resources has been preparing to hand-over responsibility for operating and maintaining water supply systems for about 5 years. In this time, only one or two schemes in the entire country have been fully handed over. This is partly due to unclear policies on the process.¹¹⁹

The World Bank has recommended to the Ministry that rehabilitation of schemes should be undertaken by communities to foster a sense of "ownership".¹²⁰ However, current Ministry documents state that the Ministry will rehabilitate water supplies "in partnership with willing and able user communities and facilitate them to be water undertakers."¹²¹ The key difficulty in this latter approach is ensuring that the community is fully aware of the options available in terms of development of alternative water schemes, and is also aware of the potentials and limitations of the schemes being rehabilitated. It is in the interest of the Ministry to rehabilitate existing schemes, as a means of retaining a key role in the water sector for the next few years at least. However, this concern should not dictate policy, overriding considerations of sustainability and community participation.'

Staff in the Ministry are aware of this "inadequate political will and commitment to create an enabling environment" for handing-over to

communities.¹²² Stumbling blocks to successful handing -over are not speedily addressed. Such stumbling blocks include:

- Lack of clear, detailed policy on rehabilitation and handing-over.
- Registration of water committees is cumbersome and lengthy.
- Inadequate capacity building programmes to facilitate community management.
- Inadequate investment in sensitisation of all parties involved - including parts of the Ministry- leading to "lack of common understanding amongst sector actors".
- Lack of clear policy on ownership of infrastructure after handing-over.
- The legal requirements for gaining the right to abstract water, particularly in cases of community organisations, needs to be streamlined.

All of these points are also valid in the case of Tanzania, where steps have been taken to research different institutional options for water management.¹²³ Information on different options should be disseminated widely to villages across Tanzania. However, for water users associations to function, it is vital also "to avail them with the executive powers in their areas of operation as is the case with the village council."¹²⁴ This is because the village councils hold "all executive power in respect of all the affairs and business of a village."¹²⁵

Moreover, once a local water management organisation has been established, its operation may need to be monitored through mandatory evaluations and self-assessment. This is currently neglected by policies in both countries. NGOs may be in a better position to do this than poorly funded government departments. Examples of this can be found in Arusha Region.¹²⁶

Box 9: Clarifying community roles

A gravity water scheme in Kisii District, Kenya was implemented using contributions of money and labour from the whole community - even from people living on higher ground that cannot be served by the gravity scheme. They were not fully informed of the way in which the scheme would work, and were angry to learn, at a later date, that they could not benefit from the scheme. The agency working with the communities to resolve the conflict concluded that a key problem was poor definition of different stakeholder roles. There was a need to differentiate between 'community' (the wider settlement in which the scheme is located), 'user' (which can include anyone using the water) and 'member' (which refers to those with specific rights and responsibilities arising from ownership). It is important to ensure that all are sensitised about their rights - can they expect water from the scheme, can they take part in decision-making? - and their responsibilities - do they have to pay contributions, or attend meetings? If information had been more freely available to all the stakeholders before implementation, intra-community tensions could have been avoided. There was a similar need for clearer definition of the functions of office-bearers and committee members. Source: Oenga and Ikumi (1999)

In Tanzania and Kenya, some agencies, especially church organisations, are not in contact with the local authorities. The lack of co-ordination amongst NGOs, and between NGOs and the state, has led to problems. In some places such as Isiolo in Kenya, NGOs have facilitated irrigation schemes without undertaking proper feasibility studies. These schemes often fail after a relatively short time due foreseeable reasons: natural variability in water supply, or semi-migratory lifestyles of the beneficiaries, for instance.¹²⁷ Furthermore, when donors choose to assist specific communities without seeking the advice of the government, more needy or more suitable communities may be by passed.

However, lack of money can limit the frequency of co-ordination meetings. It would seem to be in the agencies' best interests to put

some of their own money towards organising regular meetings, because their existing networks of contacts are bound to have some information gaps. A specific part of each agency's annual budget should be allocated to improving and using networks of information exchange.

3.3.1 *Tariff-Setting Powers*

In both Kenya and Tanzania, rural tariffs for water consumption are generally lower than those in urban areas, despite the higher costs involved in implementation, operation and maintenance.¹²⁸ Most in the fieldwork area were essentially free. Hence, many are currently unsustainable because there is no money available for repairs. Tariffs should reflect the cost of the water supply system, and allow for repairs as well as development of new facilities when increased population demands. Tanzania is trying to implement a policy of "cost sharing" in rural areas, whereby the community pays for a portion of the total costs (see section 2.3). In urban areas, the authorities try to ensure full cost recovery.¹²⁹

There is a need, however, to ensure that safe water is available to the poor. There is a trade-off between raising awareness and encouraging everyone to pay the "full cost" of water, and giving the option of taking a small amount of water (e.g., 20L per person per day) at subsidised "lifeline rates". There is some debate in both Kenya and Tanzania about whether rates should be set by water users associations at the local level, or by the government. The poorest within communities may not be adequately represented at community-level, so that price-setting at the scheme level may lead to water being priced out of their reach. However,, there is also the risk that a District-wide tariff may not be sensitive enough to local variations in financial power.

It would seem sensible to allow communities considerable autonomy in tariff-setting, but it may be appropriate for the government to set maximum rates for "lifeline" amounts. Tariff-boundaries must be flexible in order to create an enabling environment for private investment (see section 2.3).

3.3.2 Water User Associations

"The main focus in government policy should be on training local communities, rather than on funding the construction of water supply systems."

