Policy Framework for Conservation and Management of Riparian Lands in Kenya

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Abstract

Riparian lands are important components of functioning, healthy aquatic and terrestrial ecosystems. Healthy riparian lands are critically important landscape components, providing environmental, economic, cultural and recreational benefits. However, the extent and health of riparian lands has declined in most areas in Kenya. This is partly because riparian lands are inadequately defined with many of the definitions based on the objectives and the field of interest. In addition, the environmental legislation framework in Kenya is marked by a series of environmental legislations which are scattered across different laws or Acts of Parliament. This has led to uncoordinated implementation of sectoral and management plans for sustainable management of riparian lands. This paper looks at the current state of riparian lands against the needs of relevant sectors and proposes recommendations for improving riparian land conservation and management in Kenya. A review of the existing legal, regulatory and policy frameworks indicated a number of gaps and opportunities from the conservation of riparian lands in Kenya. Most of the legislations and regulations are scattered in a range of resource and sectoral specific Acts, regulatory and policy documents. With regard to institutional settings, there is a lack of coordination, lack of or poor enforcement, lack of manpower, and in many cases lack of a clear management plan for the riparian areas. There is also political influence and overlapping mandates between or amongst institutions. This confusion between the existing Acts, regulations and policies hamper implementation and result in a lack of practical guidelines for enforcement officers on the ground. Therefore, there is need for the various sectors and institutions involved in management of riparian lands to derive a working definition of riparian lands and their extent to guide the operation of these sectors/institutions in conservation and management of riparian lands.

Key Words: *Riparian lands, Policy, Sustainability, Highest water mark, Kenya*

INTRODUCTION

Riparian lands are found along the edges of water bodies, considered to be transitional habitats, representing a transition from wet (open water) to dry (uplands). Healthy riparian lands provide environmental, economic, cultural and recreational benefits. Despite the benefits and ecosystem

services riparian lands provide, they continue to be destroyed and degraded largely by unsustainable human-induced activities over time.

The responsibility for managing riparian lands in Kenya is shared amongst jurisdictions, from local municipalities through to the county and national governments. The National Environment Management Authority (NEMA) and relevant lead agencies have faced challenges of managing riparian lands. While there are no existing specific laws, regulations or policies that explicitly apply to the management of riparian lands, there are a number of laws, regulations, standards, guidelines, policies, and programs administered by both government and non-government agencies that are used to direct riparian lands management in the country.

Effective conservation and management of riparian lands essentially calls for involvement of all levels of government as well as diverse stakeholders on both public and private land. The main purpose of delineating and managing riparian lands is to achieve specific goals and objectives. Smith and Prichard (1992) mentions four general management strategies for riparian lands; (i) maintenance of existing riparian conditions, (ii) improvement of degraded riparian lands, (iii) recovery of lost riparian areas, and (iv) development of new riparian areas.

The principle of sustainable management of riparian lands borrows from the principle of sustainable development that provides that development projects should meet the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland Report, 1987). Therefore, sustainable management of riparian lands ensures that riparian communities utilize these ecosystems in ways that serve them without reducing the resources to minimal levels and that the ecosystem is also able to manage its functions throughout. In order to attain sustainable management of riparian lands, the government should put in place legal and policy frameworks that govern the use and the utilization of the riparian lands. Also, the current threats and challenges facing the riparian lands ought to be addressed by the state and propose solutions towards their protection and sustainable management. This study sought to assess riparian extent, health and approaches to management of riparian lands.

LITERATURE REVIEW

Importance of Riparian Lands

Riparian areas are productive and valuable resources, providing numerous social, economic and environmental benefits (Hawe, 2005). Riparian lands provide water, livestock forage, fish and wildlife habitat and recreational opportunities. A healthy riparian area enhances primary vegetative production, protecting stream banks from erosion, trapping stream-born sediments, promoting water absorption and storage, recharging groundwater reserves, and regulating stream flow, as well as well as life support for local communities dependent on the riparian systems for their survival (Bellows, 2003; Gregory et al., 1991).

Competing claims and land uses struggling to control certain locations along the riparian lands have had far much greater effects on these areas. Activities inappropriately located along riparian lands cause extreme environmental degradation, habitat loss and unpleasant waterfront scenery. These threats greatly impact negatively on the riparian ecosystems causing extensive degradation, flooding, reduction in water quality and quantity and loss of goods and services.

