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## Kenya: The challenges facing the implementation of IWRM in Lake Jipe Watershed

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# Contents

- Introduction ..... 3
- Current state of the Lake Jipe watershed ..... 3
  - Current actions..... 5
    - Policies ..... 5
    - Management Strategies..... 5
    - Infrastructure Development ..... 6
- Outcomes of Current Actions ..... 6
- Analysis and suggested steps to improve management in Jipe - Lumi Basin ..... 7
  - Co-management ..... 8
  - Capacity Building..... 8
  - Waste management..... 9
- References ..... 9
  - Key Reference Lake Jipe:..... 10
  - Contact details ..... 10

## Introduction

Lake Jipe watershed is an important transboundary wetland ecosystem at the border of Kenya and Tanzania that covers an estimated area of 30km<sup>2</sup>. Lake Jipe is bordered by Mt. Kilimanjaro to the South, North Pare Mountains to the West, and the Tsavo-West National Park to the South East. The is fed by River Lumi which originates from the slopes of Mt. Kilimanjaro and River Muvulani from Pare Mountains. It outflows into River Ruvu (IUCN, 2000).

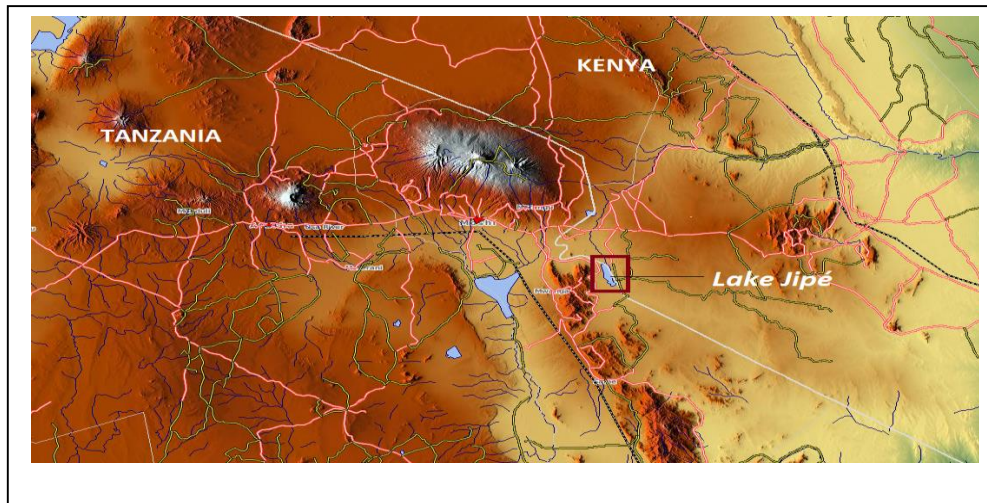


Figure 1: The location of Lake Jipe watershed shared by Kenya and Tanzania  
Source: Google maps ([www.maps-for-free.com](http://www.maps-for-free.com))

The Lake Jipe-River Lumi ecosystem is endowed with rich biodiversity and natural resources of social, economic and ecological importance. At local level, the lake supports livelihoods by providing water for domestic use, livestock, fishing, farming, and biodiversity conservation which supports tourism and recreation (NEMA, 2009). Secondly, the wetland provides a habitat for various biotic communities including water birds species and serves as a breeding ground for endemic fish species. In addition, Lake Jipe is a permanent watering point and feeding ground for wildlife in Tsavo National Park and serves as a migratory route for bird species such as *lesser jacana*. Lastly, the basin offers important ecological services such as stabilizing the shoreline and regulating hydrology, stores and purifies water (IUCN, 2000).

## Current state of the Lake Jipe watershed

The Lake Jipe -River Lumi basin is experiencing severe catchment degradation mainly due to anthropogenic activities. This can be attributed to the fact that majority of the population lives adjacent to the lake and they rely on fishing, agriculture and livestock rearing as their primary source of livelihood. These activities have a bearing on the basin in the following ways:

- (a) Unsustainable land practices such as farming along the riverbeds and steep mountain slopes, or flat cultivation in stream valley bottom has contributed to heavy siltation within the basin.

In addition, the basin is characterized by deep and wide gullies which enhance the rate of soil erosion.

- (b) Encroachment into the buffer zones of the basin has led to massive loss of vegetation cover which rendered the soils unstable and susceptible to water and wind erosion especially during peak environmental flows.
- (c) Reduced inflow into the basin due to increased water abstraction and unreliable water flow patterns at the mouth of River Lumi.

