International workshop on '*African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa*', 26-28 January 2005, Johannesburg, South Africa

Managing the River Njoro Watershed, Kenya: Conflicting laws, policies, and community priorities

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This paper reports on an experimental process underway in the River Njoro Watershed in Kenya to engage riparian communities, other local stakeholders, and government policy-makers in a dialogue to develop a riparian management plan. The process is part of the Sustainable Management of Watersheds Project (SUMAWA-CRSP), a multidisciplinary applied research effort established in 2002. The River Njoro's riparian zone is a common pool resource that supports critical downstream watershed services and provides valued resources to its poorer communities. However, its survival is threatened by the incompatibility between communal regulatory mechanisms, tribal norms and mechanisms of statutory enforcement, and between national laws and institutional arrangements in Kenya. The ensuing free access lawless mentality has lead to resource degradation and subsequent decline in riparian services such as water quality and flood protection. A contributing cause is the absence of any institutional structure to harmonize conflicting government laws and policies on land, water, and forest resources on the ground.

Keywords: riparian zone, watershed management, laws and policies, natural resource use, Kenya

Introduction

The River Njoro Watershed provides an on-going case study of the ecological degradation of the riparian zone that occurs when government policies and laws conflict with local people's traditions and cultural practices. Typical of the semi-arid basins in the Rift Valley of Kenya, this watershed has been undergoing a new phase of rapid land use change in the uplands portion of the watershed, and continued significant growth in both rural and urban populations and associated economic activities. Considerable negative environmental impacts are occurring, in particular to the quality and quantity of river water (Shivoga et al. 2002). Increased erosion, nutrient and sediment loadings, and human and animal pollution, along with damage to the integrity of the riparian corridor and changes in the hydrologic regime of the river have been observed.

In 2002 a multidisciplinary international applied research effort was established in response to water management concerns in the River Njoro Watershed and other regional watersheds in Kenya. The Sustainable Management of Watersheds Collaborative Research Support Project (SUMAWA-CRSP) brings together Kenyan and US scientists and engineers, and Kenyan public agency staff to demonstrate improved and integrated management of water and environmental resources in the Njoro Watershed through local stakeholder participation and action supported by scientific information and analyses. Its objective is to with stakeholders in order to reverse negative trends and enhance the integrity and sustainability of water and environmental resources in the Njoro watershed, while also addressing critical poverty issues. In the first phase of public participation, a bottom-up approach has been used to engage local riparian communities in a participatory problem analysis and solution opportunity appraisal process. An emerging priority for action has been the protection and management of the riparian zone. The community problem analyses revealed how a free access mentality has developed in regards to the riparian zone. This state of affairs can be traced in part to the lack of enforcement of long-standing riparian conservation rules and confusion arising from more recent conflicting government land, forest, and water laws and policies. As a consequence, riparian degradation along the river has increased the risks of downstream flooding and contributed to declining water quality. Emerging from the analysis is a need for an institutional structure to bring together government agencies that make and implement laws and policies on land, water, and forest resources to harmonize conflicting regulations on the ground. The future well-being of the riparian zone will be closely linked to how well cooperation can be established between

national and regional policy-makers, on the-one-hand, and local community leaders on the other to define a coherent management framework and enforcement mechanisms.

SUMAWA is now tackling this challenge in the second phase of the public participation process through a series of tiered workshops to set up a structure for government-community dialogue and cooperation. The preliminary findings from the on-going research in the River Njoro Watershed point to the need to develop strategies through this dialogue process that restore and enhance the integrity of the riparian zone, while at the same time meeting the aspirations of different population groups residing along the river.

Background

The River Njoro is located in Nakuru District in the centre of Rift Valley Province in Kenya. The river is approximately 60 kilometers (km) in length. It emanates from the eastern slopes of the Mau Escarpment at about 3000 meters and terminates in Lake Nakuru at about 1750 meters (Figure 1). The watershed, of about 280 km squared, has over 300,000 people and includes the urban centers of Njoro Town (~ 30,000) and much of Nakuru Municipality (~240,000). On its journey from its source in the Eastern Mau Escarpment, the river cuts across several land uses and communities with diverse cultural orientations. The Njoro Watershed constitutes a critical water source for Lake Nakuru, a large shallow saline lake designated a Ramsar wetlands site of international importance. During the last 20 years the region has undergone rapid land use change and population growth with associated negative impacts to the water resources, public health, the local economy and livelihood systems.