Definition of Riparian Lands

An overview of existing literature suggests that no single definition is used across studies or even across governments and other regulatory bodies. Riparian lands are commonly thought of as the transition zones between land and water bodies such as streams, rivers, and lakes (Clare and Sass, 2012). They include areas that are adjacent to and hydrologically connected to lakes, rivers and streams through overland surface runoff, inundation during floods, or subsurface flow. They also encompass flood prone areas, wildlife corridors, associated riparian soils, and wetland communities. A clear and consistent understanding as to what characterizes riparian lands arises in part to a lack of a universally accepted functional definition, as well as the lack of clear ecosystem boundaries. In practice, definitions for what constitutes riparian lands vary according to its intended use in research, academia, legislation, policy and regulation, land use planning, resource management, inventories and mapping. The approach used by different laws and sectoral actors are diverse and focuses on specific interests that are meant to be addressed by a particular law or field of interest.

Reference to location is the most frequent characteristic of definitions of "riparian". Riparian lands are commonly thought of as those lands directly bordering water bodies such as streams, rivers, lakes, wetlands, springs, and ponds (Karisa, 2010; Booth *et al.,*2004; GoK, 2010; Frietag & McGinley, 2008; UN, 2006). The interpretation of riparian lands borrows a lot from the Ramsar Convention (UN, 2006) who defined wetlands as areas that are permanently or seasonally flooded by water where plants and animals have become adapted. From this definition, several concepts have been used to define the lands. These include riparian area, riparian reserve, riparian zone, riparian buffer, riparian vegetation, and riparian forest and riparian land. This paper uses the concept of riparian land to denote all these concepts.

A critique on the application of the Kenyan definition of riparian lands

The Kenyan definitions of riparian lands use the centerline of river, river banks and highest water marks as different points of reference of measurement of the width of the riparian area without much consideration of the land use and biophysical factors as well as failure to provide guidelines on what width to use for specific functions (Muketha, 2014). Fixed width determinations may be inappropriate because watercourses widen from their source to mouth as they collect more water from tributaries and also limited to site-specific determinations, which may not reflect ecological needs of an entire river basin (Vannote *et al.,* 1980). For instance, rivers Tana, Yala, Athi and Nzoia may be quite wide in their lower catchments and the rivers widen as they travel from their sources. Similarly, the use of the edge of river as the basis of measurement is also not a consistent method because river banks are subject to natural and human activities and changes over time and vary at different locations.

From the above review, it is evident that different laws stipulate different measures for the same riparian lands (Table 1) and are applicable in varied scenarios highlighting some critical gaps for promoting sustainable development for these fragile ecosystems.

Table 1: Legal definitions of riparian lands in Kenya based on riparian delineation

Statute/Institution	**Legal definition for recommended riparian width (in meters)**

Survey Act, Cap. 299	Section 111. Reservation on all tidal rivers to at least 30 meters in width above the highest water mark. No mention of other smaller rivers.
EMCA (Conservation and Management of Wetlands) Draft Amendment Regulations, 2017	9(1) Shores of lakes protected zone of 50m from the highest water mark, shore of the ocean 60m, rivers 30m.
EMCA (Water Quality Regulations), 2006	Minimum 6m and maximum 30m from edge of river, based on the highest recorded flood level.
Agriculture Act Cap 318 (Basic Land Usage Rules), 1965	Minimum of 2m and a maximum of 30m. Not indicated from what point.
Lands Act, 2012	Land adjacent to the ocean, lake, sea, rivers, dams and watercourses as provided in the Survey Act or any other written law.
Water Resource Management Rules, 2007	Minimum of 6m and a maximum of 30m from the highest water mark.
Physical Planning Act Cap.286/ Physical Planning Handbook, 2008)	Land on each side of water course as defined having a minimum of 2 meters, or equal to the full width of the river as measured between the banks of the river course up to maximum of 30 meters (seasonal and perennial rivers).
EMCA 1999 (Amended 2015)	Minimum of 6m and maximum 30m from edge of a river

Despite the many acts, policy papers and institutions that deal with the management of riparian lands in Kenya, sustainable management of these areas has not been achieved. Therefore, it can be noted that there is no single legislation on riparian land protection or a national environmental legal, policy and institutional framework that addresses and provides for proper use and sustainable management of Kenya's riparian lands. Most of the regulations regarding riparian areas are scattered through a range of environmental resource and sectoral Acts and policy documents. Some of the Acts which directly or indirectly address the issues of riparian lands management appear to be duplicated, have overlapping mandates and/or have a system of weak penalties (GoK, 2009). Environmental Management and Coordination Act 1999 serves as the key environmental framework law and it is augmented by the Constitution 2010, Article 60(1) which proposes sound conservation and protection of ecologically sensitive areas.