According to Shemdoe & Mwanyoka (2006), the sediment load is deposited into the River Lumi increases the nutrients level in the stream and the lake resulting in decreased water volume and depth as well as reduced water flow to downstream users. It also alters the water salinity and creates conducive environment for the proliferation of invasive waterweeds such as *typha domingensis*. IUCN (2000) stated that dominant water weeds have contributed to the rapid reduction of the surface area of the basin.

Deforestation on the upper parts of Mt. Kilimanjaro and the Pare Mountains is fuelled by the demand for charcoal production, firewood and building material. Deforestation not only contributes to the decline of carbon sinks for the absorption of greenhouse gases. It also escalates siltation processes by increasing the surface run-off during heavy rains and decreased dry season flows. As a result, the Lake Jipe – River Lumi basin is highly vulnerable to impacts climate change such as prolonged droughts in the dry seasons and flash floods especially in the low lying areas where inundation of the river banks is common. This is particularly true as it rains in Tanzania (Mt Kilimanjaro area) and flash floods occur on the Kenyan side.

Water pollution is another major challenge facing the basin. This is brought about by inappropriate liquid waste management from surrounding settlements, urban and peri urban centers where the use of septic tanks, soak pits and open drains is commonly used to dispose sewerage, industrial discharge and other wastewater material. Consequently, sanitation problems arise particularly in areas where the water table is high and the bedrock is shallow therefore restricting the depth of the pit latrines. It is stated that human waste seeps through the bedrock and contaminates the groundwater thus reducing the quality of water. In the event of flooding, the waste material is washed out.

Preliminary efforts to address the degradation of Lake Jipe basin adopted a top-down approach whereby the government excluded local communities from the project design, planning and decision making process. As a result, community needs and aspirations were not addressed which lead to further marginalization of the poor. At the same time, all government led projects in the basin have failed because they contributed to the displacement of local people from their communal land. This resulted in a lack of motivation to conserve Lake Jipe - local people do not have secure tenure rights to use and manage the resources. Furthermore, swampy areas have been illegally reclaimed for rice fields where water is derived through flooding irrigation. These swamps or floodplains have a role in groundwater recharge and filtration points thus its disappearance will have adverse environmental consequences.

The current policies on natural resource management advocate for public participation, however, there is limited capacity (human and institutional) to actualize this collaboration into practice. This is particularly true for Lake Jipe basin whereby local community and other stakeholders are not adequately consulted or engaged in planning and decision making processes. For instance, water user representation in the Pangani Basin Water Board does not include unorganized groups such as pastoralists or small scale farmers. This calls for the formation of water resource user association (WRUAs) in order to incorporate their representation to the board and enhance their participation in management activities. At the moment, appointments are based on political affiliations and not merit based. Therefore, the process is headed by personnel that lack technical knowledge on water resource management.

### **Current actions**

Lake Jipe has been subjected to numerous environmental threats which have had negative impacts on the management and conservation of the basin. This case study reviews the driving forces behind the degradation of the Jipe - Lumi ecosystem and documents the current actions and measures taken to counter the ongoing catchment degradation. It will evaluate the policy and legal framework guiding wetlands conservation, and management strategies in place, and the effectiveness of public participation.

### **Policies**

Under the Constitution of Kenya (2010), water resources management is a national function whereas the provision of water services is a county function. Furthermore, the Bill of Rights within the Constitution underscores the right of access to water among other human rights such as social rights, environmental rights, minority group rights and economic rights. This underlines the need for sustainable water resources management through the application of integrated and adaptive water resource management (IAWRM) approach. In this context, Kenya has managed to develop a comprehensive IWRM plan, but its implementation is yet to be fully realized.

The Environmental Management and Coordination Act (1999) constitutes a section on wetlands regulations which provides for the conservation and sustainable use of wetlands, riverbanks, lakeshores, and seashores management in Kenya. It also provides a framework for public participation in the management of wetlands, however, it is silent on women's role and participation in the management of wetlands resources. Nonetheless, EMCA 1999 is a good reference point for the management and governance issues of Lake Jipe - River Lumi basin because it provides a legal framework for effective conservation of water catchments, control of floods and prevention and control measures aimed at reducing pollution and siltation.