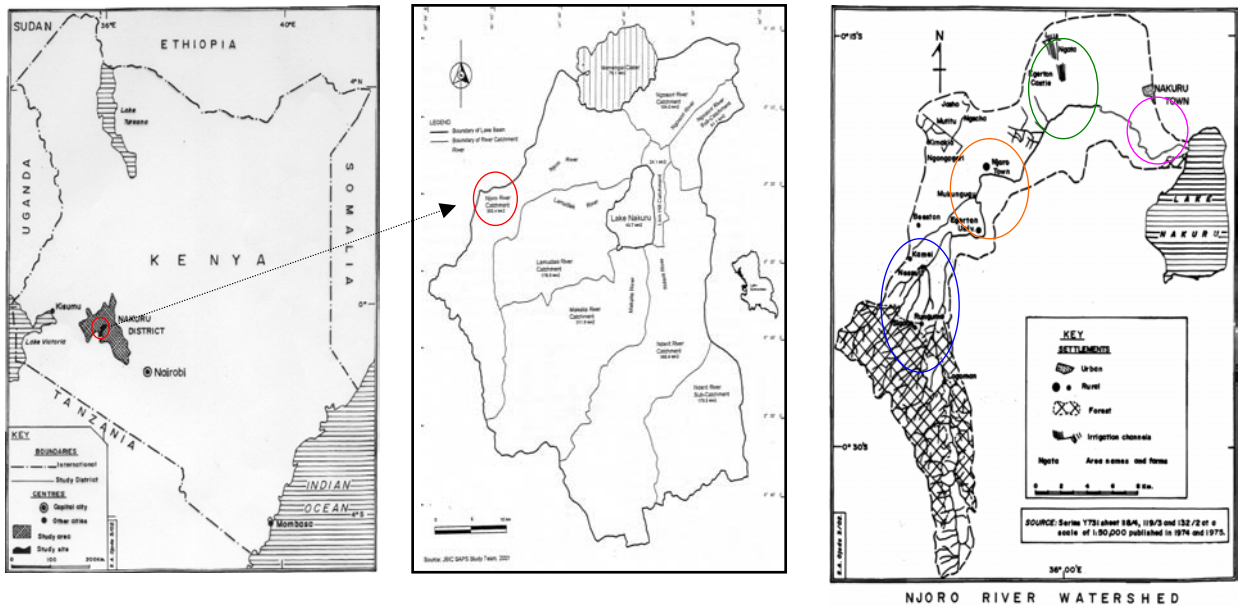

Figure 1. Location of River Njoro Watershed in Nakuru District (a), in Lake Nakuru Basin (b), and communities in the watershed (c): Nessuit – blue, Njoro Town – orange, Ngata –Green, Baruti – pink

At least four land uses are significant, which have a bearing on the riparian vegetation. Starting at the top of the watershed, the upper zone is predominantly forested with indigenous plant species. This opens to new settlements on recently felled plantation forests, characterized by temporary structures and small scale subsistence farms (Photograph 1). This landscape is still littered with tree stumps. Most of the new settlers were originally pastoralists but are now practicing agro-pastoralists. In addition to farming, they are using

cleared forest areas for livestock, mainly cattle, sheep and donkeys. This gives way to a third zone, of older and more permanently settled small and large-scale farms. Besides subsistence farming, these farmers also keep dairy animals and grow wheat as a cash crop. Smaller farms are interspersed with a few remaining large scale farms from the colonial era, including Egerton University's commercial farm. Urban centers are the fourth type of land use, mainly in the middle and lower zone, including Egerton University Campus, Njoro Township, and large parts of Nakuru Municipality. These zones consist of more densely populated settlements, industries, commercial activity, and the accompanying concentrated waste disposal problems. At the end of the watershed is Lake Nakuru National Park (LNNP) which encloses Lake Nakuru. The park is Kenya's second most internationally visited wildlife park, due in part to Lake Nakuru's unique bird population. In addition to the birds, other wild animals abound and their presence is dependent on the continued flow of the River Njoro.