A critical review of the available acts and policies was undertaken highlighting the challenges of the mandated institutions. In addition, the study worked to incorporate the opinion and

knowledge of all the relevant stakeholders in order to triangulate what and where the problems are and what needs to be done in order to come up with a more strategic and sustainable riparian lands conservation and management policy framework in Kenya. Various gaps in policy and challenges alluded to include the following:

1. *Inappropriate Definition and Delineation of Riparian lands.* A visible example lies in provisions for riparian reserves, where the Survey Act takes its measurements from the highest water mark level, whereas the Physical Planning Act starts from the edge of the river.
2. *Ambiguous and fragmented laws.* The inconsistency in laws have makes it hard to implement such laws with different approaches where every other part of the environment has a particular law governing particular resources.
3. *Jurisdictional and Institutional Overlaps.* There is fragmentation identified as being an issue across all levels of government, as well as between departments within government.
4. *Discretional nature in protecting riparian lands.* The existing laws in Kenya have not yet declared riparian lands to be protected areas.
5. *Lack of specific provisions and policy directions focusing on riparian lands.* For instance, the discretion left to the minister to gazette riparian zones as protected areas as per Section 18 of Environmental Management and Coordination (Wetlands, River Banks and Sea shore Management) Regulations 2009 is too general and has not yet been exercised which has partially contributed to so many people encroaching and settling on riparian zones.

MATERIALS AND METHODS

Given the diversity and geographic dispersion of key informants, a survey was considered the most cost-effective method for reaching the largest number of participants. The survey was administered using a structured questionnaire and interview schedules which followed accepted qualitative methodologies. Working in consultation with the National Land Commission, a list of key informants was compiled, which included participants from a variety of backgrounds and with a broad range of experiences working in the area of riparian lands management in Kenya.

The survey consisted of four parts: Section 1 focused on questions related to the participants experience in, and knowledge of riparian lands management in Kenya. Section 2 asked participants to rate the effectiveness of existing riparian lands management policies and programmes. If participants indicated that they felt existing policies and programmes could be improved, they were asked to specify what they considered to be the barriers limiting the success of riparian stewardship and conservation and were asked to identify strategies that could be employed to overcome these barriers. Section 3 of the survey asked participants whether they think the country needs a new riparian lands policy framework, and included an open-ended question asking each participant to elaborate on the reasons for, or against, adopting a new riparian lands policy framework.

Scope of the study area

Thirteen counties with varying ecological and natural resources zones (Coastal, Arid, Forest zones, and mining) were selected. These counties act as representatives of the whole Country. They included counties of Nairobi, Machakos, Kiambu, Muranga, Nakuru, Meru, Baringo, Garissa, Kilifi, Kakamega, Kisumu, Vihiga and Siaya.

Data Collection

Data collection and collating of information from both secondary and primary sources was conducted within the selected counties with varying ecological and natural resources zones and this involved literature review, both structured and plenary discussions as well as consultative meetings, administration of questionnaires, observation and photography. Secondary data involved a review of existing documents on riparian lands conservation and management, and included relevant books, scholarly articles, reports, periodicals, internet resources and relevant maps. These provided general background information on the patterns of land use scenarios and trends along riparian lands in the selected counties as well as processes and interventions advanced in promoting sustainable development of the riparian lands.

Stakeholder consultation and key informant interviews

A wide range of actors in the counties and nationally, with stakes in the use and management of ecosystems of riparian lands, were consulted. These include the National Environment Authority (NEMA), Water Resource Authority (WRA), Kenya Forest Service (KFS), Lake Victoria Environment Monitoring Programme (LVEMP), Water Services Board, Kenya Agricultural and Livestock Research Organization (KALRO) and County Departments of Water, Environment and Natural Resources, Agriculture, Lands, Survey, and Physical planning. Others include non-sate actors including, water and land users including public and private land users such as Water Resource Users Associations (WRUAs), Academia such as Egerton University Njoro River Rehabilitation Project in Nakuru, and, Chemeron Dryland Research Training and Ecotourism Centre in Baringo, surrounding land owners and developers occupying the riparian lands either legally or through illegal encroachments. In total, 39 participants from various government institutions and non-governmental organizations were involved in one way or another in the conservation and management of riparian lands.

RESULTS AND DISCUSSION

Current state of riparian lands in Kenya

A riparian land in Kenya is owned by the person and or entity who own land bordering water bodies such as streams, rivers, lakes and ocean. Despite some good work and knowledge on riparian lands in Kenya, there lacks a clear assessment that identifies how much riparian lands currently exists, what the state of riparian lands is, and how much of these lands have been lost or degraded, as per the background information gathered in this project. County Governments are aware of the value of riparian lands and are trying to work towards promoting riparian lands health and overall protection amidst numerous challenges ranging from capacity, facilities, finances and lack of public knowledge and political good will. Consequently, effective management of riparian lands is needed to protect these valuable lands.

