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Title: Degraded Silver Springs: An Analysis of Governance of Urban Water Resources – The case of Machinjoni River Basin in Kitale Town, Trans-Nzoia County, Kenya

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Degraded Silver Springs: An Analysis of Governance of Urban Water Resources – The case of Machinjoni River Basin in Kitale Town, Trans-Nzoia County, Kenya

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Summary

The fact that there is a water crisis has been acknowledged by various scholars but it is pointed out that the crisis is as a result of poor management practices, where water resources have been threated due to poor institutions and governance practices (Mollinga, 2008, Cosgrove and Rijsberman, 2000). The purpose of this thesis is to provide an understanding of the manner in which institutional arrangements affect the implementation capacity of WRUAs in river basin management. The main research question is: *How do the current institutional arrangements influence the implementation capacity of Machinjoni WRUA in river basin management?* This was answered through 3 sub questions as follows: What are the key characteristics of current institutional arrangements related to river basin management in Machinjoni? What is the level of implementation capacity of Machinjoni WRUA in river basin management? How do legal framework and roles and responsibilities of organizations in water management affect the level of implementation capacity of Machinjoni WRUA in river basin management?

Literature review indicates that in order to bring integrated river basin management into effect, institutional arrangements are needed to enable for stakeholder participation, water resources management on hydrological boundaries, an organisational setup in river basin and sub basin authorities with their respective by-laws to incorporate decision making at the lowest appropriate level, planning system oriented at production of integrated river basin plans and introduction of a system of water pricing and cost recovery (Jaspers, 2003). Stakeholders need to be structured through effective organizational and procedural arrangements so that each stakeholder group is aware of its own and others rights and responsibilities (Bandaragoda, 2000).

Data collection included both primary and secondary data analysis. For primary data 16 semi-structured key informant interviews with purposively selected experts directly involved in RBM and 3 Focus Group Discussions were carried out making a total of 19 interviews. Interviews were carried out for 2 National government agencies based at the county level namely WRMA and NEMA; 4 County Government departments as follows: Water, Environment, Agriculture and Public Health and Sanitation. For local NGO operating in Machinjoni sub catchment 1 interview was done with KEETA project, and 3 Focus Group Discussions with 3 groups of Machinjoni WRUA namely; Management Committee, Ordinary members and Non-WRUA members living within the sub catchment. Secondary data was obtained through reviewing law and policy documents, reports and journal articles.

Major findings are that there exists a legal framework for RBM in Kenya but county specific laws and regulations for RBM in Trans Nzoia County government are not in place, showing a disconnect between national and county government linkages and consequently presence of overlaps and duplications in roles and responsibilities of organizations related to water management at county level. Lack of clear guidelines and structures for accountability among these organizations has resulted in inefficiency and a lack of commitment to Machinjoni WRUA by relevant state agencies and county government departments leaving the WRUA confused, not knowing who or which organization to report to and or seek for support from. Empirical evidence further suggests a lack of coordination among state agencies (NEMA and WRMA) and county departments of Environment, Water, Agriculture and Public health in implementation of catchment conservation and protection activities in Machinjoni River

basin. Lack of adequate financial resources on the parts of both county departments and WRUA hampers the implementation of catchment management activities within Machinjoni River basin.

Keywords

River basin, River basin management activities, catchment activities, WRUA, Institutional arrangements

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Abbreviations

IHS	Institute for Housing and Urban Development
WRMA	Water Resources Management Authority
WRUA	Water Resources Users Association
WSTF	Water Services Trust Fund
SCMP	Sub Catchment Management Plan
WDC	WRUA Development Cycle
NGO	Non-Governmental Organization
WSB	Water Service Board
NEMA	National Environmental Management Agency
RBM	River Basin Management
MOU	Memorandum of Understanding
WRM	Water Resources Management
LBDA	Lake Basin Development Authority
KEETA	Kenya Environmental Education Teachers Association
KFS	Kenya Forest Service
NWRMS	National Water Resources Management Strategy
CMS	Catchment Management Strategy

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Chapter 1: Introduction

This chapter gives the general information of the thesis and includes description of the background information, problem statement, research objectives, research questions, significance of the study as well as the scope and limitations of the study.

1.1. Background Information

Kitale town is the commercial capital of Trans Nzoia County, located 380km to the north west of Nairobi City. The town is situated at about 1890m above sea level between Mt. Elgon and Cherengani hills, two of the country's major water towers. The town and its hinterland are considered the bread basket of Kenya due to its high agricultural potential and is also the largest town serving the drought prone dry lands of northern Kenya. Kitale has a population of 220, 000 people with an annual population growth rate of 12% which is higher than the country's average of 7% for urban areas (Majale, M., 2009). The high growth rate is mostly attributed to increase in-migration from rural areas partly brought about by constant droughts experienced in northern Kenya. As a result, more than half of the town's population lives in slums (Majale, M., 2009). The largest slum in Kitale town is Kipsongo slum which is mostly inhabited by migrants from northern Kenya and other local residents. This slum is located within Machinjoni River basin, which covers about 20% of the town's municipality (Machinjoni, W., 2012).