Mr Mayallah, Water Engineer, Tanzanian Christian Refugee Service

Generally, viable local institutions for management of land and water resources rely on social relationships, and tend to represent small constituencies (i.e., the village or sub-village level). These often have difficulty influencing processes, such as lateral flows of water or pollutants, which are outside of their immediate locale.

The other approach to land and water management, generally described as "top down", starts with national level policies and often uses hydrological units (river basins and sub-basins) as the main unit of planning. This approach, which tends to utilize government machinery and is effective in creating wide-reaching organizational and geographical linkages, is less effective when it comes to ground-level implementation. Hydrological boundaries do not fit with the realities of community interaction, and top-down projects are generally unable to invest adequate time and resources in consulting with local stakeholders.

The result is that while both approaches are often attempted within the same region, country or river basin, neither is able to bring sustained improvements at the "meso" level.

Most organizations involved in integrated management of land and water resources (such as the World Bank and many bilateral donors) have advocated creation of "umbrella" organizations as a solution to this problem of lack of effectiveness at the meso scale. Examples of this approach include the river water user associations (RWUAs) which are in existence in some areas. These are voluntary organizations composed of a range of water users which share a water resource, typically a stretch of river some 10-25 miles in length, or a small lake.'

In most developing countries, RWUAs are seen as the future for water management, due to a number of reasons, including:

- Minimal budgets, plus SAP-affected staff numbers, limit the Ministry of Water's abilities to monitor and enforce the water regulations.
- Increasing water demands, decreasing water flows in some areas, and multiplicity of water users, makes central monitoring and enforcement very difficult.¹³¹
- The principle of subsidiarity included in the Dublin Principles on water management, accepted by almost all countries world-wide.

In a 1995 United Republic of Tanzania document, it was recommended that while basin-wide functions should be performed by the River Basin Water Offices; more local institutions such as irrigation groups, village elder groups, and village governments should be responsible for local water allocation, conflict management, pollution controls, and environmental protection.¹³² The Water Policy recognises five levels of water management:¹³³

- i. National Level
- ii. Basin Level
- iii. River Catchment/Sub-Catchment Level
- iv. District Level
- v. Livelihoods/Water User Association Level

Interestingly, these levels are a mixture of hydrological units (e.g., river catchment) and administrative units (district level).

Examples of water user associations from Kenya include Lake Naivasha Riparian Association and Ngare Nything/Sirgon River water users association in Ewaso N'giro North catchment, while in Tanzania, the Traditional Irrigation Improvement Project area has a River Committee that represents users of river water over a distance of many miles. Every irrigation canal (serving ten households) has a representative, and commercial farms are also represented. Agreement at meetings is apparently reached through consensus, rather than by voting. There is also a Board of Inspectors to monitor extraction rates, especially during the dry season. However, the main force behind the organisation is the Ward Development Committee, and water user associations have yet to take "ownership" of it, suggesting it is only partially successful.¹³⁴ Also, the framework linking the lower levels (irrigation furrows, village water committees) and higher levels "is yet to formally emerge"¹³⁵.

Such institutions fulfil a number of functions:

- They allow downstream users to have some say in the amount of water being abstracted by their upstream neighbours. This is especially important during the dry season, and local arrangements over abstractions may be more efficient than a regime stipulated by the government. In Tanzania, the Ministry of Water calculates a drought-season water balance

using L/second rather than a set "ecological minimum". In Kenya, at the law states that at least 30% of the water at the point in a water source used by a water right holder must not be abstracted.

- They allow different kinds of users to meet and discuss issues. Representatives of different interest groups may never otherwise meet, and regular face-to-face discussion could lead to a better understanding of each water user's situation. However, there are few concrete incentives for the powerful to make concessions.
- They provide an effective information gathering, reporting, and information-dissemination mechanism. The Ministry of Water and other institutions can easily get an idea of the current 'water balance' in the area covered by an umbrella institution, and can use them to disseminate policy information, practical advice, and meteorological data.

Current wisdom suggests that for such associations to be effective, the following criteria should exist:¹³⁶

- The negative impacts of lack of management (i.e., water shortages, sedimentation) must be well understood by all stakeholders;
- Impacts must be clearly significant;
- Economic aspects should be quantified;
- Groups of upstream and downstream users should be few and well-organised;
- Political commitment must exist; and
- Strong institutional and legal frameworks must be in place.

Box 10: Information as a constraint to participatory management

There are many ways in which power relations operate within or between institutions. Controlling information is a common mechanism for controlling water users. In one irrigation scheme, managed by members of three tribal groups, one group was dominant in terms of numbers and influence on the water committee. By controlling information on regulations, payment schedules, and water allocation arrangements, this dominant tribal group could have other water users penalised or even barred from using water. The weaker groups would miss deadlines for payment, or would not be invited to meetings, and would thus be marginalised. The development agency which was assisting the scheme thus had to devise a system for disseminating information to all the users, which of course demanded investment of more time and money.

(Scheme located near Moshi in Tanzania, which was assisted by Traditional Irrigation Improvement Project.

Source: Interview with Mr Van der Berg, former project co-ordinator.

3.4 Water Conflicts

Studies of "conflict" in natural resource management have become increasingly common in the recent past. However, definitions of conflict differ greatly, indicating differences in theoretical foundations that underpin research.