Riparian Lands Extent

The process of riparian lands delineation in many jurisdictions in Kenya as indicated above use the fixed-width buffer methods around water bodies to protect and manage riparian lands. There are currently no systematic measurements for the extent of riparian lands or specific approaches

to mapping riparian lands extents in Kenya. Similarly, there have been minimal assessments of national riparian acreage and a handful of comprehensive studies on the condition of riparian lands. However, there are some rough estimates of riparian lands extent and mapping initiatives that do capture different aspects of riparian lands including vegetation, soils, and hydrology available from the different sectoral agencies.

The fixed width determinants could either be insufficient to protect riparian areas as it varies greatly between different jurisdictions and vary naturally in width among and within riparian systems. For purposes of this research, the Consultancy team assessed the riparian lands according to on site-specific ecological characteristics that determine the width of riparian lands such as slope, soil type and vegetation cover and land use activities (Table 2).

Table 2: Summary of the characteristics of the Riparian Lands assessed

County	**Riparian land water course**	**Slope**	**Soil characteristics**	**Dominant Vegetation**	**Land use activities**
Machakos	Maruba Dam	5-15%	Red Soils	Shrub, Grass	Farming,
	Mwania River	<5%	Red Soils	Trees	Farming
	Ikiwe River	<5%	Clay	Grass, Trees	Farming
	Chai Dam	<5%	Red Soils	Grass, Trees	Farming
	Thwake River	<5%	Clay	Trees	Sand Harvesting
Kiambu	Karemenu River	<5%	Red Soils	Grass, Trees, Bamboo Plantation	Farming
	Thiririka River	>15%	Red soils	Trees	Farming
	Bathi Stream	5-15%	Red soils	Trees	Residential
	Brackenhurst River	5-15%	Loam Soils	Grass, Trees	N/A
	Ondiri Swamp	>15%	Red soils	Grass	Farming
	Tigoni Dam	5-15%	Loam Soils	Grass, Trees	Farming
	River Ng'enda	<5%	Red soils	Grass, Trees	Farming
	Theta River	5-15%	Red soils	Grass, Trees	Farming
	Rwafera River	5-15%	Red soils	Grass, Trees	Farming
	Karia-ini Dam	<5%	Red soils	Grass, Trees	Farming
	Chania River	<5%	Red soils	Grass, Trees	Commercial
	Gathembere Swamp	<5%	Red soils	Grass	Farming
	Gathieka Stream	<5%	Red soils	Grass, Trees	Farming, Residential
	Ndarugu River	>15%	Murram	Trees	Farming
	Thika River	5-15%	Red Soils	Trees	Farming
Nairobi	Highrise (Kibera)	<5%	Clay	Grass, Trees	Residential, Farming
	Highrise (Mbagathi)	<5%	Clay	Grass, Trees	Residential, Farming
	Reuben	5-15%	Clay	Trees	Residential, Farming
	Ngara	5-15%	Clay	Grass	Commercial
	Tassia	5-15%	Clay	Trees	Residential,

					Commercial, Farming
	Ngara	5-15%	Red Soils	Grass, Trees	Commercial
	Kware	5-15%	Clay	Trees	Residential, Commercial,
	Mukuru Kayaba	5-15%	Clay	Trees, Grass	Residential
	Gikomba	5-15%	Clay	Trees	Commercial
	Kwa Njenga	5-15%	Clay	Trees	Residential
	Kibera (Nairobi Dam)	5-15%	Red Soils	Grass, Trees	N/A
Murang'a	Thika River	>15%	Red Soils	Trees	Farming
	Ruchu	5-15%	Red Soils	Grass	Farming
	Mathioya River	5-15%	Murram	Grass, Trees	Farming
	Gatabua River	5-15%	Red Soils	Grass, Trees	Farming
	Gondo River	<5%	Red Soils	Bare, Trees	Farming
	Kayahwe River	<5%	Red Soils	Trees	Farming
	Kaihungo River	<5%	Red Soils	Grass, Trees	Farming
	Irati River	>15%	Red Soils	Trees	Farming
	Gakira Quarry	5-15%	Murram	Bare land	Mininng/quarrying
Vihiga	Wandede River	5-15%	Red Soils	Grass, Trees, Maize Crop	Farming, sand harvesting, brick making
Kisumu	Nyakapewa wetland	<5%	Black Cotton soils	Grass	Farming
Siaya	River Yala Estuarine	<5%	Red soils, Murram	Grass, Trees	Farming, Fishing
Kilifi	Mbogolo	5-15%	Red Soils	Grass, Trees	Commercial, Farming
	River Sabaki	<5%	Clay	Trees	Residential
	Kadzuhoni	<5%	Black Cotton	Grass, Trees	Residential, Farming
	River Perkerra	<5%	Clay	Trees	Farming, Livestock
Baringo	Mogotio River	<5%	Clay	Grass, Trees	Commercial
Nakuru	L. Naivasha	<5%	Black cotton	Trees	Fishing
	Njoro River	5-15%	Red soils	Scattered grass, trees	Farming, sand mining
Kakamega	River Yala		Clay and Black cotton soils	Grass, Maize	Commercial, Farming
Meru	Mariara	5-15%	Red Soils	Muram, Trees	Farming, Quarrying
	Maathi	5-15%	Red Soils	Trees	Farming, Residential

