The interface between bylaws and statutory laws in promoting "functional water markets" as an instrument for managing water scarcity in Lake Baringo Basin, Kenya

Yatich Thomas T.B.[1]

Paper presented during the CGIAR and Partners' African-wide research workshop on bylaws, their effects on natural resource management and linkages to customary and statutory law

Abstract

The *interplay of rainfall variability, poor maintenance of water sources and the cumulative effects of ecosystem degradation in Lake Baringo Basin, have not only enhanced water scarcity, but increased competition and strengthened water resource-based conflicts amongst different water users and uses. Statutory laws rarely address water scarcity related problems because of existing mismatches between the law and reality. Hypotheses on the reasons for this include the failure of the water policy and law to accommodate bylaws. Local communities formulate binding bylaws to allocate and regulate access to and use of water. Land use change in upstream areas has worsened water scarcities in downstream areas. Given the magnitude of water scarcities, water 'market-like' initiatives have provided 'soft' solutions and opportunities for exploring new and innovative approaches for water management in arid and semi-arid lowlands of Lake Baringo Basin. This has catalyzed the emergence of new institutions, including bylaws focusing on water development, allocation, regulation and conservation. Locally derived bylaws have significantly promoted the functioning of 'water markets'. Using two cases, this paper discusses the theoretical foundations for water markets revealing that with a well-designed, measurable and enforceable water use rights system however crude it is and good mix of by-and statutory laws, it is possible to enhance water regulation, allocation and conservation, especially in water stress environments.*

Keywords: Interface, bylaws, statutory, and 'functional water markets'

Introduction

Water allocation, regulation and conservation in arid and semi-arid areas (ASALs)[2] can be traced to three epochs[3] of policy formulation and enforcement in Kenya. During the pre-colonial period, local communities perceived water resource as bountiful. Access and use of water sources was stringently regulated by a council of elders using locally formulated bylaws. During the colonial period pre-existing laws especially among communities who lived in what became the white highlands were replaced by restrictive colonial law. Community practices were depicted as barbaric and backward. Post-independent legal regimes and structures advanced the interests of the "Kenyan Europeans" who bought out the white highlands.

Sessional papers No. 10 of 1965 on *African Socialism and its Application to Planning in Kenya* and Sessional Paper No. 1 of 1986 on *renewed growth for economic development* focused on high potential areas as *'development focal areas'* neglecting less resource endowed areas. Forty four years after independence, less resource endowed areas are still ignored. In places where attempts are being made conflicts with local bylaws abound. It can therefore be argued that the neglect of arid and semi-arid areas for the last forty four years gave room for the formulation and enforcement of bylaws that continue to regulate man-water interactions. In places where concerns of social justice, equity and increased consumption per capita catalyzed initiation of irrigation schemes, water scarcities thrived. Diversion of limited river water and change of water tenure as irrigation was adopted introduced a new approach to water management. This ignored community norms, values and traditional water governance. Land use changes in upstream areas, the severity of water scarcity and poor maintenance of water supply structures among a triad of factors influence water use and community innovations for water management. In the study area, underground and surface water sources are 90 percent

---

[1] World Agroforestry Centre (ICRAF)

[2] 80 percent of Kenya's surface area is arid and semi-arid areas supporting 26-30% of the population, 50% of the livestock sector and a wide range of wildlife

[3] Pre-colonial, colonial and post-colonial. Elsewhere these are referred to as pre-industrial, industrial and post-industrial

silted, including Lake Baringo that used to be the main source of water. The lake's depth has reduced by 6.45m over the last 18 years. Its depth is currently 2.15 down from 8.6m in 1975. Statistics by the government indicate that Lake Baringo has shrunk in size from 146.4km^2 in 1984 to 120.2km^2 in 1995. It has become a brown mass of shallow water with reduced fish stock. The study area also exhibits high incidence of poverty. Strategies and plans aimed at improving one ecosystem service negatively affect other ecosystem services[4], and often worsened by policy and market failures.

Water management approaches as well as varying climatic conditions continue to enhance water scarcities and associated conflicts. Dry season water use falls to 5 litres per day (UNDP, 2006) as the distances to water sources increases. This presents the challenge of balancing the interests of different users and ensuring that both women and men are empowered to decide on the level of access to safe water and hygienic conditions and on the typology of water-using economic activities that they desire, and organize themselves around[5].