Kenya is classified as a water scarce country (Marshall, 2011) since it receives less than 650 cubic meters of fresh water per capita hence the need to account for every drop of water (Mathenge, Luwesi, et al., 2014). Climate change and its variability, land use practices, environmental degradation and population growth had adverse impacts on the hydrological regimes of the country's water resources with diminishing water resources as a consequence. Other than this, the country's water sector was coupled with bad policies and poor management practices which necessitated reforms in the water sector starting with Sessional Paper No.1 of 1999 which set in motion the reforms that resulted in enactment of the Water Act 2002 (Mathenge, Luwesi, et al., 2014). The reforms were aimed at separating water supply and delivery from water resource management, and this resulted in the creation of several water sector institutions.

The Water Resource Management Authority (WRMA) is one of the institutions that were created as a result of the Water Act 2002. WRMA is the lead agency in water resource management throughout the country, and uses a catchment approach by forming community based groups called Water Resources Users Association (WRUA) to sustainably manage the quality and quantity of water within the water sources at the sub-catchment level.

The WRUAs are majorly funded by Water Services Trust Fund (WSTF) to develop a Sub-Catchment Management Plan (SCMP), which provides a thematic roadmap for the implementation of sub-catchment conservation activities by the WRUAs. This is done through the WRUA Development Cycle (WDC), a framework that was developed by WRMA and WSTF to facilitate funding to WRUAs in order for them to engage in catchment protection and conservation activities in collaboration with relevant stakeholders (WSTF, 2015). Relevant stakeholders include State departments of Water and Irrigation, Environment, Agriculture, Public health, forestry and fisheries, Non-Governmental Organizations (NGOs) and local community members among others. It is through this framework that investments into water resource management activities are done throughout the country.

1.1.1 Study Area

Machinjoni River Basin is an urban river basin located in Kitale town, Trans-Nzoia County which falls under Lake Victoria Nortch Catchment Area drainage basin and is bounded by latitude $0^0$56'50"to $1^0$3'15"N and longitude $34^0$53'00" to $35^0$0'25"E. It is one of three sub catchments that fall within Kitale town that was delineated by WRMA for management by WRUAs. The river basin covers an area of 77 square kilometers and consists of the area drained by the following Rivers: Machinjoni whose source is at the centre of Kitale town, Rivers Simba, Shimala bandu, Olkadongo and Lubere all of which originate from Cherengany Hills, Rivers Research and Lukhendu whose sources are wetlands within the sub catchment, and Rivers Kiminini and Kibyeyon which originate from Mt. Elgon.