From the assessment, it was noted that a number of land use activities encroach to the riparian lands ranging from commercial and informal settlement, at the most built up sections and agricultural activities upstream. Commercial activities that have found their way into and around the riparian lands include sand mining, quarrying, building bricks making, and car washing among other informal businesses. Several informal settlements and developments have been erected within most of the riparian lands also cropped up in and around the areas with some of the kiosks and informal structures serving as residential.

Riparian Lands Health

Riparian health considers the condition and related functions of riparian ecosystems. Simply defined, riparian health refers to the ability of an ecosystem to perform a number of key ecological functions. Function is usually inferred from status or condition. The state of full cover by native vegetation, as one would expect to occur in a natural setting with minimal anthropogenic disturbance, is typically interpreted as indicating that a wide range of functions are occurring with minimal impairment. A healthy riparian ecosystem is one that can provide the ecological goods and services that flow from riparian ecosystems, such as potable water, edible fish and wildlife, adequate water for irrigation, flood protection, filtering of pollutants, and aesthetic landscapes. Unhealthy riparian zones, on the other hand indicate muddy waters in the watercourses.

The majority of riparian areas in Kenya have been converted or degraded as a result of economic and population pressures. The assessment of the health or riparian lands in this project used the Best Judgment Panel assessment tool (Table 3). This assessment tool is based entirely on the opinions of experts who answer a set of questions based on their knowledge of the riparian lands in question (Clare & Sass, 2012). A series of questions including; physiographic features, immediate threats, status, sustainability/resilience, and biodiversity were asked to capture the riparian health status.

Only eleven institutions and organizations indicated that they had carried out Assessment of Riparian Health in the selected counties. The experts from these sampled institutions were asked to rank the Riparian Health status of the riparian areas according to four classes reflecting the degree of impact or degradation for each riparian area (Table 3).

Table 3: Riparian health status categories used in best judgment panel assessments of Riparian Lands

Class	**Description**
A	Unmodified/Natural/Healthy

B	Largely natural with moderate modifications. A small change in most natural factors may have taken place, but the ecosystem functions are essentially unchanged or recovered from any disturbance.
C	Largely modified and heavily impacted. A large loss of natural factors and basic ecosystem functions has occurred. The losses of natural habitats and basic ecosystem functions are extensive. Many factors have degraded over time and are below or forecasted to be below ecologically acceptable values.
D	Degraded. Modifications have reached a critical level and the lotic system has been completely modified, with almost complete loss of natural habitats and biota. Most factors are now below ecologically acceptable values and the basic ecosystem functions have been destroyed.

Based on a summary of riparian assessments with available data collected from eighteen (18) of the 52 institutions that had conducted assessments, the distribution of riparian health across the counties reveals that majority of the sites assessed are heavily impacted (33%), degraded (33%), moderately modified (28%), unmodified (6%) (Figure 1).