Source: Miller (2002)

Photograph 1. New settlement next to indigenous forest in the upper River Njoro Watershed, Kenya.

Statutory versus community resource management

Riparian zone definitions and enforcement

In Kenya, rivers are public resources and accessible to anybody at anytime. The Land Act (Cap 307, section 13 and 3) states that the riparian zone, including the vegetation which grows along the river, is government property (Jackson 1988). The official size of the strip of government-owned riparian land is marred in confusion. It is not standard and varies according to the width of the river, according to a non-conventional calculation whereby the riparian area on each side of the river is to be set equal to two times the width of the river. By law the two pieces of land on both sides of the river, referred to as the riparian zone, are to be left intact. However, in most cases due to the enormity of the task of definition and enforcement, management of the riparian zone is left to the interpretation of the individuals owning land adjacent to the river. In practice, this leads to many land owners clearing the vegetation and using the land right up to the edge of the river. Whereas the law is clear about the conservation of riparian vegetation, its interpretation and lack of enforcement leaves room for individuals to flout it. The enforcement of riparian zone conservation is solely the responsibility of government agents, represented by local chiefs, the water bailiff, local agricultural and water officers, foresters and more recently environment officers. As these officers cannot be everywhere all the time along the river, the fate of riparian resources lies ultimately with the local communities.

Pluralistic customary and stakeholder views on resource management

The communities living along River Njoro belong to different ethnic groups and therefore have different cultural backgrounds. They also have different histories of settlement in the watershed. Starting at the top, in the upper indigenous forested zone are Ogiek, who are traditionally hunters and gatherers but have recently begun to settle the land adjacent to forests. Newly arrived and settled Kalenjin groups are mixing with Ogiek in the upper two zones. These give way to mixture of older Kikuyu and Kalenjin residents. In the lower zone and before entering the lake are mixed groups of people from different parts of Kenya, some living in urban centers and owning farms along the River Njoro. Most of them came in the first wave of rural settlement prompted by the post-independence land reform starting in mid-1960. Each of these groups has diverse livelihood interests and activities and a different historical attachment to the land. Some are more interested in pastoralism, while others are a mixture of agriculture and livestock, while others have predominantly urban lifestyles. Other stakeholders such as Kenya Wildlife Service, World Wide Fund for Nature, Tourist Lodge owners etc. are interested in nature conservation and have little interest in what goes on outside the boundaries of Lake Nakuru National Park except as it affects the health of the park's wildlife. However in all these cases, either directly or indirectly, they depend on the natural resource base, in particular, on water and riparian resources in the public domain in the River Njoro watershed. Each of these stakeholders applies their own cultural values and experiences in the way they view River Njoro water and riparian resources.

Source: Krupnik (2003)

Photograph 2. Riparian destruction along the upper River Njoro, Kenya

Resource conservation in conflict with customary traditions

Kenya's nature conservation areas are modeled on American system. In American parks one is not permitted to take anything away or leave anything behind inside the park. This contrasts with the African conservation ethic. In traditional African culture there was no demarcation or separation of people from nature; nature and people were one and the same. Thus, local people complain when they are stopped from grazing their livestock inside nature conservation areas, and prohibited from entering these facilities on foot. The facilities are said to be too dangerous, and yet not long ago grandparents used to walk barefooted in the same places. Nature conservation areas have become the preserve of the tourists and the minority middle class who can afford gate fees and own cars. This has not helped, but fueled the local people's negative attitudes towards protected areas in general, including forests and riparian resources. This attitude is attested by the fact that those who cut down trees and destroy facilities in protected areas live safely and securely among their fellow villagers, where nobody is willing to give adverse evidence against them. It is as if a silent protest has been declared. To most local people, government conservation regulations are oppressive.

Many sections of the riparian areas of the River Njoro are devoid of vegetation (Photograph 2). Farmers adjacent to the river and outsiders cut down trees and overgraze the area, as they claim the resources are free for all. They do this because they know that enforcing authorities (chiefs and government staff) are too over stretched to note what is happening or fail to follow-through with sanctions. The conflict over the use of riparian resources in River Njoro provides a microcosm of the land management crisis facing Kenya: a case of the existence of laws that are not supported by local people and their institutions.