Kenya's rural water supply in retrospect

Water security brings with it a temporal dimension of inter-generational equity requiring consideration of future water as part of the present planning approach. This requires a paradigm shift and pursue of innovative and integrative approaches in natural resource management. In Kenya, any challenge to the principle of water supply services as a public responsibility is strongly resisted. The opposing coalition include those fearful of tariff increases, public service unions afraid of redundancies, taxpayers and members of the civil society pushing water to be retained in the public domain. Kenya at independence, adopted the basic needs strategy which promoted the belief that water is a gift from God and that all had free access and use. Government took it upon itself to provide water to its citizens. Basic needs strategy introduced the problems of exclusivity in water access and use[6]. By contrast, Agenda 21(1992) and World Bank (1993) emphasized water management at the lowest appropriate levels and its treatment as an economic good. Despite the deepening of this popular public perception, it however depends on time-related variables such as government policies, population distribution, energy use and costs, per capita disposal income, technological development, consumer habits and the prices of goods dependent of water for their production.

Nyaoro (1996) argues that, as more supply systems were built to meet the needs of the rapidly growing rural populations, pressures on government spending became more acute and resources dwindled. There were doubts both about the prospects of sustaining existing water supply schemes and extending services to those underserved and/or unserved. Local communities were viewed as recipients of development. Pressure from population increase led to shortages even where it was previously abundant. Only a small proportion of the population has access to water supplies, most of which in urban areas. The rural poor continue to experience acute water shortages.

In the 1966-70 planning period, water planning and development were perceived as critical elements in economic development. In 1970 – 1974 planning period, it was observed that water requirements had not been met in the rural areas due to lack of technical and financial resources, lack of sufficient flexibility in terms of financing water schemes resulting in the failure to take into account the local conditions in case development funds were insufficient for water development; and continuing

---

[4] Perkerra irrigation scheme has reduced downstream flow to Lake Baringo, water available for ecological sustenance and upstream damming of Kiranditch River for supplying water to Kabarnet Town has affected downstream small-scale irrigation schemes and water for domestic and livestock use

[5] As per the 2025 target objectives of the World Water Forum

[6]The paternalistic approach believed that the planners, technicians and experts possess all the knowledge, wisdom and virtue needed to achieve water supply development and enhancement of its sustainability, and that the poor should be responsible and grateful beneficiaries. Promoted free-rider perception until today pose serious problems in the development, management and protection of water sources, especially in water stress areas.

shortage of skilled manpower and inadequate institutional arrangements. During that planning period, only 15 per cent of the rural population received treated water supplies. During the 1974–78 planning period surface dams were seen as, and still viewed as the most appropriate option in the arid and semi-arid areas. The lifespan of these dams, however, has been affected by the changing land use leading to increased rates of sedimentation. Water scarcities increased competition and conflicts amongst water users. Water conflicts argues Okidi (1994), are caused by a variety of political and social tensions, aggravated by widespread poverty and squalor associated with drought; drying up of water sources and land degradation upstream. The reduction of such conflicts can either be by increasing the quantities of water in order to achieve sufficiency or by control, apportionment and utilization through adoption of effective and efficient allocation mechanisms of the limited supply. Hence, the need to balance these competing needs and interests amongst the many uses and users through water markets.

Theoretical foundations of *'water market-like initiatives'*

In arid and semi-arid lands, the critical problem with water management is how to coordinate individual users to attain an optimal rate of production or consumption for the community as a whole. Oakerson (1999) suggested that in order to address this basic problem, there is need to understand and integrate technical and local ecological conditions, decision making arrangements, patterns of interaction and the outcomes of the preceding three (as is in fig. 1). According to Oakerson, resources are constrained by ecological aspects which include jointness of supply or consumption where each individual can potentially subtract from the welfare of others, exclusion and indivisibility. He poses the question: "within certain limits, can all users derive benefits jointly without conflicts? Under decision-making arrangements, Oakerson further argues that, rules governing both individual and collective choices towards common pool resources like water can be divided into three categories:

- rules that establish conditions of collective choice within the group most immediately involved with the common resource;
- operational rules that regulate the use of the resource; and
- the influences of external arrangements or decision structures outside the immediate group.

Patterns of interaction among users of common resources are derived from strategic choices of individuals that are in most cases positive-sum due to social stratification. Oakerson classified the strategies into reciprocity, where individuals positively contribute to the welfare of others and non-cooperation where individuals resort to "free-riding" use of the resource, promoted by communal tenure. The failure to understand and appropriately mix these two perhaps is the source of problems associated with natural resource use. These create outcomes, which can be measured by efficiency of use and equity in resource allocation.