At its broadest, environmental conflict can be defined as "tensions, disagreements, altercations, debates, competitions, conflicts or fights over some element of the natural environment."¹³⁷ This is very wide definition. Competition over a resource may include, for example, a situation where different irrigators share a single water intake and attempt to maximize their share - through lobbying, purchasing, etc. - within an organized framework. This is clearly a very different situation from one in which parties are physically fighting over a

resource: such as sometimes occurs between pastoralist groups vying for control of water sources and grazing lands. It may be useful to ask whether the two examples are different in "kind" or just in "degree". Does competition tend to become conflict, unless correctly managed? An unsophisticated Malthusian theory of conflict sees increasingly intense competition for resources as leading directly to conflicts. This narrative describes a finite resource-base being utilized by a population that is growing exponentially, with per-capita demands for natural resources increasing due to changing consumption patterns. Frequently, shortages in the per capita availability of natural resources are seen as leading to the impoverishment of those most dependent upon them, and their poverty then prevents investment in technological means to intensify use of the resources.¹³⁸ Increasing desperation leads to more frequent and serious violations of regulations and norms of behavior, particularly by those who are most dependent on the resources and typically least able to negotiate or bargain through "normal" channels.

In terms of water conflicts in Tanzania, all the ingredients elements of this narrative are evident: Tanzania is *water-stressed*¹³⁹ and has an "endangered" water supply, in terms of degradation of sources and increasing population (with a national average population growth rate of around 3% p.a.) River and stream flow rates are in many cases declining due to a number of factors, including deforestation in highland areas, overgrazing, and degradation of wetlands. In addition, inadequate controls on both industrial and domestic pollution are responsible for localised reductions in water quality with associated health risks to humans, domestic animals and wildlife, and general ecosystem function. There is a strong link between availability of water and economic status of the community, such is the fundamental importance of this particular resource, so that those with poorest access to water are unable to generate income to invest in infrastructure to improve that access.

However, such narratives are overly simplistic, as decreasing 'absolute' water availability and per capita availability are just parts of a tangled web of political, legal, historical and cultural issues that result in *competition* escalating into *conflict*.

One useful framework for understanding conflict defines a "dispute" as "a disagreement about interests".¹⁴¹ A dispute is over a specific quantifiable need, generally tangible resources, something that is thus negotiable. The important difference between a conflict and a dispute, according to this definition, is that a dispute can usually be settled through arbitration or through a court process.

Using this definition, "conflict" is something different, because conflicts arise from disagreements over "values". Values include perceptions of rights, and are linked closely with issues of identity and freedom; according to some, they "are things about which we cannot negotiate".¹⁴² The important difference between a conflict and a dispute, according to supporters of this view, is that such conflicts can only be *resolved* by a change to perceived underlying "injustices" or inequalities.

In Sub-Saharan Africa, agriculture and pastoralism are so important in the lives of the people that natural resources are intimately bound with cultural values.¹⁴³ This is especially true of water, which is vital for most human activities. Thus a dispute over access to water will often also, include facets of conflict over ideology or values, especially when two or more cultural groups are involved.

Hence, in the context of natural resource management in Tanzania, it is unlikely that a clear division between a "dispute" and a "conflict" can ever be drawn in real life: "Most conflicts are dynamic processes; many conflicts are nested in bigger conflicts which are harder to see".¹⁴⁴ Many conflict analysts see individual instances of dispute as

symptoms of wider power-struggles. According to this view, conflict erupts as a result of "structural inequalities" in access to resources and in perceptions of social power, freedom, and other intangibles.

Some of the most common processes that can lead to structural imbalances and/or land and water tenure disputes include:

- Individualisation of land which was previously held communally;
- Population movements;
- Increasing population;
- Historical rivalries;
- The weakening of social structures; and
- Uninformed intervention by outside agencies.

Proponents of the "structural imbalance" concept tend to view conflict as "a potential force for positive change"¹⁴⁵ or alternatively, as a symptom of changes which may, in the aggregate, be positive. Many development projects explicitly attempt to benefit those who are marginalized by poor access to social, legal, and natural resource capital. These projects specifically seek to change the balance of power. Such processes are very likely to bring about conflicts. It is for this reason that many commentators have stressed the need for a "conflict assessment" to be built-into the process of planning and implementing development and conservation projects.¹⁴⁶ For example, it may be easiest to persuade communities to change established abstraction rates to reduce inequities, if a project is being implemented and the incentive of improved water quality is offered.

Different cultures are known to have different perceptions of conflict, so that in some cases a constant undercurrent of disputes and sometimes a certain level of violence is in fact the social norm. One rural development manager commented that in many areas around

Arusha. "people are too violent to allow people to monopolise water, and this keeps corruption down".¹⁴⁷ In some "traditional" water management regimes such as those for ponds or streams that are susceptible to great seasonal variation, the number of minor, possibly violent disputes between individuals experienced during the dry season can be high.¹⁴⁸ Such levels of stress to the system seem to be socially acceptable. As has been noted, large number of different cultural traditions in area can prevent customary management regulations from operating. Different cultural groups may refuse to follow each other's traditions, making natural resource management and conflict negotiation difficult, as is seen in parts of the Ruaha River Basin in Tanzania¹⁴⁹.

In such cases, there is perhaps a need for an "independent" authority with some measure of local legitimacy to mediate. However, it is not a simple task to find or create a body with independent status, a working knowledge of water issues, as well as an understanding of local conditions. Some have called for "a new generation of water managers" who embody traditional values of local "legitimacy", and have strong community links, to re-invigorate indigenous cultural values related to water-points. However, they do not make it clear how these visionary individuals will succeed in making themselves credible to local people if they are government staff, or acceptable to government if they are "community-based".¹⁵⁰

Other options include special "water courts" which could potentially embody customary law as well as statutory law, and which could be more successful than the mainstream judiciary because of specialist knowledge. However, the challenge is always to find funding for such mechanisms, and financial issues have stalled such institutions in Swaziland, for example.