The British colonial systems protected the forests and riparian zones through coercion. Forest guards and chiefs were given authority to punish those who encroached. Since independence, the same colonial rules and enforcement structures exist but in the background of self governance, while the guards and chiefs no longer have express authority to punish offenders. In the midst of this confusion, the government is equally to blame for giving mixed signals to the communities living adjustment to forests and riparian zones. Whereas it is the government policy to protect these zones, starting in the early 1990s, large sections of protected national forest areas were declassified and allocated to private individuals and groups for political expedience.

Correcting the wrong

Initial results from the Sustainable Management of Watersheds Project

The SUMAWA-CRSP project has started working with stakeholders in the Njoro Watershed, from the agro-pastoralists in the upper part of the watershed; the large scale and small scale farmers, and town dwellers and Egerton University in the middle; and manufacturers and slum dwellers in Nakuru town suburb, on a variety of water and environmental resource management issues in the Njoro watershed with attention to critical poverty issues. The first stage of the research activities focused on identifying and understanding the perceptions, problems and priorities of the different riparian communities in relation to surface water and conditions in the riparian corridor (Jenkins et al. 2004). Tables 1 and 2 summarize results from the Participatory Rural Appraisal (PRA) assessments in four communities along the River Njoro.

Riparian resource use patterns in the Njoro Watershed

Table 1 documents the involvement of different groups and communities in water and riparian zone resource use and decision-making. The findings indicate that women have key responsibility and decision-making roles for domestic water supply from the river and firewood collection along the banks, men for livestock watering and grazing decisions (esp. large livestock such as cattle), and small-scale irrigation, and young men for water extraction, fodder collection, sand and other resource extraction activities from within the riparian zone for cash sales or hired work. Men and women both are involved in timber/wood gathering for house building, and in maize cultivation decisions, while men alone are involved in wheat cultivation. All of these resource extraction activities occur within the riparian zone and often provide critical livelihood strategies for very poor households.

The assessment information shows that exploitation of water, river bed materials, and vegetation in the riparian zone (medicinal herbs, firewood and fodder) by people from outside each community is significant, especially in the middle and lower parts of the watershed. This confirms the understanding that a river is a free access resource (Photograph 3). In the absence of any recognized institutional framework for managing such a resource it is conceivable that in the long run it could lead to Garren Hardin's (1968) tragedy of the commons scenario. This fate seems to be have already befallen River Njoro Riparian resources in critical parts of the watershed, and threatens the newly opened upper catchment settlement areas.

When River Njoro dried up in 1984 the locals assumed it to be a rare case and that the situation would revert to normal. However, since then the river has become increasingly seasonal and flashy, and at times fails to reach Lake Nakuru. Studies suggest a possible correlation between rapid deforestation and new settlement in the upper zone starting in the early 1990's and the decline both in water quality and stream flow during dry periods (Shivoga et al. 2003; Baldyga et al. 2004). The SUMAWA team has several scientific investigations underway to test the validity of such claims and develop greater understanding of observed changes. However, the fact that people are continuing to cut down trees in the upper watershed right up to the riparian zone needs to be

critically reviewed in terms of whether people have always behaved like that or it is a new phenomenon. It would be necessary to find out if some aspects of traditional common property resources management approaches could be incorporated into the government statutory systems. For example the Mijikenda tribes still manage sustainably their Kaya forests as common property resources, through their traditional resource management institutions. All members of the community revere and recognize the authority of the elders and the laid down rules (Robertson 1984).

Source: Miller (2002)

Photograph 3. Unmanaged open access resource use along the middle and lower portion of the River Njoro, Kenya.

Among many traditionally agricultural communities in highland ecosystems, the slope was the determining factor on whether land could be cleared or left intact (Ezaza 1992; Buyers and Sainju 1994). Among the Kikuyu community, it was wrong to clear any steep slopes. That left most of the riparian vegetation in tact (Chiuri 1996).