Oakerson's model however fails to incorporate other essential components for effective water resource management, especially to address market failures. Cousin (1993) argues that Oakerson's Model allows insufficiently for the analysis of:

i) The ecological characteristics of the common resource;
ii) The socio-economic contexts (production and exchange relations);
iii) The diversity of actors likely to be strategizing in relation to use; and
iv) Power structures and struggles within local communities and in relations with external agents and institutions.

Cousin suggests that adequate understanding and integration of these variables provide a framework (fig.2) for reducing resource-based conflicts and promoting social welfare. This however is limited by the failure of development agents to understand power structures and struggles among local communities over water resources.

Figure 1: Oakerson's Model, 1999

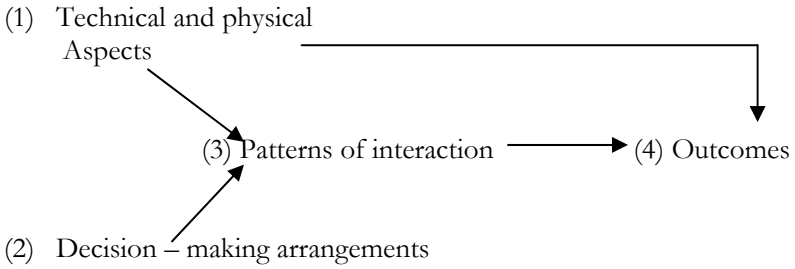
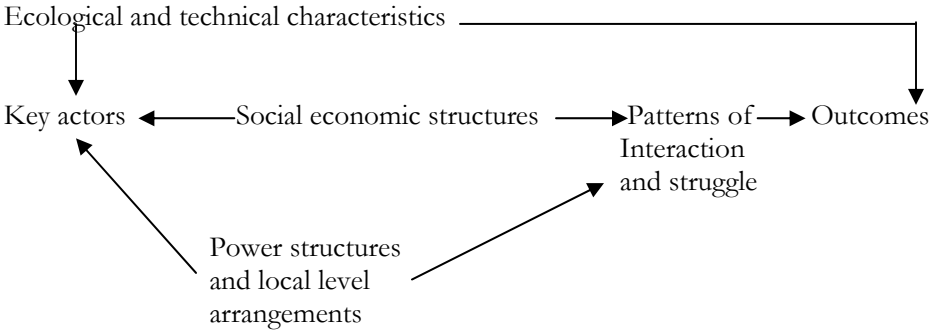


Figure 2: Cousins alternative Model



In his model, cousin did not integrate a strategy for the maximization of equity and elimination of non-cooperation amongst the several users of water sources. The adoption of water resource markets can effectively address this gap.

Water market-like initiatives

Water market-like initiatives have the potential to promote equity and cooperation among users. The mode of adoption and how equity is gathered for are critical building blocks. Water market-like initiatives are institutionalized tradable water rights. This can be statutory-customary rights or a mix of these two. The degree of users to own and make decisions on their users' rights could offer solution to water scarcity in arid environments. Other elements to strengthen water market-like initiatives include clarity on property rights, contracting mechanisms, availability of information and enforcement. They provide a framework for eliminating free-riding and a sense of ownership and responsiveness among users.

(a) Definition of property rights

Design of property rights requires the estimation of both water supply and demand within an area. This could be through an increasing block tariff system (IBT). The product to be traded should be controlled and measured. In an arid zone where a reliable reticulation system is lacking, a 20-litre jerrycan can be used to measure quantity. Once this is established the total consumption per household (for the different uses) can be calculated and put in a block system and in which a price is then attached to. As the population increases, that particular household or individual would move into a different block and pay the corresponding price. The blocks or units would form shares that a particular user is entitled to. During periods of drought, these rights are then sold as pastoralists migrate to dry season grazing areas. Individuals can sell their entitlements to irrigation farmers. An intermediary agency will have the right to regulate transactions and farmers will have usufruct rights but the state will continue owning the water. The intermediary agency will remit collected revenue to local government, and maintain a central control and storage system. The agency issues allotments to the users, "providing them with a permanent contractual right to use the allotted water under the

terms and conditions set in their contracts which represent a usufructionary right that has the standing of a property right under law (Manuel M., and Kavin E.K, 1999)". The allotment contracts would be of different categories depending on existing water uses: Water for household use (class A), water for municipal use (class B), water for industrial use (class C) and finally water for irrigation (class D). These categories do not restrict commodity transactions and the users are free to periodically rent and transfer water from one use to another. This transfer can be temporal or permanent and can be effected once two parties have submitted allotment change application to the central enforcing agency after negotiations on the financial terms.