Finally, the authorities can explore various ways of strengthening the capacity of local people to reconcile problems. It is important if this option is taken that models are not superimposed, and that trainers see themselves as catalysts to help locals establish or renew their own mechanisms. As an alternative or as part of this training, local communities can be helped to gather all the knowledge necessary to fully grasp the legal, ecological, and political context of conflicts, and to pursue their aims through the courts, if necessary. At present, many rural communities are operating on a very limited information-base.

Case studies conducted by ACTS in Tanzania¹⁵¹ suggest that the following factors often interact to cause disputes, and cause disputes to escalate into conflicts:

- Out-of-date water permits, allocated in a time when the demographic context was very different, resulting in inequitable access to water resources unless adequate compensation measures can be put in place.
- Lack of storage facilities to mitigate seasonal variations, resulting in greater water demand. There is limited local capacity to construct such facilities, due to financial, organisational, and hydrological constraints.
- Lack of participation of local people in the water allocation process, including hydrological studies. Involvement of respected local people through mutually agreed procedures would reduce the amount of misinformation clouding conflicts.
- Mistakes by the Ministry of Water may compound the problem. Capacity in technical (e.g., hydrological) and socio-cultural issues should be supported, to counteract limitations of funds and available time.

- Many local people do not consider the water right process to be valid, believing that water is the property of communities, not the state.
- Lack of an effective mechanism for disseminating information on water rights applications and decisions. Publishing a notice for a water rights application in a local newspaper may not be sufficient, especially in the more remote rural areas. Literacy rates in some communities are very low. Amongst the Barabaig in the Hanang area of Tanzania, for instance, only 6% speak Kiswahili.¹⁵² Lack of foreknowledge about proposed projects leads to suspicion and resentment.
- Lack of an effective conflict-resolution mechanism. While it may be possible for the District Administration to resolve some disputes, it may be better to develop an administrative procedure that is more methodical and can be seen to bring an impartial judgement. In Zimbabwe, Administrative courts judge water disputes, but they are rarely well informed.¹⁵³ The challenge may be to form an autonomous and accountable decision-making body, while at the same time keeping costs manageable (time and money). WUAs which include all parties in the dispute may be able to take this role, if they are amply supported by training and political will.
- Water disputes are often found in situations where there is some existing tension between the parties on socio-economic or socio-cultural grounds. However, it is important to realise that such feelings will not be felt equally by all sections of the communities, and indeed may be stirred-up by a minority for political reasons. Facilitated face-to-face discussion of key issues is one way to avoid the reality being overtaken by rumours.

4. POLICY OPTIONS

" The water policy should be treated in the same way as the White Paper on the Constitution, in fact, discussions on the water policy are even more important than the political changes."

Mr. Nasari, Regional Hydrologist, Arusha

This research has looked at water policies, and it is clear that technical aspects of water development have to be founded on the appropriate legal, fiscal, and institutional basis in order to succeed.

However, technical considerations are also important in the water sector, particularly in terms of identifying affordable and manageable "intermediate technologies". "[Community] participation cannot substitute for technology that does not work, geology that is difficult, and climate that is not co-operative".¹⁵⁴ Some of the problems identified in the case study areas stemmed from technical difficulties, which is perhaps to be expected when the Ministries responsible for water are generally very poorly-funded in Africa, except for specific donor-supported projects. Improving the access to suitable equipment, and increasing the time money available for field-visits, may reduce problems. It is important therefore that the Ministry of Water is able to recoup more costs through user charges, and to devote some of the funding to these areas.

Appropriate technical improvements are particularly necessary in most traditional irrigation schemes to reduce seepage losses. The Traditional Irrigation Improvement Project (TIIP) provides a good model. The fact that TIIP is demand-driven (reacting to requests for assistance by organised groups) and has been approached by a very large number of communities, indicates future potential for partial cost-recovery or substantial labour-inputs from communities. Because communities recognise the benefits that may accrue to them

through more regular flows and agricultural advice, they may be willing to invest in improvements that will conserve water for downstream use.

In terms of cost-recovery in water institutions, it is clearly necessary to charge for water. However, it is important to separate water uses and prioritise them into what may be called "social goods" (essential uses, e.g., domestic use) and "economic goods" (e.g., irrigation, other commercial uses). While it is important to give local communities some autonomy in managing water, it is also important to regulate use to encourage conservation for other communities' benefit, and to avoid the local elite from benefiting at the expense of the poor, by effectively subsidising irrigation water, for instance. There should be a legal requirement for a free or low-cost "lifeline supply" of water for domestic use, which should be properly enforced.

There is currently no standard mechanism for calculating water charges. A water charge pricing strategy should divide and "ring fence" revenue according to recipient end-users, e.g., communities/district authorities/Ministry of Water. Within each institution, the share devoted to different uses would be made clear, such as water resource protection, monitoring, and repair of systems. Once such a strategy has been introduced it should be made transparently accountable to users to make the charge seem less like a tax and more like an investment in water resources. It could also be linked to some kind of agreement or "letter of understanding" between the authorities and communities, further demarcating responsibilities between the institutions.