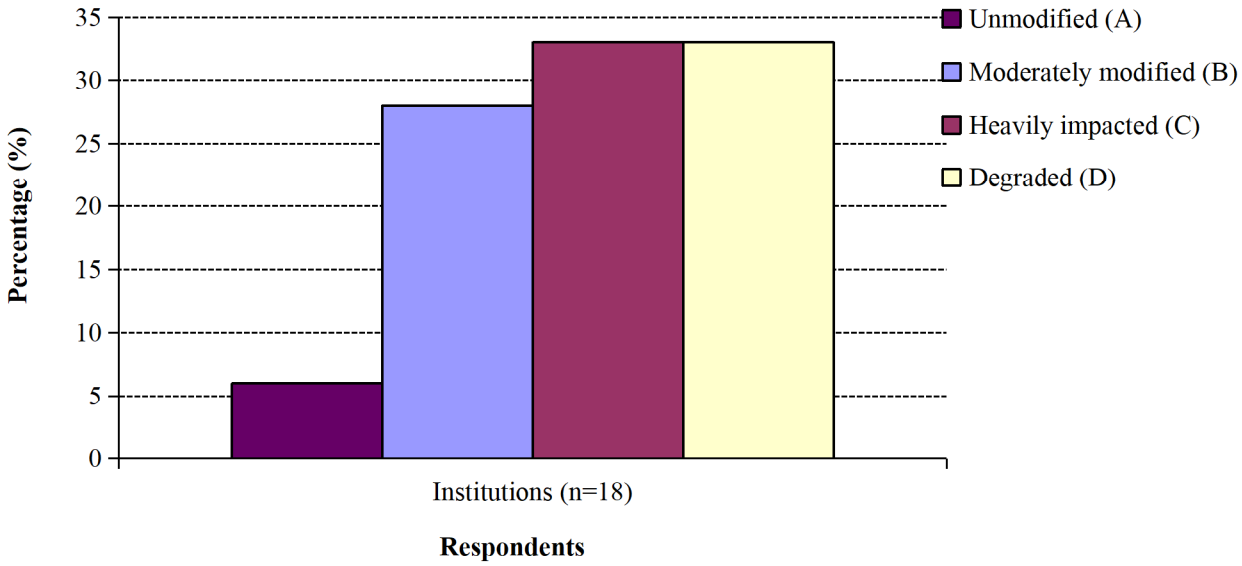

Figure 1: Current Status of Riparian Lands in Kenya *(Source: Field Survey, 2018)*

It is important to note that this estimate of County riparian health is crude at best, and thus, should not be taken as a definitive statement on the condition of riparian lands in the country. However, despite the limitation of this analysis, the results do suggest that there is a clear need to

focus on riparian lands management to ensure that those sites listed as heavily impacted and degraded are rehabilitated and managed to reduce further decline.

Need for a New Riparian Lands Policy Framework

When respondents were asked whether they thought there was a need for a new policy framework to direct riparian lands conservation and management in the country, the overwhelming majority was in favor of adopting a new policy framework (Figure 2). Support for a new riparian policy framework was 90% and 100%, from the surrounding land users and institutions, respectively.

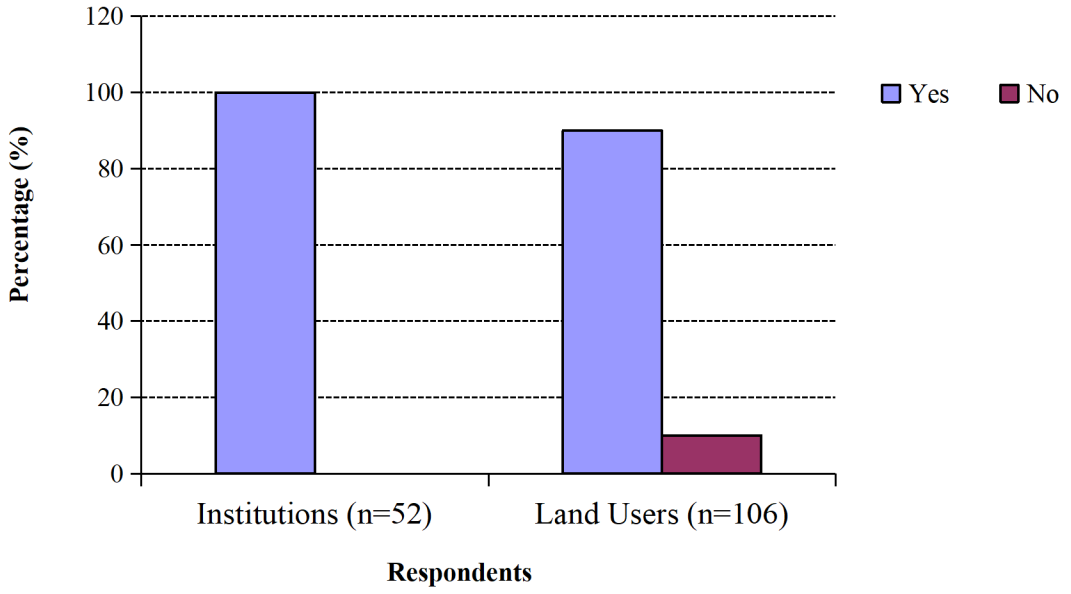

Figure 2: Need for a New Riparian Lands Policy Framework *(Source: Field Survey, 2018)*

Support for a new riparian lands management policy framework was qualified by the notion that a new policy framework would create greater clarity for both regulators and the regulated communities, and the recognition that a new riparian lands policy framework could be developed to fill important gaps in existing laws, regulations and policies. A small minority of the respondents were apprehensive to a new riparian lands management policy framework reiterating that sufficient laws, regulations and policies already exists in the country, and that greater effort needs to be placed in enforcement and promoting compliance, rather than on developing new

policy framework. With improved enforcement and compliance, or with modification to existing laws and policies, improved riparian land management could be achieved without the development of a new riparian lands policy framework.