### **Management Strategies**

The Lake Jipe watershed falls under the Athi River Catchment which is delineated further into the Coastal Management Unit. The Lake Jipe Basin Integrated Management Plan (2009-2014) is an enabling guideline that outlines intended actions to achieve sustainable and equitable use of land and water resources in the basin for sustainable livelihoods. The integrated management plan was developed in a consultation with various stakeholders including government, civil society, private sector and the local communities. It focuses on improving farming systems, sustainable

livestock production, conservation and management of water, fisheries and forest resources. In terms of the social systems, the management plan aims to create awareness on wetlands values and wise use principles, capacity building of the riparian community and involve them in participatory action research. Furthermore, there is a clearly defined monitoring and evaluation framework to track progress and ensure successful implementation of the management plan.

The Government of Kenya and Tanzania have signed a memorandum of understanding for the joint transboundary management of the Lake Jipe basin. The MoU aims to establish a joint cooperative framework for sustainable development and management of the ecosystems and set up institutional arrangement for the management of ongoing projects, programmes and initiatives within the basins. It is worth noting that the MoU is silent on key issues such public participation and collaborative research efforts.

### **Infrastructure Development**

Lake Jipe – River Lumi basin is found in Taita Taveta County, one of the poorest counties in terms of development, that is, limited human resources, poor infrastructure and inadequate social services. The Taita Taveta County Integrated Development Plan (2013-2017) does not explicitly address the management of Lake Jipe - River Lumi basin, however, it attempts to integrate environmental concerns into its development planning processes.

The CIDP acknowledges the need to protect water catchment areas for the benefit of the citizens in terms of political, social and economic development. The county has not invested financially or otherwise in the development of water infrastructure. The only notable infrastructure present at the basin is the construction of gabions to counter soil erosion and the ongoing illegal construction of river weirs structures by upstream users significantly reduces downstream flow of water along the Lumi River. This generates conflict between the upstream users and the downstream users.

Improved water infrastructure development within the catchment will enhance conservation water resource and ensure availability of water resources for ecological, commercial and livelihood production. The CIDP should therefore focus on water storage facilities, flood mitigation measures and groundwater recharge and exploitation for infrastructure development.

### **Outcomes of Current Actions**

Despite having a 5-year management plan for the lake Jipe - River Lumi basin, the catchment is experiencing severe environmental degradation. The management plan has proved to be ineffective mainly because the basin is not in a protected area therefore there is increased encroachment at the shores of Lake Jipe and the nearby tributary rivers in attempt to secure food security. Poor governance is also a contributing factor to the failure of the management plan. This is because there is lack of complementary conservation by-laws which makes it difficult to enforce the proposed strategies into actionable deeds. In addition, there is lack of ground personnel to monitor compliance. Lastly, the continuous loop of dependency on natural resources in the basin due to lack of diversified livelihood options limits wetland conservation efforts.

Wetlands and water resource management is currently guided by a non-operational wetland policy and management strategy. As a result, conservation efforts at Lake Jipe basin have been cross-sectoral, fragmented and uncoordinated without specific institutional mandates leading to unsustainable water resources utilization and conflict. At the community level, the Upper Lumi and Lower Lumi Water Resource Users Associations (WRUA) were formed and each developed its own sub-catchment plan (SCMP) through a multi-stakeholders participatory approach. Each WRUA provides a platform for public debate and dialogue to minimize conflict and promote efficient use of water and the equitable sharing of water. In addition, SCMP adopted IWRM approach to address the main challenges experienced by the community.

Table 1: Ongoing activities undertaken by WRUAs in Lake Jipe basin

<b>Challenge</b>	<b>Interventions</b>
Heavy siltation and soil erosion	<ul style="list-style-type: none"> <li>• Rehabilitation of riverine areas</li> <li>• Construction of gabions &amp; sand dams</li> <li>• Enforcement of current laws, fencing of game park</li> </ul>
Encroachment of riverbanks	<ul style="list-style-type: none"> <li>• Zoning and gazettement measures of access points</li> </ul>
Deforestation and vegetation loss	<ul style="list-style-type: none"> <li>• Planting trees, vertiver grass, bamboo &amp; other indigenous vegetation</li> </ul>
Flash floods	<ul style="list-style-type: none"> <li>• Construction of water dykes at strategic points</li> <li>• Flood disaster preparedness</li> </ul>
Invasion of water weeds	<ul style="list-style-type: none"> <li>• Physical and biological control mechanisms to remove invasive species</li> </ul>
Waste water management	<ul style="list-style-type: none"> <li>• Construction of sewerage structures</li> </ul>
Community participation	<ul style="list-style-type: none"> <li>• Assist the community and other stakeholders to form Water Resource User Association</li> <li>• Build their capacity through knowledge and skills training</li> <li>• Strengthen capacities of farmers to avoid bad farming practices</li> </ul>

(Source: Wakhungu and Sikoyo, 2004)

The biggest challenge facing Lake Jipe - River Lumi basin is heavy siltation caused by inappropriate farming practices by both downstream and upstream areas. This is followed by intense flooding during the wet season which brings about mass displacement of riverine communities, and subsequent socioeconomic losses.