Dilemma of centralized planning

Colonial legacy

When Kenya became a colony early in the last century the British found it necessary to assert authority from a central point. This necessitated dismantling traditional institutions and vesting all the power with the central government. Local people were denied any role in decision making and became passive observers in all spheres of development. The management of key resources, such as water, forest, and wildlife was vested in the colonial state. The locals could only access these resources through unauthorized hunting and fishing (poaching), charcoal burning, grazing in the forest, and farming in the forests and on river banks. They also sabotage installations such as water pipes, destroy fences, and pilferage materials. This is what Scott (1985) calls the weapons of the weak. In his study on Ol Donyo Sabuk National Park in Kenya, Lelo (1994) states that local people who illegally take government controlled resources are not villains in the eyes of their fellow villagers. Instead they are regarded as heroes and heroines.

Post-Independence efforts at decentralizing planning

After independence the government of Kenya adopted several strategies or milestones aimed at enticing people to get more actively involved in the development agenda. This included:

- The production of "African Socialism and its Application to Planning in Kenya" (1965) document, as the basis of national development planning processes for the new country.
- They also introduced self-help slogans and activities all over the country (*Harambees*) as a means persuade local people to build facilities such as schools, dispensaries, water projects and others. Soon this approach became a political tool, and though unpopular, continues today at a low key.
- The Training and Visit (T&V) approach which was aggressively promoted by the Ministry of Agriculture in the 1970s but did not succeed either (Feber and Slade 1984).
- The boldest effort the government ever made to demonstrate commitment to decentralized planning was in 1983, when the District Focus for Rural Development Strategy was launched (ROK 1984). Through this approach power was to be devolved from the centre to the districts. However, over time this noble approach has for all practical purposes been abandoned.

Conventional methods of engaging communities in development processes have failed to yield significant results for the majority of Kenyans. This is exemplified by the spiraling levels of poverty over the years and continued degradation of local environment. Despite the frustrations and failure of these past attempts to introduce local participation in the development planning process, the need still remains to continue searching. This seems the only way Kenya might address environmental degradation facing the country. This will require rethinking the institutions which link resources, people, and government. The NGOs and local CBOs such as the Green Belt Movement, the Kenya Forest Working Group and others have been in the lead in this. However, these groups have often faced tough opposition from the government which has insisted on using the archaic colonial institutions to manage resources. Such institutions would need to include accountable representation from community based organizations (CBOs) such as women groups at the village level, youth groups, church organizations and men groups where they exist, in order for the community to develop ownership of resource use and conservation. Such inclusion brings forth sustainable livelihoods and environments.

True development means improvement of the quality of life of the majority of the people, which in Kenya refers to the rural people as they constitute over 70% of the population (ROK, 1999). Despite various efforts, such as use of improved seeds, agricultural innovations such as organic farming, irrigation and so on, which have increased in use, the majority of rural people have remained untouched by these changes. One of the main reasons is that the changes target men in the rural areas, whereas it is the women who are the actual food and labor providers within the rural setting (Thomas-Slayter and Rocheleau, 1995).

Indeed in many instances, while statistics may show improvements in the standards of living, poverty continues to overwhelm rural communities. Demand for food has grown with population while the level of technology to increase food production has not kept pace (Millenium Development Goals: Progress Report for Kenya 2003). Similarly demand for water and fuelwood increases while the forests are declining and water supply systems failing. These unfulfilled demands are putting pressure on the natural resource base upon which rural populations depend almost entirely.

Accountable institutions and decision-making

A major cause of the failure of development programs to achieve intended results lies in the way the development process has been packaged. The colonial administration dismantled community institutions, and brought centralized decision-making and coercive implementation of policies. This arrangement suited their needs well as they did not have long term interests of the people at heart. Local people did not participate in the making of decisions that affected their lives. However, Kenyans need to take stock of what has been done since independence to correct the mistake. Unfortunately, the top-down approach has been perpetuated. Decisions continue to be made in Nairobi and packaged by experts for the rural people. Rural communities see government extension officers who speak unfamiliar languages address them in quickly arranged meetings. Such meetings are intended to symbolize participation by consultation. Most donor funded projects often use foreign and complicated technologies. As soon the project life span expires and the money runs out and technicians leave, the projects collapse. Local people do not have the capital or the technical know-how to manage such projects. Many times such projects are not within the priority needs of the community.

Table 1. Resource extraction uses by riparian communities along the River Njoro, Kenya.