Current Threats to Riparian Lands

Human activities encroaching on the riparian reserves along the surveyed areas include residential developments, commercial developments, small-scale industries (informal garages and automobile mechanical enterprises, car wash and making of building bricks), sand harvesting and agricultural activities. When survey respondents were asked to rank the current threats to riparian lands, majority ranked the following as high threat: Encroachments and conversion for agricultural use, settlements and commercial developments; Quarrying and mining, particularly sand harvesting; Pollution from point and non-point sources such as car wash, industrial and domestic effluents; Sedimentation and siltation from unsustainable land use practices that cause erosion from upland areas; and Adverse effects of climate change.

Majority of the surrounding land users in the surveyed areas identified the causes of riparian lands encroachment to include the following:

a). *Low level awareness of environmental and land use standards:* Majority of land users in the area confessed of the lack of knowledge on the width standards of the riparian reserves, and had their activities extending to the water courses. Most of them also do not know of the allowable and unallowable activities within the riparian zones. However, enforcing officers from different agencies indicated that land users are aware of the environmental policies but are negligent or ignorant;

b). *Vague guidelines and poor enforcement of regulations:* The land users' perceptions that the riparian zone to be either idle or free land, and therefore use it the way they dim it fit. Others perceive it to be government land thus free for all; and

c). *Lack of coordination of land use policy guidelines and institutional framework:* Despite a number of policies and laws in regard to riparian conservation, the study found out that enforcement of these standards has failed in the conservation of the riparian reserves of the study areas. Most county governments have licensed and collect levies from the very

businesses encroaching on the riparian reserves. Moreover, during land subdivision, physical planners provide for delineation of riparian reserves but surveyors in most cases fail to implement the same during actual ground surveys.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Results from this study suggest that while the majority of stakeholders believe that riparian lands management needs to be improved, many of the respondents recognise the value of the work that has been and continues to be done by the many organisations engaged in riparian lands assessment and management, most feel that there are significant barriers to realising an adequate level of riparian lands conservation or protection. Many of these barriers are institutional in nature and would require investment of both human and financial resources in order to move riparian lands management forward towards the goal of improving conservation and stewardship of riparian lands in Kenya. Regardless of how respondents felt about the need for a new riparian lands policy framework, there was overwhelming consensus that riparian lands are important ecosystems' components, and that more attention and effort need to be placed on the conservation of these habitats.

There are many important governmental, non-governmental, industry-led, community and individual efforts that have prioritised the protection or conservation of riparian lands in Kenya. While individually these efforts are important, a more coordinated effort is required if riparian lands management outcomes are to significantly improve over time. This coordination needs to happen within and between organizations and needs to include all aspects of riparian lands management, from data collection and management, through to programme-funding and public outreach. The country has some very fundamental pieces of legislations, regulation and policies already in place for significant strides to be made in advancing riparian lands management; the challenge lies in bringing these disparate pieces together in a coordinated and cohesive manner under a common and collective goal. The performance of the above-mentioned laws have been hindered by their contradicting and overlapping mandates, uses and management regimes.

Finding ways to remove the critical barriers that limit the success of existing management tools or to create new tools to enhance those that already exist should be a focus moving forward.

The enforcement agencies lack a clear information and data on the extent of riparian lands for the effective and sustainable management of riparian lands. This has presented a big problem for the conservation and management of riparian lands which are endowed with a number of natural resources that need to be protected through a better and effective system of management. Consequently, there has been a continued aggravated degradation of the riparian lands due to lack of a proper legal, policy and institutional framework encompassing the interests of government and riparian stakeholders in the use and management of riparian lands.

Recommendations

Some of the key considerations and recommendations for advancing the agenda of improving riparian lands management in Kenya, and certain activities that can be engaged to minimize the challenges impeding effective and efficient management and conservation of riparian lands are listed below:

Provide clear guidelines and update existing legislations, regulations and policies

Many respondents highlighted the need for more clear and concise guidelines for riparian lands management in the country. The government must provide and adopt a clear overarching policy framework. Respondents felt that much of the confusion and lack of coordination that currently exists around how riparian lands are managed is manifest out of a lack of clear direction for decision-makers.