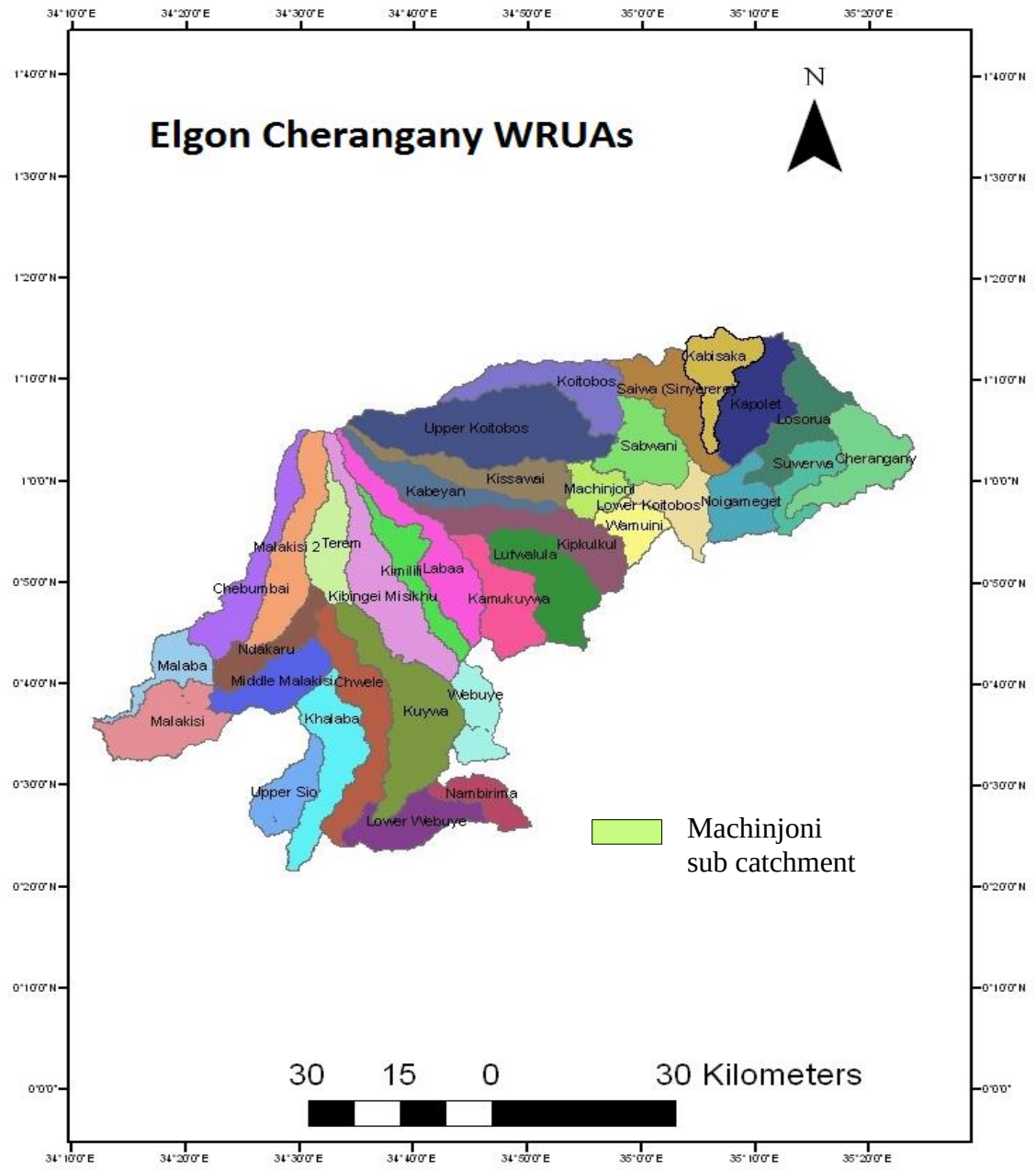

Figure 1*: Map showing Machinjoni River Basin*

(Source: WRMA)

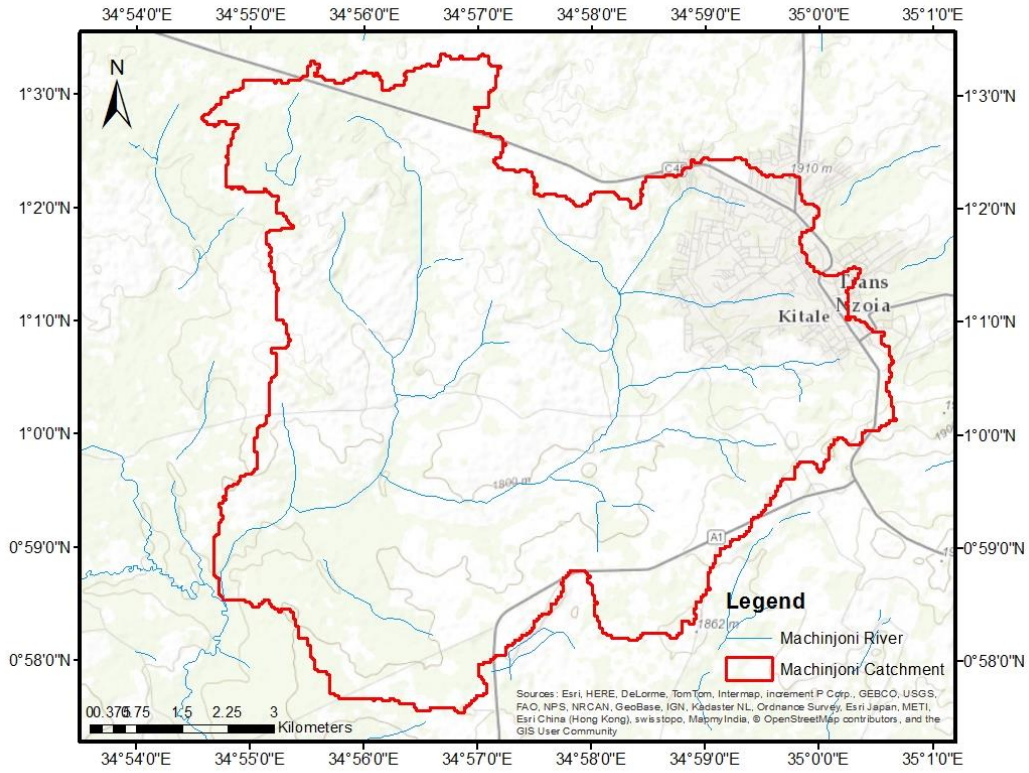

Figure 2 Map showing Machinjoni River Basin in relation to Kitale Town (*Source: WRMA)*

The river basin is managed by Machinjoni WRUA which was established in 2010 by the WRMA. Machinjoni river basin covers an area of 77 square kilometers and about 20% of the sub catchment falls within the town's municipality (Machinjoni, W., 2012). The river basin has several streams, some of which emanate from the town and join to form bigger rivers downstream. One of the streams is Machinjoni and despite it being a first order stream in Machinjoni river basin, it is the only stream draining westwards from the town centre and carries with it loads of pollution from surface run off from the town, the neighboring residential areas and siltation from the farms, and discharge these polluted water into second order streams downstream.

Due to the high pollution, the stream is referred to as 'sewage' locally because of pollution through dumping of solid waste from the town and slaughter houses, raw sewage from burst and leaking sewerage pipes, fertilizers from agricultural activities, and riverbank encroachment by migrants from the rural areas and from Turkana, the drought stricken northern part of Kenya. In addition, there is encroachment by the informal economic sector enterprise commonly referred to as the 'jua kali' industry in Kenya and encroachment in form of small urban farming along the streams within the river basin. Deforestation and soil erosion additionally are other forms of ecosystem degradation that are experienced in Machinjnoni River basin. All these contribute to ecosystem degradation which is one of the current global environmental challenges (Lemos and Agrawal, 2006).

Streams provide important ecosystem services such as clean drinking water, water for domestic use, irrigation, leisure and relaxing sites, habitat for aquatic life among others, which makes them of ecological importance hence the need for conservation. The sub catchment alone is home to 96,416 people (Machinjoni, W., 2012) and has been regarded as a 'hot spot' as far as water pollution is concerned (Machinjoni, W., 2012).