In cases where water systems are "handed over" from NGOs or the Ministry of Water to local community institutions, the responsibilities of ownership should be made clear. A form of contract is necessary to ensure that the system infrastructure is clearly under the ownership of

a specified institution. While it is wrong to regulate the activities of the water user associations too inflexibly, some guidelines could be included on the details of the community institution's responsibilities. As has been firmly established in numerous studies, the best way to ensure that communities undertake operation and maintenance is to include them in every stage of the project process, from the planning stage onwards.

Additionally, the demand-oriented approach, which focuses interventions in areas which request assistance, runs the risk of failing to meet the needs of communities which have low capacity for fund-raising and communicating with outside agencies. To mitigate this problem. "A major effort should be undertaken to raise awareness of the various sources of funds and mechanisms in remote and isolated areas".¹⁵⁵

As regards disputes over water, misinformation is often a factor in resentment amongst users of shared water schemes. Thus an awareness campaign must also include details of the water permit policy and the reasons for exacting water charges. It is important that local authorities and NGOs disseminate clear statements regarding water and general development policies. This requires regular briefings for extension staff and use of mass media, where appropriate. The Tanzanian Ministry of Water has distributed leaflets in simple Kiswahili that outline the main responsibilities of the government and the communities under the new policy. Kenya has planned to undertake a similar process, but it is not clear that adequate funding has been assigned to this component. Also, the process should be one of consultation, rather than just dissemination of a formulated message.

For watershed protection, the Tanzanian water policy recommends the introduction of a "resource and catchment conservation charge,"

to be levied on water-using communities as part of an overall charge. However, a potential challenge is posed by the fact that the key water catchment areas are often the most resource-rich areas: the wooded slopes of Mt. Meru are an example of this. To relocate money from the drier areas downstream (which are poorer in terms of natural resources) to conserve the highland areas may be considered to be inequitable. Of course, differences in population density and landholding size complicate this picture. Policies should be based around co-operation and consensus and should reward successful community conservation efforts. Previous attempts, such as the compulsory destocking policy in Arumeru district (households were limited to owning a maximum of ten cows and had to obtain a permit to keep goats or sheep)¹⁵⁶ were unrealistic and punitive in character.

The use of "joint management" systems, whereby resource-conserving communities benefit from sustained sales of forest products over the long-term, has yet to be proven. The fact that the proceeds are likely to be invested in community-projects means that individuals may see more benefit in "poaching" for immediate personal gain.

Tanzania is pursuing a policy of encouraging land registration. However, it is wisely taking steps to defend the interests of those who own land under customary systems, since 1991 those with customary or "deemed" rights to land can apply for a Water Right, and can be assisted by projects such as the Traditional Irrigation Improvement Project. Customary water management regimes may in some areas offer a useful foundation for modern interventions to build upon, and it is important that these are properly understood and placed in the modern context so that interventions do not undermine them.

In Kenya, it is likely that land individualisation policies that are used to parcel-out land in areas of "communal" land use are denying

communities access to water. In many cases, private owners of land continue to grant informal access rights to water for domestic and livestock purposes for local people (e.g., Maasai group-ranches that have been subdivided).¹⁵⁷ However, it is important that such informal agreements are secured by force of law where possible. Given the often inequitable effects of land-individualisation in the case of Trust Lands in Kenya, it is necessary to overhaul the land tenure laws to avoid corrupt allocations and to give local communities more control over sale of land.¹⁵⁸

In the Tanzanian water sector at present there are "no guidelines for prevention of conflicts through consensus-building"¹⁵⁹. Although the draft water policy suggests that the River Basin Water Offices should be "the preliminary centre for conflict resolution" it is realistic to view its role as a mediator of macro-level conflicts. As regards micro-level conflicts, clear guidelines on conflict prevention and resolution should be developed at the regional/national level. Such guidelines should include transparency at all stages of the Water Rights allocation procedure, and should identify a mediating institution with independent status. This fits with the Ministry of Water's aim of separating its regulatory and operational functions.¹⁶⁰ However, each dispute occurs within a different context and local political factors, and may require a tailor-made strategy for conflict resolution. Traditional dispute mechanisms should be identified and strengthened as appropriate. Training in conflict management is necessary for key water sector personnel.

One of the most important tasks for the Ministries responsible for water in Kenya and Tanzania is to include more stakeholder participation in the mechanisms for making water allocation decisions. At present, for instance, five of the ten members of the Tanzanian Pangani Water Board are from Government, "while the rest are from parastatals and other stakeholders".¹⁶¹ It is unclear

whether any of these "other stakeholders" are legitimate representatives of small-scale irrigation, livestock-keepers, or rural users of domestic water supply. One way to work towards an ideal of participation is to have a structure of "nested" institutions that allows a flow of communication and sufficient representation of the interests of the many interest-groups. There is a potential gap in communication and the ties of responsibility between the users and the high-level organisations such as the Basin Water Board, unless bridging institutions can work to ensure that all stakeholders are represented. It is important too that policy-makers examine the constraints to participation by local communities and their representatives and create a genuinely enabling environment for negotiation between all stakeholders. Common constraints include the amount of information that is available to stakeholders. Water users should be educated about their rights, their responsibilities and those of other water users and regulatory bodies, as well as being kept informed of relevant for a discussion and participatory policy-making, and changes in the law.