Strengthen public awareness and education and promote compliance

The land users along the study sites generally show minimal concern for the conservation of the riparian zone and they perceive the space as either idle or free land for construction and dumping of all kind of waste they produce from their premises and operations. Others perceive it as private land for their own determined use whilst others still perceive it as community land. These distorted perceptions and low-level environmental awareness have catalyzed the use for the ‘free

space' in the areas. A strong campaign is necessary to educate the residents of the riparian lands about the negative impact of their activities and to identify solutions that are within their reach. There is need for more targeted awareness building and education for county governments.

Improve enforcement of existing laws and legislations

There is need to improve enforcement of existing laws, regulations and policies. The main challenge appears to be the enforcement of existing legislation where both the national and county governments are unable to move people who are living or have built homes in the riparian areas. Several respondents cited the need for increased security and strict protection of certain areas of the riparian lands through fencing, compliance promotion, imposing sanctions, evictions and revocation of illegally acquired land entitlements.

Identify, Delineate, Demarcate and Document Riparian Lands

There is a lack of adequate information on riparian lands extent, health, and functions in the country. This calls for a need to undertake a specific national riparian lands mapping exercise in order to develop an inventory of the riparian areas within public and private properties, to enable specific protection. Counties should identify and map all significant public lands, water resources and lands in the vicinity, including all the natural water bodies such as rivers, streams, lakes, watercourses, aquifers, riparian lands, wetlands, flood zones, reserve lands, natural recharge and discharge areas located within its jurisdictional boundaries.

Improve coordination of governments and programmes

The riparian lands in the study area covers the interests of politicians, opinion leaders, NEMA, County Governments, the Physical Planning Department, other government agencies and all other relevant land users. In general, respondents recognized that there are a number of programmes that currently exist that have led to successful riparian land management; however, some respondents suggested that with better coordination and cooperation between the various agencies, even greater success could be achieved. In order to address issues of coordination of riparian land management between various levels and departments of government it is important

to promote consistency in riparian management across jurisdictions that permit or manage land and water use.

Promote sustainable conservation practices and involvement of riparian residents

There is need to empower and sensitize the local stakeholders and communities living along riparian lands on riparian land protection in order to mobilize their own capacities and create institutions operated by them. This could be facilitated through extension outreach programmes and use of indigenous knowledge on improved conservation practices like agroforestry, conservation agriculture, landscape restoration activities like tree planting and reseeding, establishment of conservation riparian buffer, and, soil and water conservation measures to curb soil erosion. Other programmes include clearing garbage and waste off the water courses at a fee such as the Watamu beach programme in Kilifi County (Gwada *et al.,* 2019).

Improve land tenure and land use administration, and, clarify land use rights

Tenure can be described as the rights of secure, long-term access to land and other resources, their benefits, and the responsibilities related to these rights (Barrow & Murphree, 2001). Related to tenure rights are ownership, proprietorship and entitlement. Majority of the respondents indicated that they did not have tenure rights. Tenure rights confer authority and responsibility and the strength of tenure acts as an incentive for the community to conserve resources. Where the local people lack strong tenure rights they may not support conservation initiatives, and, when tenure rights are certain, they provide incentives to utilize natural resources sustainably or invest in resource conservation. The respondents indicated the need to improve entitlement to motivate stewardship of riparian lands among the adjacent land users.

Increase the capacity of governments and other agencies

Riparian lands management in Kenya is a complex task, given the diversity of users and activities that occur on the landscape. This complexity requires not only clear and concise regulatory and policy direction, but also the human and financial capacity within the county government to carry through with education programs, enforcement, and monitoring activities.

Providing additional resources to counties in the form of qualified and knowledgeable personnel can be a way to improve riparian lands management outcomes in the country.

Increase government accountability

Increasing government accountability was brought forward as a strategy to improve outcomes by several respondents. This increased accountability could come in the form of stronger department mandates for managing public land, and more open and transparent reporting and monitoring programmes.

Encourage conservation on private lands through incentives

Riparian lands management outcomes in Kenya can be improved by creating incentives for riparian lands conservation, as such would foster stewardship of the riparian areas and the conservation attitudes of the surrounding land users. The type of incentive may vary, but during the stakeholder's consultation, there was general agreement that private landowners often incur financial risk or forgo financial opportunities to pursue riparian land conservation activities, and offsetting these costs through incentives would result in improved outcomes. One particular type of incentive that can serve as a classical example include tax exemption on private land set to improve conservation outcomes. Others include the government, both at the national, county and municipal levels, to set up a fund for paying local residents around riparian areas to encourage them to gather waste and deliver it to designated sites.

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