Additionally, reports indicate that over 50% of Kenyans obtain their water directly from water resources such as rivers, streams, and wells, among others, rather than from improved water supply systems, hence the need to safe guard water resources at the source (WSTF, 2015). Majority of inhabitants in Machinjoni river basin are low income earners, with small pieces of land while other live in slums and therefore still rely on water from springs on the banks of the streams and the rivers within the sub catchment for their domestic use and livelihoods, despite the deteriorated quality and associated health risks. Further downstream, oblivious of the pollution at the source, the riparian community uses this water for domestic purposes and small scale irrigation through illegal abstractions.

In addition, access to clean and safe drinking water is a basic human right (Constitution of Kenya, 2010), and therefore it is the responsibility of the state and other relevant actors to ensure that urban rivers are governed in a manner that results in improved water quality and quantity for the benefit of the inhabitants.

1.2 Problem Statement

Machinjoni WRUA was established in 2010 to manage the urban river basin, and has since received several trainings from various stakeholders to build capacity for implementation of various catchment management activities in the river basin. However, despite establishment of the WRUA and the development of their Sub Catchment Management Plan (SCMP), the state of the sub catchment in general has not improved.

Compared to other WRUAs that were established around the same time, the implementation capacity of Machinjoni WRUA towards improving the sub catchment is low, given the few activities done so far towards conservation and protection of the water sources within the river basin. Some of the activities undertaken include tree planting along streams and river banks, spring protection and establishment of tree nurseries.

The WRUA has therefore not made significant steps in implementing catchment management activities such as river bank protection through river bank pegging and marking, afforestation, construction of gabions and terraces among others described in their SCMP towards improvement of the river basin (Machinjoni, W., 2012). In addition, catchment management function was recently devolved to the county governments in the dispensation of the Constitution of Kenya 2010 (Constitution of Kenya, 2010) implying changes in the governance arrangements for river basin management at the local level.

The challenge therefore still remains how to ensure effective water resource management for the urban river basin given the presence of multiple actors such as WRMA, county government of Trans-Nzoia, National Environmental Management Authority (NEMA), Ministry of public health, Ministry of Agriculture, NGOs, private companies, youth groups, CommunityBased Organizations (CBOs) and local community members interested in the governance of urban rivers at different levels.

This research seeks to analyze the urban governance structure in Machinjoni river basin since governance is increasingly gaining recognition as a key element of development at all levels in society (Franks and Cleaver, 2007) and also due to recognition that contemporary environmental governance encompasses both state and non-state actors including community based management of natural resources (Lemos and Agrawal, 2006).

The research therefore seeks to understand the various institutional arrangements for water resource management and the influence of these arrangements on management of the urban river basin in Kitale town. The need to understand the influence of these state and non-state

actors on the capacity of Machinjoni WRUA to implement catchment management activities in the river basin is therefore the basis for undertaking this research.

1.3 Research Objective

The aim of the research is to investigate the influence of current institutional arrangements and how their interactions affect implementation capacity of Machinjoni WRUA in river basin management. This will be achieved by analyzing the institutional arrangements and level of implementation capacity of Machinjoni WRUA in river basin management.
The research also intends to achieve the following specific objectives:

1. Characterize the current institutional arrangements in urban river basin management in Machinjoni
2. Explain the level of implementation capacity of Machinjoni WRUA
3. Analyze the effect of current institutional arrangements in the implementation capacity of Machinjoni WRUA

1.4 Research Question

How do the current institutional arrangements influence the implementation capacity of Machinjoni WRUA in river basin management?

Sub Questions

1. What are the key characteristics of current institutional arrangements related to river basin management in Machinjoni?
2. What is the level of implementation capacity of Machinjoni WRUA in river basin management?
3. How do key characteristics of institutional arrangement affect the level of implementation capacity of Machinjoni WRUA in river basin management?

1.5 Significance of the Study

The significance of WRUAs in water allocation and conflict resolution at the lowest appropriate level of river basin is widely debated. However, there is limited literature on WRUAs and their operations in water resource management with regard to catchment and ecological conservation of river basins.

Further, various conceptual elements on institutional arrangements and local level community water management especially relating to WRUAs has been debated, but less attention has been given to identifying the influence of these institutional arrangements on the capacity of these local water resource users associations to implement catchment management activities for protection of water quality and ecological conservation in the river basins.

Further, water sector reforms are currently ongoing in Kenya with various changes in institutional arrangements of water resources management in the country. This research is timely in terms of providing insights as to how these institutional arrangements affect capacity of WRUAs to implement various water related activities within river basins. Devolution of roles to County Governments has implications for river basin management.

This study will therefore contribute to water and environmental governance scholarship where further research has also been recommended for environmental policy decentralization specifically in relation to furthering insights on common property institutions (Lemos and

Agrawal, 2006, Lemos and De Oliveira, 2004). WRUAs fall within decentralized water resource management governance institutions that involve decision making at local level through river basin approach. Their effectiveness depends on ability of local community to participate in planning and implementation of catchment level decisions.