Third-party impacts of change of use by an upstream rights holder would negatively affect the downstream users. Usually, water that is used for non-consumption uses upstream return to the river flow at a point and the downstream user will have all the right to use this water. But in case there would be change of user, then the legal system can order for compensation of the downstream user or the enforcing agency can introduce high transaction costs and may prevent desirable transfers from taking place (Howe, al. 1986).

(b) Transaction Mechanisms

Allotee's units are registered using a system synonymous to the banking transaction system. When a rights holder engages in a transaction (preferably annual rentals), *"he and a prospective buyer, after agreeing on a rental price, simply have to send a postcard to the enforcing agency specifying the volume of the rental, the source and destination"* (Manuel M., and Kavin E.K, 1999). The enforcing agency would verify the signatures and credit the water under the seller's account and debit the account of the renter. Information on transactions or availability of water use rights can be disseminated through the print and electronic media. In due course, once water markets have been established there would be brokers who would provide information on potential trading partners. Brokers however, will complicate the system.

(c) The Administrative System

Intermediary organization will make allocation, regulation and conservation decisions in consultation with users. It will also act as a 'clearing house' and ensure users adhere to their contractual requirements. Regulations for dealing will defaulters will jointly be put in place.

Markets however, do not perform effectively in relation to public goods where exclusion is difficult. However, markets are efficient instruments to solve market failures, react to changes in water demand and solve water scarcities through balancing supply and demand.

Designing user rights requires water users and government to be involved. This promotes a balanced participatory system. Balanced allocation, regulation and conservation of water will achieved through *"distributed governance"*.

Distributed Governance

Ostrom (1990) classified resource governance into open access, state control, communal governance and private property. Governance however can be shared among the state, local communities and private interests. Each of these brings different interests, abilities and perspectives to the resource management process as well as sharing of authority. In distributed governance, internal and external structures peculiar to each stakeholder are analyzed. Distributed governance[7] will be appropriate for water market-like initiatives given problems that have been experienced before with command-and-control approach.

In designing a cooperative, there is need to decide who should be designated as members and if cooperative membership could be sold to yield a return to the community member or not. As Jentoft (1989) notes, it is unlikely that common pool resource co-operatives would have open

[7] Distributed governance is typified into rights-based management, co-management, contractual management, co-operative management and corporate management.

membership. He further argues that members must be fully-paid members in order to benefit from the cooperative. They then buy shares from the cooperative with the institutionalization of administrative structures. The members would have the right to sell their shares or rights to third parties. This has not be adopted for the so called public goods like water.

Townsend (1995) has argued that cooperative and corporate management can be conceptualized as two ends of a spectrum of collective governance institutions and this leads to corporate management. Under corporate management, owners would make decisions either directly, by voting their shares on management issues, or indirectly, by electing a board of directors to make those decisions on their behalf.

Case studies of 'water market-like initiatives'

Status of water sources in the semi-and-arid lowlands of Lake Baringo Basin

In Marigat Division water sources[8] Division, water sources vary from one location to another. This influences the levels of supply, demand, technology and typology of the adopted governance systems. Surface water and potential groundwater supply are influenced by the number of users depending on state of a particular source, proximity of the source to "favourable" sub areas and physiographical attributes.

Salabani residents depend on Lake Baringo as the main source of water for domestic and livestock use. However, Lake Baringo has reduced in depth from 8.7m to below 2m in a 20-year period because of siltation. The siltation of the fresh water lake has also reduced water supply from the two lake points-LK002/Salabani and LK003/Kampi Samaki. Previously, the two duty pumps used to pump at 18m^3/hour and operated for 8 hours a day. At this rate, it was possible to provide 288m^3/day. Ideally, the local government is the gatekeeper for all boreholes and hand pumps, but with dwindling resources and corruption, it has been difficult to maintain most of the existing water supplies.

In the entire region, all the pans and dams are between 10-90% silted and they have been abandoned. *Chemeron* Dam, for instance, is 90% silted and dry. *Endao* irrigation scheme, depended on the Dam as a source of water for irrigation, ceased functioning from 1984 leading to loss of livelihoods for the Njemps community. Additionally, seven of the fifteen boreholes are operational, but not at their full potential. The piping systems are not dependable because of poor reticulation system. Apart from nature's influence on water availability, appropriate technology has not been adopted. In fact, there are only two boreholes fitted with mono pumps in the entire division: Loberer and Maoi.