Riparian Community	Group	Surface Water Extractions at River's Edge							River Bed/Bank Material Extraction			Riparian Trees/ Vegetation/ Cultivation Uses								
		D	L-L	L-S	SL	IR	BL	C	SD	RK	HS	FW	FDC	FDG	VG	VG-MZ	VG-WT	BM	HB	HY
Barut	Women	*d	*			*	*d		*d			*d			*d			*	*	
Ngata	Women	*?	*	*d											*d	*d			*d	
Rumwe	Women	*d				*d	*d					*d		*					*d	
Mwigito	Women	*d	*d			*				*d		*d								
Barut	Men	*	*d			*?	*d		*d									*d	*d	*d
Ngata	Men	*	*d		*?											*d	*d		*d	*d
Rumwe	Men		*d			*d	*d		*d	*d				*d					*d	
Mwigito	Men	d	*d			*d				*d		*d		*d						
Barut	Youth	*	*		*d	*												*d	*d	
Ngata	Youth	*		*d	*?															
Rumwe	YgMen	*d	*		*d								*d	*						
Mwigito	YgMen[d]																			
Barut	Others[a]		*		*d		*d	*d	*d			*d							*d	
Ngata	Others[a]																			
Rumwe	Others[b]		*d		*d		*d		*d	*d	*d	*d	*d	*d					*d	
Mwigito	Others[c]	*d	*d		*d	*d				*d		*d		*d						

Notes:

* use activity carried out by group

d decisions regarding use made by group

? likely decision maker, but unclear from initial report.

[a] 'Others' refers to people from outside the community and ministers (in case of baptism).

[b] 'Others' refers to hired hands and people from other sections of Njoro Town (L-L); other communities in the watershed such as Ngata and Nessuit, as well as outside the watershed (e.g., Lare, Ngecha, elsewhere) (L-L and FDG); traders and construction people from outside the community and watershed (BH, RK); County Council (SN, RK); KARI, forest department, and the Forest Action Network (HS).

[c] 'Others' also includes male youth which were not split out in the Mwigito PRA, and people from other communities in the watershed (L-L).

[d] Included in 'Others' for Mwigito

Resource Extraction Use Codes:

D: fetching water for domestic use

L-L: watering large livestock at the river

Resource Extraction Use Codes:

L-S: fetching river water for or watering small livestock at the river

S: fetching water for transport and sale

IR: river withdrawals for irrigation adjacent to river

BL: fetching water for construction and building houses

C: cultural uses such as baptisms,

SD: extracting sand from river for construction

RK: extracting rocks and gravel from river for construction

HS: humus gathering along banks for tree nurseries

FW: gathering fuel wood along banks, for domestic uses, for sale, and for charcoal making

FDC: grass fodder collection for sale

FDG: grass/fodder livestock grazing along river banks

VG: growing vegetables along side of river (e.g., potatoes)

VG-M: growing maize along side of river

VG-W: growing wheat along side of river for sale

BM: gathering wood, bark, parts of trees for house building materials

HB: gathering herbs and other plant matter for medicinal purposes (roots, barks, leaves)

HY: bee-keeping for honey for sale

Table 2. Community problems and priorities for resource management along the River Njoro, Kenya.