1.6 Scope and Limitations

The scope of this study is limited to investigating the governance of urban river basins in terms of the influence of institutional arrangements on implementation capacity of WRUA in management of river basins. Comparison of Machinjoni and other WRUAs in terms of their levels of implementation capacity would have been interesting to do and would have shed more light on the topic at hand, but this could not be done due to limited resources and period for data collection.

Chapter 2: Literature review

2.1 Introduction

This chapter describes the main concepts related to the research namely: Integrated water resource management, integrated river basin management, River basin organizations (RBOs), Institutional arrangements, Water Resource Users Associations and Implementation capacity. The chapter concludes with a conceptual framework.

2.2 Concepts of the Study

2.2.1 Integrated Water Resource Management

UNDP (2000) defines water governance as "the range of political, social economic and administrative systems that are in place to regulate development and management of water resources and provisions of water services at different levels of society" (Pahl-Wostl, 2009). Water governance is as old as human civilization itself, and with increasing demand for water referred to as 'blue gold', water governance has more than ever become a particular challenge that involves multiple levels of action with intricate relations to spatial scale (Moss and Newig, 2010). This demand on water and the recognition of vital ecosystem services that water provides has further led to the increasing need for effective water governance (Agyenim and Gupta, 2012).

The traditional single focus of water management has been considered ineffective in dealing with the multifunctional nature of water and many scholars have described this situation as crisis of governance, necessitating an appropriate management approach for water resources (Agarwal, delos Angeles, et al., 2000, Agyenim and Gupta, 2012, Gupta, Pahl-Wostl, et al., 2013, Hooper, 2005). This crisis in water governance together with the perception of water management as wicked problem led to water reforms in many countries all over the world in the 1990s with the aim of integrating land and water management.

The concept of Integrated Water Resources Management (IWRM) dates back to the 1990s when it was packaged in neo-liberal theory focussed on water as having economic value and hence an economic good. The need to minimize state role and enhance stakeholder participation in water management was further embedded in the Dublin principles formulated during the Dublin Conference of water and environment in 1992 (Agyenim and Gupta, 2012), which set forth the agenda for water sector reforms globally.

The four Dublin principles which are the core of IWRM concept first consider fresh water as a finite and vulnerable resource that should be safe guarded through sustainable water management practices that recognize both the multiple uses of water and different water users. The second principle advocates for participatory approaches in water management, the third inclusivity of women as they play a central part in provision, management and safe guarding water and lastly, that water has economic value and should recognized as an economic good (Agarwal, delos Angeles, et al., 2000). Following this, the global water partnership technical advisory committee (2000) therefore defines IWRM as a process that promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems (Agarwal, delos Angeles, et al., 2000, Hooper, 2005). Coordination and collaboration among different state and non-state actors is needed to support IWRM.

According to Van der Zaag (2005), IWRM is an institutional challenge that needs capacity to enable for integration to occur, and in many countries, this capacity was developed at district level through various government departments. Emerging trend of IWRM in Southern Africa has created parallel structures away from existing administrative structures following the hydrological boundaries, which potentially may result in misunderstandings, competition and generally uncoordinated development (Van der Zaag, 2005). Despite problems in vertical and horizontal integration in South Africa for example, IWRM has been implemented following a top down approach where water is considered a national resource vested in the state and catchment agencies have been created through various laws to promote community participation in water management, issuance of licences and preparation of catchment management plans (Agyenim and Gupta, 2012).

Van der Zaag (2005) also notes that upstream-downstream interaction of water users results in asymmetrical relationship as the actions of upstream users' impacts on the downstream users but the reverse is not true. There are many conflicts that arise due to this interaction making upstream downstream interaction an important aspect in IWRM (Van der Zaag, 2005). Upstream users need to take into consideration the needs of downstream users to enable for sharing of the available water resources and sustain usability in the river system. This implies that that the responsibility to create participatory mechanisms and capacity at national, basin, catchment or community level to facilitate IWRM lies with the government (Agarwal, delos Angeles, et al., 2000).

Implementation of IWRM therefore requires real stakeholder participation and transparent decision making processes and apart from the notion that IWRM involves relationships among and between water users and government presupposed good governance, it is also acknowledged that water use decisions are very political in nature as equitable water resources sharing has not yet been achieved, indicating that IWRM is relevant yet elusive and fuzzy concept (Van der Zaag, 2005). Despite this, many countries around the world have embraced IWRM and are in the process of implementing it through water sector reforms to facilitate creation of the needed institutions to carry out various mandates relating to water resources management and water supply and service provision by involving stakeholders in water management. These reforms are happening at varying speeds and scales in different countries. Some countries with institutionally advanced water sectors are going for high level institutional changes while in other countries there is a gradual move from centralized forms to more user centric inclusive forms of governance (Menard and Saleth, 2012).

Ideally the move from state centric to user centric mode of governance in the water sector should result in more effective water management through separation of functions, clear roles and responsibilities for water sector institutions to facilitate integration of water management. Nevertheless, some scholars argue that implementation of IWRM has not been without prejudice. An example of Zimbabwe is given where institutions involved in water resources management are multiple, disparate and discordant, compounding the already existing problems in the water sector in the country (Chereni, 2007).