Popular participation in policy-making depends to a great degree on the abilities of the stakeholders to understand the 'rules of the game': to be able to stand up for their rights, negotiate, present their views clearly, and utilise all the potential mechanisms for intervention in the policy-making process. Many Tanzanians are not yet comfortable with the idea of "challenging" the views of the authorities, because of the controls previously imposed on society by the one-party state, as, "For thirty years TANU/CCM sought to undermine any basis of social organisation outside itself."¹⁶² For this reason, participatory mechanisms must aim to *actively* support the ability of citizens to present their views, particularly those representing the interests of the many small-scale farmers who make up the vast majority of water users. Discussions should be "opened up" to stakeholders early in the decision-making process.

Catchment-level WUAs could bridge the gap between the individual water users and the Basin Water Boards. For such institutions to be effective, they require legal status and a well-defined role in the management of basin-wide water resources, with access to formal channels of discussion and decision-making. The presence of NGO staff in a training and "watchdog" role could be very useful. To be effective, the process would have to involve a "give and take" approach, whereby NGOs support the process financially, but exercise power *within mutually-agreed limits*. NGOs which were appropriate to dealing with grassroots-level meetings would have experience in planning and implementing water projects (including training components) and would have a good track-record of dealing with conflict situations. Those dealing with higher-level meetings would require the ability to put some pressure on the participants to make the process truly participatory, and thus would typically be well-funded, possibly international organisations, such as WaterAid or Oxfam.

Another issue of great importance is the membership of water user associations: whether they should be open to those with customary, rather than legal Water Rights. A mechanism for dialogue with 'illegal' water uses should be developed. Involving them may also be an effective way of ensuring that they apply for a Water Right during the proposed two-year "grace" period.

4.1 Summary of Key Policy Issues

- i. The changes in the land tenure system and ownership patterns 'on the ground' should be monitored to assess the effects on water issues in both Kenya and Tanzania. While it is necessary to keep the Water Rights system separate from land ownership. Ministry of Water staff will have to consider the existing realities of customary rights to avoid disputes. More

research is necessary to understand the complex and evolving nature of the many variations of customary land tenure systems, and interpretations of these systems should not be over-simplified when being incorporated into official policy.

- ii. Clear guidelines on conflict prevention and resolution should be developed at the regional/national level. Such guidelines should include transparency at all stages of the Water Rights allocation procedure, and should identify a mediating institution with independent status. However, each dispute occurs within a different context and local political factors, and may require a tailor-made strategy for conflict resolution.
- iii. The Water Rights allocation system should be reviewed at the same time as the existing Rights are renewed and/or annulled. A participatory review process, involving a cross-section of water users (both those with Rights and without) and Ministry of Water staff from all levels, should be instituted. Streamlining the process while making drought-contingency measures and compensation packages transparent should be the aim.
- iv. Water sources should be ranked according to the threat of degradation, in terms of quantity and quality. It should prioritise monitoring and enforcement activities accordingly. This may be a good way of mobilising funding, through identifying particular problems and strategies.
- v. Water-management institutions should divide revenue into recipient end-users -and uses. Systems should be transparently accountable and should be made clear to users.

- vi. Any "resource and catchment conservation charge" should be means-tested according to the 'means to pay', should be based on clear calculation criteria, and should be transparently directed towards effective conservation measures. If money is given from downstream communities to catchment-dwelling communities as incentives, this could be very unpopular and should be justified by monitoring and dissemination of results.
- vii. Against a background of conflicting interests and widespread inefficiencies in the use of water, the importance of "umbrella" community institutions, which represent a number of communities, is clear. At the moment the framework linking the lower and higher levels of the water allocation system "is yet to formally emerge" 163, so the opportunity exists to make the framework conducive to participatory, representative water management. The framework should be driven by realities on the ground, rather than an unrealistic "ideal" being imposed.
- viii. It is important in many areas that technical capacity to plan, maintain and repair water systems should be improved at the local level. One means of doing this is to offer training to local private artisans, small companies, or community-based organisations. Whenever possible, similar technologies should be used and networks of spare parts suppliers and technicians created.
- ix. In cases where water systems are "handed over" from NGOs or the Ministry responsible for water to local community institutions, a form of contract is necessary to ensure that the system infrastructure is clearly under the ownership of a

specified institution. Some guidelines could be included on the details of the community institution's responsibilities.

- X. As non-state stakeholders increase their abilities to manage water and to operate at a policy level, particularly umbrella organisations representing smallholders, they should be increasingly included in government water allocation institutions and in policy dialogues, as is increasingly the case. Minutes of key policy and water allocations meetings should also be made widely available to interested parties.

P qygu'

1. World Health Organisation, 1998
2. Madulu, N. 2002. The categories are not explained, however. World Bank (2003) estimates that about 60% of the population earn less than \$2 per day.
3. Madulu, N.F, 2002
4. Research included semi-structured interviews with focus groups and key informants in villages around the town of Arusha, interviews and correspondence with Ministry of Water staff and other water specialists, and a three-day ACTS workshop on water policy in Kenya and Tanzania.
5. See for example Torori, Mumma, and Field-Juma, 1995; Krugmann, Hartmut, and C. Torori, 1997; Mugabe and Khroda.
6. Republic of Kenya, 2001
7. See, for instance, references to the Sukuma of Tanzania in Ramazzotti, Marco, 1996,
8. Ramazzotti. pg. 359
9. Ibid.
10. Lane, Charles, 1996
11. See Western. David, with Huggins, C., 2000
12. Mwakalinga and Faraji in Hirji, Patorni, and Rubin, 1996
13. See for example Krugmann, Hartmut, and C. Torori. 1997
14. See Scoones. 1992, and Kunzi, Droz, Maina. and Weismann, 1998
15. Kunzi, Droz. Maina. Wiesmann, 1998
16. Republic of Kenya, 2001
17. Hirji, Patorni, and Rubin (eds) 1994
18. Liniger, Hanspeter, 1995
19. Republic of Kenya, 2001
20. Mwaka et al., 1999
21. See FAO. 1999
22. According to latest National Census results published in daily nation, 15th February, 2000
23. Mwaka et al., 1999'
24. Compared to Africa as a whole which uses about 4% of its total flow of available water; see UNEP. undated
25. Some estimates differ, but see Mugabe and Khroda. and Chenje and Johnson, 1996, pg. 2
26. CARE Tanzania Country Profile
27. Ministry of Water Resources, 1999