Problem	Perceived Causes & Issues	Ranking[a]			
		N	B	R	M
Insufficient (river) water	River runs dry periodically (Barut); lack of alternative sources; poor river protection; shallow dams upstream (Barut); drought; irrigation upstream; sand scooping; overstocking of animals; outsiders extracting water for sale, too many users (Barut); obstruction of river flow (Rumwe)	3	1	7	
Low income	Over-reliance on milk and maize, farm employment, and sawmills employment (which have shut down); reliance on middlemen for marketing; lack of storage facilities for wheat; lack of market for produce.			1	
Water	Poor quality water, not enough- scarcity esp. in January-February dry season; water siltation.	3			1
Water-borne diseases (consuming polluted river water)	Run-off with dirt including human waste; dirty water from washing of vehicles, laundry, and bathing in river; dirty effluents; lack of latrines; soil erosion; sand extraction makes river dirty; dumping of waste in river (from Kaptembwa in Barut);		2		3
Poor community cooperation	Poor leadership; ignorance about group value.			2	
Fuel wood (scarcity)	Deforestation; failure to plant trees on own shambas; closing down sawmills.			4	2
Polluted river water	Human diseases; no water access points, lack of sewage system, garbage collection. (details limited in draft PRA)	3		8	
Sand scooping (extraction from the river)	Related to unemployment; rising demand for sand; laxity in enforcing rules; destroys roads, makes river dirty; causes land slides, deaths, and devaluation of land.		3		
Weak community water institutions	Low income; low level of skills to start income generating project; lack of trust among members; poor leadership; poor project management.			3	
Flooding	Siltation of the river; soil erosion; sand scooping; destruction of vegetation on farms and on river banks increasing run-off to river; bank vegetation removal related to fuel wood gathering, tree felling, and tree dying from root/bark removal.		4		
Electricity	In village but not connected to houses.				4
Weak Nakuru County Council	Lack of sewage system, garbage collection. (details missing in draft PRA)			5	
Insecurity	Unemployment; drunkenness.				5
Unemployment	No jobs				5
Lack of riparian managem't plan	Lack of knowledge; lack of ownership of riparian zone.			6	
Dumping	Attitude.				6
Livestock diseases	Plastic papers; outbreaks; expensive drugs.				7
Lack of extension services (soil erosion)	Extension officers never seen; steep slopes; lack of terraces.				8
Poor roads	Erosion causes pot holes; no bridges, river Njoro blocks access to Egerton U. for many residents who work at U.; lack of culverts.	1			8
Seasonality of fodder	(details missing in draft PRA)			9	
Inadequate infrastructure	No water access points, inadequate bridges, lack of storage facilities. (details limited in draft PRA)	2		10	
Notes: [a] B = Barut, R = Rumwe (section of Njoro Town), M = Mwigito (section of Njoro Town), N = Nessuit					

SUMAWA stakeholder involvement process

The SUMAWA-CRSP project has taken the lessons from past development projects and chosen to apply a participatory approach from the onset. The main focus of the project is sustainable development of the River Njoro Watershed in order to reverse the current declining trends. The approach is motivated by a strong believe that participation by the beneficiaries in any project is fundamental, and that locally selected and serviceable technologies and policies are more likely to succeed unlike complicated, expensive, imported or imposed ones chosen by external decision-makers. This approach also incorporates local values, cultural traditions, local institutions, and local knowledge systems in its attempts to bring science to bear to address local watershed problems. The project builds on the premise that sustainable development must incorporate approaches that communities themselves can manage and control.

Dialogue and coordination for watershed-wide action planning

As a result of the dialogue that has been initiated through the participatory approach, communities and sub-groups in the Njoro watershed have been actively planning and implementing local actions to improve conditions and begin conserving riparian resources. Using the PRA approach, the communities living from the forest zone down to Lake Nakuru, have managed to develop preliminary their own community watershed action plans (CWAPs). Proposed actions include planting trees on household farms to reduce pressure on the riparian zone, building roof catchment water tanks to increase domestic water supplies, construction of pit latrines to curb river pollution, developing local enforcement mechanisms for protecting the riparian reserve and for the laws on river pollution, rehabilitating water supply infrastructure and building new water supply systems, among others.

However, these have been largely developed and pursued separately in individual communities and risk coming into conflict without coordination and harmonization of efforts across the watershed. Thus, the current phase of planned SUMAWA Project outreach activities is designed to create opportunity to begin engaging in dialogue to develop cooperative solutions to the management of river water and riparian zone resources between communities and "outsiders", in cases where outsiders exploiting riparian resources are actually from other communities within the watershed (see Table 1). Some of these outsiders are in fact large institutional, public and commercial enterprises in the watershed who, under the free-access mentality, also extract key resources in the riparian zone along with poor households and their members.

Community priorities for resource management

Using Participatory Rural Appraisal (PRA) techniques, it was possible to identify community problems and priorities for resource management along River Njoro. These are listed in Table 2. Water scarcity and water quality problems for human and livestock health, related human diseases, and fuel wood scarcity are top-ranked problems. The underlying root cause of these problems is the lack of implementable policy on watershed and riparian resources management. This has led to degradation of the forest cover which is a critical component of the water catchment system, to encroachment and uncoordinated de-gazettement of public forest lands. This has adversely affected water quality and quantity of River Njoro and has facilitated the destruction of the riparian vegetation.

Future activities with stakeholders.