2.2.2 Integrated River Basin Management

Integrated River Basin Management (IRBM) is a sub set of IWRM and it is the mode in which IWRM is undertaken at the river basin level. IRBM can therefore be defined as an integrated and coordinated participatory approach to the planning and management of natural resources of a river basin considering multiple social and environmental interconnections at catchment level (Hooper, 2005). It involves the governance of river basins and it brings together different stakeholders including government entities, private organizations, Non-

Governmental organizations (NGOs), community groups and individuals who have a particular concern, interests or stake (bargaining position) in a river basin through a participatory process to collaboratively manage resource use (Hooper, 2005).

There is theoretical discussion on identifying the optimum scalar level of implementation in relation to scale and water management because of sensitivity of water management to issues of scale as a result of the hydrological system varying from small catchment to large river basins (Moss and Newig, 2010). In addition, levels of government and administrative boundaries do not fit environmental relevant scales and this results in inefficiencies, spatial externalities and spill overs (Moss and Newig, 2010).

Governance theorists posit that multi- level governance enables for better decision making since it takes into consideration all the knowledge base available at all levels of implementation (Nielsen, Frederiksen, et al., 2013) but other scholars argue that introduction of hydrological principle is a barrier to effective vertical coordination due to the complexity of institutional structures that arise from multi-level governance (Pahl-Wostl, 2009).

The European Union Water Framework Directive (WFD) promotes a change of European water governance towards increased stakeholder participation and water management according to river basins designating river basin districts as the main units for river basin management (Franzen, Hammer, et al., 2015, Nielsen, Frederiksen, et al., 2013). A river basin synonymous with catchment or watershed is defined as the area of land and sea comprising of one or more river basins with their associated ground and coastal waters, which implies that ecosystem boundaries of the river basins make up the decision making unit for water management (Nielsen, Frederiksen, et al., 2013).

In the global north, some countries undertake river basin or catchment management within the existing political and administrative boundaries but this is done under the leadership of one national agency that has been appointed as the competent authority for all river basin districts (Nielsen, Frederiksen, et al., 2013). Such a national agency should have the mandate of coordinating all other catchment level organizations so that duplication of efforts and conflicting roles and responsibilities are addressed. Additionally, the coordinating agency should have the capacity for conflict resolution providing the necessary leadership and guidance required to foster collaboration between state departments, private organizations as well as Non-Governmental Organizations (NGOs) and the community at the river basin level. The approach for water resources management to be handled at catchment or basin level and establishment of institutional framework for the same has also been followed in many African countries and South Africa has emerged as a leading example in reforms in the water sector (Sokile, Kashaigili, et al., 2003).

2.2.3 Institutional Arrangements

Institutional arrangements have been defined as sets of working rules that are used to determine who is eligible to make decisions in some arena, and what actions are allowed or constrained, describing what procedures must be followed, the kind of information to be provided or not provided and what payoffs will be assigned to affected individuals (Jaspers, 2003, Ostrom, 1990). Institutional arrangements in this context refer to rules and roles. In order to bring integrated river basin management into effect, institutional arrangements are needed to enable for stakeholder participation, water resources management on hydrological boundaries, an organisational setup in river basin and sub basin authorities with their respective by-laws to incorporate decision making at the lowest appropriate level, planning system oriented at production of integrated river basin plans and introduction of a system of

water pricing and cost recovery (Jaspers, 2003). Stakeholders need to be structured through effective organizational and procedural arrangements so that each stakeholder group is aware of its own and others rights and responsibilities (Bandaragoda, 2000).

Institutional arrangements for developing and managing water resources are the ones that connect policy objectives and field level performance since policy ideally ask what should be done and institutional analysis asks who is to do what, where, and by what means (Hamdy, Abu-Zeid, et al., 1998). Scholars have observed that often difficulty experienced in dealing with vertical and horizontal interplay between newly established institutions at basin scale and those organized at traditional administrative boundaries prove to be a barrier in implementing integrated management approaches and may lead to overlapping in mandates (Pahl-Wostl, 2009, Borowski, Le Bourhis, et al., 2008). According to Nielsen et al (2013), much has been written on institutional interplay but there is limited literature on causal theories regarding the effectiveness of institutions. Institutional interplay has been referred to by some scholars as the interdependence among diverse institutional arrangements suggesting that the effectiveness of specific institutions is affected by other potentially intersecting institutions as they interact through functional linkages that may bring about synergies or conflicts (Nielsen, Frederiksen, et al., 2013, Stokke, 2001). This has been echoed by scholars who posit that there is no particular arrangement that would be effective in all contexts, since the success of a given arrangement, its implementation and its monitoring depends on its relationship with other institutional arrangements within its framework (Menard and Saleth, 2012).

Scholarship suggests three modes of governance namely; traditional or bureaucratic hierarchies, markets and networks, which vary according to the degree of formality of institutions and the role of government versus non-governmental actors. In bureaucratic hierarchies regulatory processes are majorly grounded on formal institutions with government having the central role while the markets are based on a combination of formal and informal institutions and non-state actors dominate. Networks are largely governed by informal institutions and both state and non-state actors may participate (Pahl-Wostl, 2009).