28. Other sources put his figure at 50% - not including the water facilities which are not functioning at any one time.
29. Thuo, 2000
30. Africa-wide figures are 88% for 1992, quoted in *Finance and Development Magazine*, June 1994. Tanzania figures are from Hirji and Patorni. 1994
31. For 62% figure see ICID. 2000. for higher figure see Mwathe, U.K., *Smallholder Irrigation and Drainage Development in Kenya*, in Hirji et al., 1996
32. FAO, 1995
33. Republic of Kenya, 2001
34. Karua, Hon. M, (2003) Speech made at official opening of East African Legislative Assembly Seminar, Kisumu, June 2003
35. Republic of Kenya, 2001
36. FAO, 1995
37. Msuya. Meraji. 1999
38. Republic of Kenya, 2001
39. This represents 'safe' water use per day. not unprotected sources. See Gleick. Peter, 1996
40. Wateraid Website
41. Madulu, N. 2002. The percentage decline is in the number of households using piped water.
42. Ibid.
43. Mr. Urassa, Village Chairman, Lekitatu village
44. "Tanzania - Country Overview" in De Sherbinin, A., and Dompka, Victoria, 1996
45. FAO, 1995 (b) and Blank et al (2002)
46. Maganga et al, 2001
47. See Republic of Kenya, 2001
48. In addition to concerns over environmental and social impacts, the donor was reportedly reluctant to disburse the last tranche of funding due to alleged corruption during the previous administration.
49. Mwaka et al., 1999
50. See Simbeye, F.. 2003, 'Government Moves to Privatise Water', in *The East African*. June 23rd 2003
51. See for example WaterAid, 2003: Mason. B. and Talbot. C. 2002
52. Republic of Kenya. 2001
53. Republic of Kenya. 2001
54. Interview with Mr Akonaay, Arusha Regional Water Engineer
55. Republic of Kenya, 2001
56. See Ong, Chin and Orengo, Frederick (2002)

57. Republic of Kenya. 2001
58. 8MW installed capacity, 4 MW firm capacity
59. JET news, November 1998, and Luhumbika, Sarmett. and Kamugisha, 1994
60. "Tanzania - Country Overview" in De Sherbinin, A., and Dompka, Victoria, 1996
61. Maganga et al., 2001
62. National Environment Management Council (NEMC), 1992
63. Interview with Mr Akonaay, Regional Water Engineer, Arusha Region, Tanzania
64. Ohlsson, 1995, pg. 22
65. To supply Teso District in Kenya, using treated river water from Uganda; see Odeke, 2000
66. Ohlsson, 1995
67. Therkildsen, 1988, pg. 99
68. Solanes/Villareal, (undated)
69. Mujwahuzi and Maganga. 1997, *Domestic Water Use and Environmental Health in Tanzania*, unpublished
70. Mujwahuzi and Maganga, 1997
71. Institute of Resource Assessment, Tanzania/IIED, 1993, pg. 7
72. See, for instance, the UNDP Water and Sanitation Programme website
73. See WAMMA documents, WaterAid website
74. F.Z.Njau. Principal Executive Engineer, *Tanzania's Water Sector Review Process*, in Hirji and Patorni. 1994
75. Interview with Mrs Mbaruku, Arumeru District Planning Officer
76. Magesa, 1999
77. Thuo, 2000
78. Much of this section is paraphrased from Republic of Kenya, 2001
79. See Ayugi-Misinde, R (forthcoming) *Policy and legal Dimensions in Water Sector Reform in Kenya: The Water Act 2002*, East Africa Law Journal (forthcoming, 2003)
80. Sustainable, self-financing community management is possible, but this is very different from a profit-making enterprise.
81. Mutayoba, *Pangani and Rufiji River Basin Management in Tanzania*, presented at Africa Water Resources Management Policy Conference, Nairobi. May 1999
82. WaterAid Website
83. Tanzania Ministry of Water. Water Resources Department, 1999
84. Maganga, P.P., 2002
85. About \$60 for domestic supply, and \$165 for irrigation.
86. See Shivji, 1998