Loberer (BH037) and Maoi (BH057) boreholes not only supply water to local residents but also to the Kenya Army, the police force and the people of East Baringo. Development of these boreholes was with external support from World Vision International, Christian Children Fund (CCF) and Global Environment Facility (GEF). Community members contributed 30% of the cost of the project and contracted World Vision, CCF and GEF to offer technical expertise. The water is treated and pumped to a central control point for storage and distribution. Laying down an effective reticulation system in a semi-arid region, is not only expensive, but cumbersome. Due low-variable rainfall, and high evaporation rates, domestic and livestock deficits are dominant in Marigat, Endao, Ngambo, Eldume, and Loboi. There is a domestic water deficit of 40m^3/day in Marigat, 21m^3/day in Endao and 34m^3/day in Loboi. Marigat also experiences livestock deficit of 65m^3/day, 31m^3/day in Ngambo, 21m^3/dayin Endao and 3m^3/day in Eldume. These locations experience deficits because of population pressure form both humans and livestock and rainfall viability. Deficits exist despite high

[8] A census of key water sources within the Semi-and-arid areas of Marigat Division identified 15 boreholes, 22 ground catchment sources, 4 springs and 5 sources of piping system

ground water potential. Groundwater exploitation would offset both domestic and livestock deficits because water would be increased by a figure between 12.8m3/day and 73.8m3/day as per table 1.

Table 1: Ground water potential, population and demands per day

Sub-location	Groundwater potential (m^3/year)	Groundwater potential (m^3/day)	Population in each sub-location	Demand (m^3/day)-calculated
Endao	14,420	39.5	2525	37.875
Perkerra	23,965	65.7	4920	73.8
Ngambo	14,108	38.7	2636	39.54
Salabani	12,194	33.4	1316	19.74
Eldume	8,468	23.2	2155	32.3
Sandai	7,718	21.2	855	12.8
Loboi	410,388	1124.4	1251	18.77
Total	**491,261**	**1346.1**	**15,658**	**234.825**

Source: Kenya Water Master Plan

Some locations have high supply, but may not be clean water. The natural spring, s198/Loboi Gate, yields 26.3m^3/hour **equivalent to** 631.2m^3/day which translates to 410,388m^3/year. As indicated in the earlier sections, Loboi experiences domestic deficit of 34m^3/day and no livestock deficit. This deficit is attributed to water quality. The water is saline and only suitable for irrigation purposes. In Loboi, beans are not grown because of the salinity of the water accentuated by the high evaporation rates. Cattle migrate to favourable sub-areas within the semi-arid region every season. Loboi, which is one of these sub areas become a dry-season grazing zone for cattle migrating from East and North Baringo. The water deficits in Marigat area are due to the use of water for irrigation in Perkerra Irrigation scheme. The rainfall patterns are unpredictable and uneven. Droughts and floods are more frequent and devastating.

Nature of water problems

Problems associated with water use and management were identified as scarcity (26%), physical distance to a water source (29%), diseases (11%), salinity (5%), pollution (8%), and siltation (7%) and bursting of pipes especially within Marigat. Scarcity and the spatial distance covered in search of water resources negatively affect the productivity of the Njemps women. Water vendors sell a 20-litter jerrycan at 20 shillings complicating the existing scenario. The physical distances increase the costs of accessing water because of bicycle repairs. Water vendors cover long distances cycling in order to reach their customers. The temptation to buy water is enhanced because the sources and the water quality differ from one area to another, and therefore water users try to obtain water of specific quality depending on its use. Pollution of Perkerra River from the headwater region and the urban centres seriously affect the quality of water and costs. People often wash and bath along the river. This has increased morbidity and mortality rates and negatively affected food security because of declining levels of production, especially in Perkerra irrigation scheme.