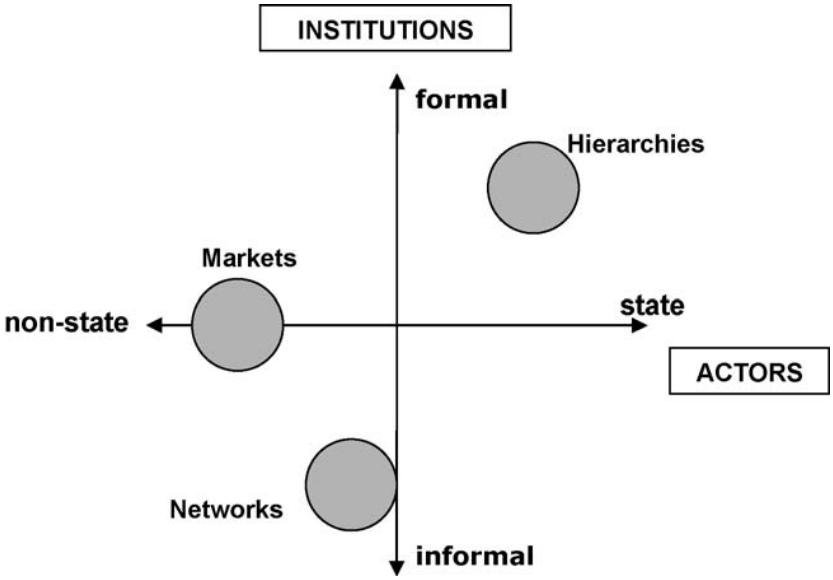

Figure 3: Different modes of governance and their degree of formality and informality

Source: (Pahl-Wostl, 2009)

The fact that there is a water crisis has been acknowledged by various scholars but it is pointed out that the crisis is as a result of poor management practices, where water resources have been threated due to poor institutions and governance practices (Mollinga, 2008, Cosgrove and Rijsberman, 2000). Many problems in the water sector are not primarily associated with the resource base but are a result of governance failures such that in most developing countries for instance, where due to corruption, lack of civil society and lack of efficiency, existing governance structures pose problems for any kind of development not only for resource governance (Pahl-Wostl, 2009).

Water resources are part of ecological or environmental resources vital for sustaining life, but have been threatened by human activity. Ecosystem degradation is among the most challenging environmental issues currently and there are discussions among scholars worldwide regarding the most effective mode of governance with many scholars placing emphasis on typical market actors, state actors, civil societies such as Non-Governmental Organizations and local communities as being the most effective way of governing environmental resources, although efficiency in this mode of governance is very much interdependent on other realms of social interactions (Lemos and Agrawal, 2006).

Effectiveness therefore relies on participation of both high levels of state actors and high levels of community participation through self-organization of user groups towards governance of local resources. Proponents of decentralization have posited that it can result in better decision making since decisions are made by those who affect or are most affected by the resource and that it promotes citizen participation and accountability. It is further noted that decentralization for environmental governance at the local level has focussed on incentives to encourage local communities to participate in new institutional arrangements and has been vested in community based user groups where new lines of institutionalized authority have been formed (Lemos and Agrawal, 2006, Lemos and De Oliveira, 2004).

There are institutional gaps in the water sector in many developing countries since water management is still centrally handled despite water sector reforms and the presence of water sector institutions. This is mostly attributed to the fact that these water sector institutions are often loosely connected; experience duplication of roles, lack coordination and some informal institutions are ignored from the water agenda (Sokile, Kashaigili, et al., 2003). Most of these informal institutions are those based at the local level and may consist of local farmer groups, women groups and youth groups that have a stake in the water resources but have ‘no voice’ and are therefore ignored in matters water management. In other cases some institutions that have legitimacy are also often ignored from the water agenda as is the case of some local governments.

In a study carried out to evaluate the extent to which existing institutional arrangements for land use planning and water management enhance or constrain the capacity of local governments in Oldman River basin to protect source waters, it was observed that institutional arrangements reinforce power differentials between senior and local level of governments thus constraining the capacity of local government to meaningfully participate in locally devised source water protection planning, and results further indicated that institutional arrangements tailored for protection of water sources at the local level are lacking in many jurisdictions across the world (Ivey, de Loe, et al., 2006).

Successful implementation of decentralized water resources management is expected to depend on features of the basin arrangements created by stakeholders and the government which may include the presence of river basin level governance institutions that enable stakeholders to articulate their interests, share information, communicate and bargain, and

take collective decisions in water resources management (Dinar, Kemper, et al., 2007, Lemos and De Oliveira, 2004).

Jaspers (2003) notes that institutional arrangements for river basins vary according to scale; for large river basins such as the Nile or Amazon, institutional arrangements are complex than for small river basins with various levels of subdivisions needed to either subdivide or support the management functions of the entire river basin or to enable operational management but the scale of subdivision depends on the physical characteristics, type of land use among others.

Institutional set up varies from country to country with examples from Tanzania where 9 river basins have been identified which will be subdivided into various sub basins, in South Africa 12 river basins have been identified, in France 5 river basins, in Turkey 7 river basins and in the Netherlands water management is carried out by 60 water boards administering small sub basins (Jaspers, 2003).

In Brazil, implementation of the National Policy for Water Resources following the new water resources law resulted in specific institutional arrangements to incorporate public participation through creation of river basin committees which facilitated water management decision making for bulk water use permit and charge system to move from the federal state down to the river basin level (Lemos and De Oliveira, 2004).