87. Luhumbika, Sarmett, and Kamugisha, *Pangani River Basin Management*, in Hirji and Patorni, 1994
88. See Republic of Kenya, 2001. and Sottas, et al., 1998
89. Sottas et al., 1998
90. International Water Management Institute, University of Nairobi, and Ministry of Agriculture, Irrigation and Drainage Branch, 1999
91. Mr. Akonaay. Regional Water Engineer Arusha, speaking during the ACTS workshop on water policy.
92. Interview with Mr Lokisa and Mr Macha of TIIP and Mr Mihambo of SIIP. 6.5.99, and with Mr Akonaay, Regional Water Engineer. 16.7.99
93. Tanzania Ministry of Water. Water Resources Department, 1999
94. Ibid.
95. See Section 3 (1) of URT, Cap 113
96. Interview with Dr Fanuel Sechamba. Institute of Resource Assessment, and George Jambiya, Geography Dept. University of Dares Salaam, 19.3.99
97. Ole Kamuaro. in Veit. 1998. pg. 302
98. Ole Kamuaro. in Veit. 1998
99. Mascarenhas, O.. and Veit. P.. 1994
100. Estimate provided by Arusha Regional Water Engineer and Arumeru District Water Engineer.
101. Mwaka. 1999
- 3240¹ Interview with Mr. Mihambo. Small-holder Irrigation Improvement Project.
103. Olsen. J.. Rodgers, A., and Salehe, J., (undated)
104. Opinions expressed during an ACTS workshop on water policy. 15th - 17th September 1999
105. UNDP/World Bank Water and Sanitation Programme website, *Voice Choice for Women*
106. Roger Yates, Oxfam Tanzania, speaking during the ACTS workshop on water policy
107. There is much scope for argument over the applicability of these terms, and even over exact definitions on 'institution' (viz-a-viz 'organisation'). See Bosen. Mganga and Odgaard, 1999.
108. Institute of Resource Assessment. Tanzania/IIED. 1993. pg. 18
109. Mascarenhas and Veit. 1994. pg. 12
110. Mageed, Y.A. 1991
Interview ¹¹¹ With Dr Fanuel Sechamba. Institute of Resource Assessment, and George Jambiya. Geography Dept. University of Dares Salaam. 19.3.99

112. Mascarenhas and Veit, 1994, pg. 17
113. Botelle and Rohde, 1995, *Those Who Live on the Land*. Ministry of Lands, Namibia, quoted in Sullivan, S., 1999
114. Clark, S.D., 1990
115. NEMC, 1994
116. Sullivan, S., 1999
117. Bergin, 1996
118. Boesen, Maganga, and Odgaard, 1999
119. Presentations of various Department of Water Development officials, during National Workshop on Water Legislation and Policy as Relates to Poverty Alleviation, KCCT. Nairobi, February 2000
120. Doyen, Jean, 2000
121. Kahia, 2000
122. Kahia, 2000
123. Swai. R.O., 1998
124. Ibid.
125. Republic of Tanzania, 1982, Section 142(1)
126. Interview with Mr Mayallah, TCRS Water Engineer, 30.4.99
127. Interview with Isiolo District Irrigation Engineer, Simon Frances Koome.
128. Hukka. J., 1996, *Rural Water Supply in Kenya*, in Hirji et al 1996
129. Mwaka, 1999
130. Examples from Kenya include Lake Naivasha Riparian Association and Ngare Nything/Sirgon river water users association in Ewaso N'giro North catchment.
131. An example is a widespread switch in priority over the last decade or more from large-scale centrally managed irrigation, to small-scale, smallholder, low/intermediate technology irrigation.
132. United Republic of Tanzania, 1995 (b)
133. See Mutayoba, 2002
134. Interview with Mr Mihambo, Small-holder Irrigation Improvement Project.
135. Mutayoba, 1999
136. Adapted from Kiersch, B. (2000) *Instruments and Mechanisms for Upstream-Downstream Linkages: A Literature Review*. Discussion Paper 2 for FAO Land-Water Linkages in Rural Watersheds Electronic Workshop
137. See Dr. Christopher Moore, in Napier (ed). 1998
138. See Leach, Mearns, and Scoones, 1999, for a critique of such views with reference to case studies of community-based natural resource management.

139. 'Water Stress' is defined as national internal renewable water availability of between 1,666 cubic in. and 1,000 cubic m. per capita. Many sources assert that Tanzania falls into this category, while some others disagree.
140. See Liniger, 1995, pg. 49
141. Mwangiri. M., Munene, M., and Karuru, N., 1998
142. Ibid.
143. See, as just one possible example, Wamalwa, 1991
144. Hendrickson, D., 1997
145. Ibid.
146. Warner and Jones, 1998
147. Interview with Mr Van der Berg, co-ordinator, District Rural Development Programme
148. Examples of seasonal stress in Maasai water management were given in interviews with Maasai community leaders and can also be found in von Mitzlaff, Ulrike, 1994
149. See Bosen, Mganga and Odgaard. *Rules, Norms, Organisations and Actual Practices- Land and Water Management in the Ruaha River Basin, Tanzania* in Granfelt, 1999
150. See Odhiambo, T., 1999
151. Soon to be available as a separate paper. See ACTS website, <http://www.acts.or.ke>
152. Pastoralist Indigenous Water Project of North Tanzania, 1996
153. Murungweni, Zeb. GTZ Zimbabwe, commenting during Africa Water Resources Management Policy Conference, Nairobi, May 1999
154. Castillo, Gelia T., in IDRC, 1987, *Women's Issues in Water and Sanitation*
155. UNDP/World Bank Water and Sanitation Programme website. *East and Southern Africa Region: Demand Responsive Approaches to Community Water Supply*
156. Republic of Tanzania, Arumeru District Council, 1987
157. Personal Observation, Kajiado District, June 1998
158. See Aketch, J.M., 2000
159. Tanzania Ministry of Water, Water Resources Department. 1999, *Tanzania National Water Resources Management Policy*
160. Ibid.
161. Mutayoba, 1999
162. Costello, 1996
163. Mutayoba, 1999

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