Sustainable management of the riparian zones will depend on the collaboration and cooperation of all the stakeholders. The proposed activities will include a series of workshops and longitudinal exchange visits along the watershed. All stakeholders will be brought together to share their experiences and challenges as well as visit the watershed from the source to the lake. The first workshop will bring together representatives of land, water and forest policy makers across the ministries with stakeholder representatives from within the watershed. This first meeting is meant to examine and interpret the meaning of various legislations and begin to tackle their harmonization in order to minimize the confusion that is already in existence.

In the long run the success of stakeholders' involvement will depend on the policies and legalities governing watersheds in the country and the region. The current Kenya government is committed to ensuring sustainable

resource management and preserving critical water catchments like that of the River Njoro as a long term measure to address water shortages in the country. The government has issued a series of new environmental rulings and regulations, and has established Provincial Water Boards aligned with major water basins in the country. These new actions will change the way the country manages its natural resources in several ways, which includes boards accountable to the local people who elect them, a broader mandate to include pollution control and power to prosecute offenders.

The SUMAWA stakeholder engagement team will be assessing the usefulness and applicability of these laws in the context of the River Njoro and the potential of empowering local communities and other stakeholders to take greater control over the development and management of resources in the watershed, within the evolving legal context and newly established regulations.

Conclusion

A model of sustainable management of watershed resources (SUMAWA) is being developed by a multidisciplinary team from Kenya and the USA using the River Njoro Watershed. So far the team has established that there are several conflicting government policies and laws which are at variance with local people's traditions and cultural practices. The government of the day has not changed from the colonial model of centralized, top down and coercive mechanisms in applying these laws, policies and regulations. This is further compounded by the lack of enforcement procedures and institutions. As a result, communities along the watershed "evoke the weapons of the weak" by developing a free access mentality to the riparian zone. Consequently rapid new settlement of formerly forested areas and riparian degradation along the river have increased the risks of downstream flooding, water pollution and decreasing water availability at critical times.

The ongoing research has established that women are the key players in domestic water supply from the river, and firewood collection along the banks. Older men on the other hand are responsible for livestock watering, grazing and small-scale irrigation.

The resolution of the many problems facing the River Njoro Watershed and others in the region which share it problems requires a multi-pronged approach. This includes new institutional frameworks to bring together government agencies, NGOs and other stakeholders of the riparian resources in dialogue and negotiation. The future condition of riparian resources and services will be closely linked to how well all the stakeholders can cooperate to define a coherent management structure and enforcement mechanisms that will be acceptable to all. If successful, this will ensure that future policy changes can be negotiated and endorsed by all concerned. The on-going debate on the new forest bill is a pointer that if the government is willing to decentralize systems for natural resources management, communities are willing to participate. However, this requires establishment of acceptable communication channels across diverse interest groups and levels of decision-making. Younger men extract water, fodder and other resources for sale as hired labor. This means as the Kenya government focuses on sustainable development, clearly mandated institutions and mechanisms that link resources, people and government will need to be created.

The SUMAWA project applied PRA tools to begin empowering communities to identify riparian problems and solutions that they can manage locally. The next stage is to interject scientific knowledge of new options into the community dialogue and use selected community action plans to demonstrate tangible activities which communities can undertake with few or no external resources. Other community members will then be able to visit the demonstration sites and learn new riparian resources management techniques. In addition as the community gets sensitized on local level solutions there will be need to sensitize them on policy and legal issues that could help or constraint their efforts. At the same time policy makers will need to be made aware of the communities' aspirations which have to be met for them to be active and enthusiastic players in the coordinated overall management of riparian resources. The process of bringing community leaders and government policy makers together will be effected through tiered workshops. The workshops will focus on how to harmonize conflicting government laws on land, water and forest resources in the River Njoro Watershed which are the corner stones of riparian management.

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Acknowledgements

The authors gratefully acknowledge the financial support of the Global Livestock Collaborative Science Research Program at the University of California, Davis and the leadership of Scott N. Miller at University of Wyoming and William A. Shivoga at Egerton University on the Sustainable Management of Watersheds Project in Kenya, making this research possible. The results presented in Tables 1 and 2 have been synthesized from the PRA reports prepared by the various PRA teams and several graduate students of the SUMAWA team in Kenya during 2002-2004.

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