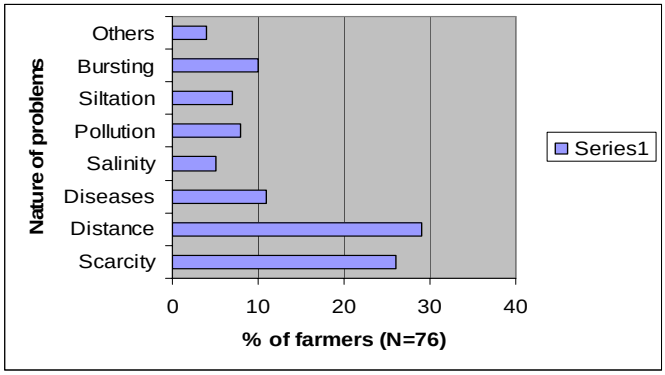


Figure 1: Nature of water problems

'Water market-initiatives' as a response strategy

Water scarcity and time spent in looking for water was an impetus for the adoption of innovative approaches at the community level, including trading of water as a good. Trading in water differs depending on who the buyer is and buyers' location relative to a water source. Water users in urban centres obtain water from members of *Enkarit* Youth Group who cycle long distances and sell water up to a maximum price of Ksh. 30 per 20-litre jerrycan, depending on the distances covered. This is governed by willing-buyer-willing -seller arrangement. The recently formed water users associations (WUAs) as per the Water Act, 2000 have not been effective in regulating the price.. Loberer and Maoi water users associations have adopted distributed governance and allowed optimal exploitation, apportionment, regulation and conservation of water resources. Distributed governance system recognizes the fact that governance can be shared among the state, local communities and the private sector. This brings different interests, abilities, and perspectives to the resource management process. The government-centred water regulation has earned a weak performance record over a long period of time and community-based governance has gained superiority over it. With this realization, through water campaigns, the community came together, developed the boreholes through assistance of the government and the donor community. Once the boreholes were operational, the community invested in a conveyance system that piped water to several communal points. Water users who desired individual connections had to incur an extra cost by buying the pipes. Once they access water in their plots, they would pay Kshs.200 to the water users association every month.

Those who obtained water from the community points pay shs.2 per a 20-litre jerrycan. In order to effectively manage allocation, regulation and conservation, the community centralized water management and developed bylaws through the water users associations. Once the rules/bylaws were formulated and agreed upon the central authority was mandated to enforce them. This control authority is the core management committee of the Water users Association. Bylaws formulated were linked to the local government laws.

On the other hand the government has interests (for example, ecological interests in biological diversity, or political interests in political economy), especially in water resources which extend beyond those of the community. Secondly, there is no guarantee that the local community can indeed organize itself into an effective governing institution. Therefore, some form of "shared responsibilities" structure must exist than the existence of either "pure" government or community management. This led to the promotion and adoption of co- and contractual management.

Contractual management has been effected because the members of the local community play specific roles which the government feels that the members of the WUAs can perform. The community members also define the roles of bilateral organizations by contracting them to develop the projects on the behalf. The members of the community also offer labour and financial support. This system has led to the creation of a governance system that would give a broader range of responsibilities to communities. Contractual management involves delineation of duties between the government, the private sector and the community through water users associations.

Members during the annual general meeting evaluate the performance of the community "central" management authority and decide on how the revenue collected should then be used. In order to minimize wastage livestock are watered on Monday, Wednesday, Friday and Saturday. This would promote wise use because the users know that if they misuse their water, then they will have to wait until the stipulated day of drawing more water. This alternate allocation also allows treatment and promotes an adaptation strategy to the water scarcity problems.

Water market-like initiatives in arid and semi-arid lowlands in Lake Baringo basin provide an institutional mechanism for managing water scarcity. But, is there truly a new paradigm of water emerging or are local communities engaging in mechanisms to perfect inequalities in water access,

use and sanitation? The actions taken, both at policy and management levels, suggest that the way water is perceived and managed has indeed changed and therefore the need to perceive water differently and measures to ensure sustainable water use in the long-run. Change is underway- movements to create river basin management committees, various planning initiatives for multi-use water schemes, multi-stakeholder dialogues, user participation and building partnerships at various levels.

Intersection and interaction of Water Act 2002 with bylaws at local scale

Water market-like initiatives at the community level is not without bylaws that govern water resource development, protection, access and use. Formulation and adoption of bylaws were informed by Local government bylaws. Such local laws govern development, water use, payments for water, use of collected revenue, rules on management, ownership, and governance of the rural water supply. In the case of Loberer/BH 037, the bylaws formulated covered level of payment, livestock watering, collection, saving and use of revenue, grazing of animals and the management of the borehole. Statutory policy milieu governing water is complex either intersect or interact with bylaws for natural resource management at the local level. Such intersection and interaction is both in time and scale.

Sessional paper no. 1 of 1999 recognizes financing of rural water supply systems as a problem. It encourages communities organizing around water to provide alternative financing for development and protection of rural water supply systems. It advocates for a clean water supply to stimulate growth at the community level as well as the devolution of water resources management. These provisions are in favour of community initiatives leveraging funds for development or improvement of rural water supply.

Kenya's water law advocates for separation of powers. It divests water resource management and water service and sewerage provision from the minister in charge of water affairs. It vests water resource management (part III) and water service and sewerage provision (part iv) to two bodies: Water Resource Management Authority and Water Service Regulatory Board. These have devolved structures at regional and catchment level either for water management or service provision.