### **Analysis and suggested steps to improve management in Jipe - Lumi Basin**

The Lake Jipe - River Lumi basin is a socio-ecological system made up of complex interrelated human and nature interactions therefore this linkage cannot be ignored if sustainable management is to be attained. In this regard, it is important to factor in the different multiple interactions within the basin to include the local community and other stakeholders, interaction between upstream and downstream users, and the multiple government agencies or institutions

with mandates to manage natural disturbance and conflicting interests. As shown in this case study, the following are recommendations will promote IAWRM and increase citizen's democratic participation in the sustainable management and development of natural resources at Lake Jipe basin.

### **Co-management**

This refers to the collaboration between multiple government agencies and institutions, civil society, and the community of multiple actors. According to Kideghesho and Mtoni 2008, the role of the government includes but not limited to:

- (a) Protecting water catchments and its associated biodiversity for the wider public good as well as regulating development activities, and
- (b) providing oversight to all relevant agencies and institutions in enforcing sustainable management practices.

Whereas the civil society can have a complementary role in championing resource user rights of the community in cases where the government retains its power in decision making and awards user rights. An emphasis on integrating traditional knowledge and management systems is equally important because it has proved to be successful in conserving endemic species (Schusler et al 2003). This can be attributed to the fact that land in the basin is a communal asset with socio-cultural significance to its people. This is particularly true for minority ethnic groups that have strong attachment to the surrounding natural environment which is commonly used for traditional functions such as rituals and initiation ceremonies. As a result, sections of the forests remain undisturbed.

IWRM is at the core of water management framework in Kenya due to its holistic approach, it provides a platform for multi-stakeholder engagement, integrated planning and capacity building aimed at promoting wise use of resources and conservation of lake Jipe basin. IWRM can be used as tool for adaptation to climate change and building community resilience to climate-related impacts such as recurrent droughts and flooding. IWRM can also be enhanced by applying a rights-based approach to water resource management by fostering dialogue amongst the different stakeholders and build consensus on equitable water allocation thereby minimizing conflict over shared and increasing scarce water resources. RBA can empower local communities to understand their rights and entitlements thus demand for good water governance using social accountability tools. The civil society working in the basin can collaborate with community based organization to advocate for institutional reforms to support public participation and representation in decision making. This will serve as a strategy to mainstream gender and ensure the voice of women and other vulnerable groups is incorporated.

### **Capacity Building**

The first step is to build and strengthen the institutional and technical capacity of government officials and policy makers involved in water resource management at county level to adopt IAWRM approach. It is therefore important to increase capacity and competence in the following areas: advocacy, networking, monitoring and evaluation, and public participatory processes.



Secondly, government agencies and institutions should develop and maintain a comprehensive IAWRM knowledge management system. This will facilitate exchange of experiences, documentation and dissemination of best practices and lessons learned. These knowledge management products can be used for awareness creation, capacity building training and evidence-based advocacy. This will in turn increase the knowledge and awareness of local community, government representatives and decision-makers about the importance and value of IAWRM in good water governance and sustainable water resources management and development.

The civil society role should be to develop the capacity of local community through knowledge and skills trainings, and enable them to manage natural resources in a sustainable way using locally available formal and informal institutions. For instance, educate farmers on sustainable land management such as soil and water conservation techniques using participatory experiential learning. Equally as important is to build the advocacy capacity of the community so that they are empowered to take self-determined actions and negotiate their position, participate in policy formulation and review process. This is important because buy-in from the community can shape and influence their resource-use patterns in a positive manner.

### **Waste management**

The Taita Taveta County Government should develop a waste management plan and allocate funds for a centralized sewerage system. This will ensure that liquid and solid waste from point sources such as industries and urban areas is not disposed into the basin. Last, conduct public awareness campaign on water pollution, proper sanitation practices and waste disposal.

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Author: Catherine Njiriri, 2016

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