Loberer and Maoi qualify to be subjected to the provisions of the Water Act, 2002 because they serve several households. This is worsened by the vesting of water tenure in the state under section 3 of the Act requiring approval of usufruct rights or acquisition of water rights for the two rural water supply projects. Section 19 part (1) of the Act subjects the right to use water to a permit requirement from the Authority. Section 27 makes it an offence to construct or use works to abstract water without a permit. Some of the factors for determining a permit application as per section 32 of the Act include: i) the existing lawful uses of the water; ii) efficient and beneficial use of the water in the public interest; iii) the likely effect of the proposed water use on the water resource and on other water users; iv) strategic importance of the proposed water use; v) the probable duration of the activity for which the water use is acquired; vi) any applicable catchment management strategy; and vii) the quality of water in the water resource which may be required for the reserve. In the consideration of these factors, use of water for domestic purposes shall take precedence over the use of water for any other purpose. Acquisition of a permit requires payment of a charge for the use of water or processing of the permit. Rural communities are rarely able to raise money for the application. This marginalizes the rural poor and could enable richer members of the community to acquire permits for water development and provision. Section 34 requires that a permit specify the particular portion of any land to which the permit is to be appurtenant. This means that the permit is linked to land title. This reinforces the possibility of landowners dominating permit acquisition.

This is complicated by Kenya's pluralistic land tenure system and the perceptions of communities on water rights. Communal land tenure is common in arid and semi-arid lowlands of Lake Baringo basin and present both opportunities and challenges. A community project/scheme can only be granted a

permit if it has been approved by persons owning or occupying two-thirds of the area. This is cumbersome at the community level. The Act under section 15 (5) provides for the establishment and operation of water users association as fora for conflict resolution and co-operative management of water resources within catchment areas. In the two cases discussed before, water users associations have pursued a water allocation, regulation and conservation mechanisms that balance supply with demand. This has reduced water resource-based conflicts, but could potentially isolate those who cannot afford to pay for a 20-litre jerrycan.

Section 47 of the Act spells out the powers and functions of the Regulatory Board. This includes issuance of licenses to water service providers. Section 56 states that no person shall provide water services to more than twenty households or supply more than twenty five thousand litres of water a day for domestic purposes - or more than one hundred thousand litres of water a day for any purpose - except under the authority of a license. Subsection (2) further stipulates that it is an offence to provide water services in contravention of the license requirement. Given this requirement, Loberer and Maoi community water projects must therefore acquire a license from the Water Service Board operating within a catchment. The applicant, the community in this case, must satisfy the Board as per section 57 that: i) either the applicant or the water services provider by whom the services are to be provided has the requisite technical and financial competence to provide the services; ii) the applicant has presented a sound plan for the provision of an efficient, affordable and sustainable service; iii) the applicant has proposed satisfactory performance targets and planned improvements and an acceptable tariff structure; iv) the applicant or any water services provider by whom the functions authorized by the license are to be performed will provide the water services on a commercial basis and in accordance with sound business principles; and v) where the water services authorized by the license are to be provided by a water service provider which conducts some other business or performs other functions not authorized by the license, the supply of those services will be undertaken, managed and accounted for as a separate business enterprise. These conditions for acquisition of a license are beyond community's reach and thus constraining community initiatives in rural water supply.

Section 113 of the Water Act, 2002 requires transfer of facilities and assets or use rights in the case of community water projects to the Water Service Boards. This means that community groups must enter into contract arrangement with the Water Service Board. This could be contended because communities argue that the own the affected assets and facilities. This could brew conflict between the water service board and the local community groups that have invested in rural water supply. Adjacent communities wishing to invest in rural water supply may negatively be influenced and may not invest at all.

Many commentators (e.g. Mumma, 2005) viewed the legal requirement on the registration of self-help water projects as an impediment. It subjects unnecessary red-tape relative to the previous practice of registering water projects with Social Services at the District level. The Act prescribes new procedures for the registration of water services which in no way will make rural water supply cheaper. Communities in lowland areas of Lake Baringo Basin however, may have contributed treated water "*on a commercial basis…"* but could potentially limit accessibility to those who can afford to pay for water.

Water market-like initiatives could discriminate against poor members of the community who may not be able to pay. However, with an increasing block tariff system (IBT) it will be possible to ensure a basic entitlement that is not charged.

Emerging issues

In the case of Loberer and Maoi community water projects, moving towards the implementation of truly 'functional water markets' will require:

i) registration of community water projects as per the Water Act, 2002;
ii) turning members contributions into shares;
iii) turning members' 'levels' of water consumption/demand into money equivalent when they migrate in search of pasture. In order to rent their entitlements, the money equivalent will have to be determined;
iv) treating this as part of shares and establishing a mechanism for selling entitlements as well as acquisition of such entitlements;
v) diversifying into small-scale irrigation to enhance the revenue base;
vi) using revenue to develop and manage new water sources (boreholes);

The pursued of these elements will however require investments in re-training of the officials of the community projects, investment in equipment and putting in place mechanisms to reduce the potential negative effects of 'water market-like projects. The government through devolved institutional structures under the Water Act, 2002 will need to play an oversight role. This is only if community self-help water projects are not seen by Water Service Boards as source of income, but mechanisms for minimizing water resource-based conflicts through balancing water supply and demand.

Conclusion

The present water resource crises in Kenya underscore the urgency of achieving effective sustainable development of the resource by adopting distributed governance systems and business approach in rural water supply. Unfortunately, allocation, regulation and conservation decisions regarding water resources have aggravated more problems in the water sector. There should not be a mismatch between the objectives of water and other natural resources. Experience has shown that the past narrow sectoral approach to water management cannot work. The local people, who for the most part are neither effectively consulted nor involved need to be involved in project conceptualization, planning design, implementation and management, so as to avoid the usual resent, ignorance and overuse and occasional destruction of the very facilities and resources intended for them. With communities investing jointly in water trading systems, a sense of ownership coupled with user participation can effectively reduce problems associated with the traditional command-and-control approach. The two cases do not fully support the scaling up of market-like initiatives because they are still under developing and evolving. However, they provide lessons and experiences that can inform other initiatives.

Acknowledgements

The author wishers to acknowledge with gratitude the assistance offered by the local communities, World Vision International and the Global Environment Facility during the preparation of this paper. I thank the World Agroforestry Centre for the financial support and facilitation that made the writing of this paper possible.

Bibliography

Cousin M., 1993. Alternative Model for Analysing the Commons. In: Netherlands Development Organization., 1996: Common Property: Use, Property and Management, ECONET, Issue 7, March/April, 1996.

F**alkenman, M., and G. Lindh, 1993.** "Water and Economic Development". In: Gleuck, P. ed., Water in Crisis: A guide to the World's Water Resources, Resources. New York: Stockholm Environment and Development

Kenya , Republic of., 2002. Water Act, 2002. Ministry of Water. Nairobi: Government printer

Kenya , Republic of., 2000. District Development Plan, 2002-2008. Ministry of Planning and National Development. Nairobi: Government printer.

Kenya , Republic of., 1994. National Development Plan, 1994-96. Nairobi: Government Printer.

Kenya , Republic of., 1993. District Development Plan, 1993-1996. Ministry of Planning and

National Development. Nairobi: Government printer.
Kenya , Republic of., 1989. District Development Plan, 1988-1993. Ministry of Planning and National Development. Nairobi: Government Printer.
Kenya , Republic of., 1992. National Water Master Plan (Draft). Nairobi: Ministry of Land Reclamation, Regional and Water Development. Nairobi: Government Printer.
Kenya, Republic of, 1999. Sessional Paper No. 1 of 1999 0n the National Water Policy on Water Management and Development, Nairobi: Government Printer.
Kenya, Republic of, 1994. National Development Plan, 1994-1996. Nairobi: Government Printer.
Kenya, Republic of, 1989. National Development Plan, 1989-1993. Nairobi: Government Printer.
Kenya, Republic of, 1984. National Development Plan, 1984-1988. Nairobi: Government Printer.
Kenya, Republic of, 1980. National Water Master Plan: Summary and National Plan: Vol. 1, Nairobi: Government Printer, 9-14
Kenya, Republic of, 1979. National Development Plan, 1979-1983. Nairobi: Government Printer.
Kenya, Republic of, 1966. National Development Plan, 1966- 1970: Nairobi: Government Printer.
Kenya, Republic of, 1965. Sessional Paper No. 10 of 1965. African Socialism and It's Application to planning in Kenya. Nairobi, Government Printer.
Nyaoro W., 1996. Environmental Constraints to Sustainable Rural Water Supply in Kenya: Towards a Planning Alternative. In: The Independent Review: A journal of Eastern Africa Literary and Cultural Studies, 1996.
UNCED, 1992: Agenda 21: United Nations Conference on Environment and Development. New York: United Nations.
World Bank, 1993: Water Resources Management: A world Bank Policy Paper. Washington, D.C.
Yatich B.T., 2002: The Relevance, Validity and Applicability of Functional Water Market Systems in the Management of Headwater Resources: A Paper Presented in an International Conference on the Management of Headwater Resources on 5-8th', Sept., in the United States International University, Nairobi.