In Sweden, four important factors regarding institutional arrangements for water councils and local stakeholder participation in water management were identified which included firstly, an organization involving key stakeholders committed to the scope and goals of the water council and willing to provide resources for the implementation of the planned activities and secondly, institutional arrangements that include a willingness for flexibility and awareness of the need to include the most relevant stakeholders. Others were a clear leadership to drive the process to realize the specific goals and assess the outcome and finally a voluntary involvement of farmers to take part in the implementation of the measures and contribute with knowledge and experiences regarding the local conditions (Franzen, Hammer, et al., 2015).

2.2.4 Institutional Arrangements for IWRM in Kenya

In Kenya, the institutional set up for IWRM is based on the Water act 2002 in which the water sector reforms revolve around four themes namely; separation of management of water resources from water service provision, separation of policy making from daily administration and regulation, decentralization of functions to lower level state organs and stakeholder involvement in management of water resources and provision of water services (Mumma, 2007).

The Water Act 2002 established the following institutions for management of water resources and water service provision: the Minister, the Director of Water, the Water Resources Management Authority (WRMA), the Water Services Regulatory Board (WSRB), Water Service Boards (WSBs), Water Service Providers (WSPs), Catchment Area Advisory Committees (CAACs), Water Resources Users Associations (WRUAs), the Water Services Trust Fund (WSTF), and the Water Appeal Board (WAB) (Akech, 2009).

The broader framework for water sector institutions established under the Water Act 2002 is as depicted in the figure below:

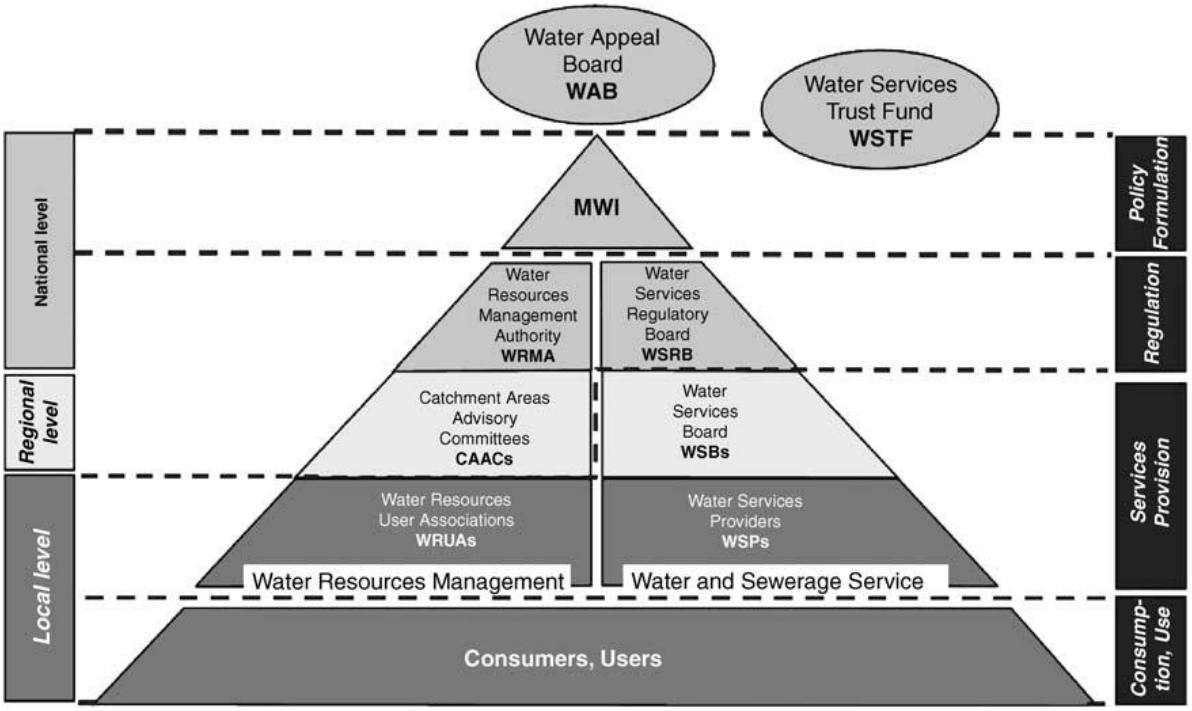

Figure 4: Water Sector Institutions established under Water Act 2002

Source: (K'akumu, 2008) *adopted from Ministry of Water and Irrigation, Republic of Kenya 2007*

According to the Water Act 2002, the Ministry of Water and Irrigation (MWI) at the national level is responsible for policy formulation, while WRMA is the lead agency in management of all water resources in the country. WRMA has the role of regulating, monitoring, assessing, allocating water resources and catchment protection and conservation through stakeholder involvement. As such, the institutional set up for river basin management is based on the country's five hydrological drainage basins where WRMA uses a catchment approach by forming WRUAs at the river basin level whose role is to promote controlled and legal use of water, conflict resolution and catchment protection and conservation. The Catchment Area Advisory Committees (CAACs) as the name suggests provide advice to WRMA regarding water allocation and permits as well as catchment management issues and operate at catchment level, while WRUAs operate at sub catchment or river basin level.

The WSTF is a financing institution in the water sector at national level and provides funding to the WRUAs to engage in catchment management activities. As a result, the WSTF in collaboration with WRMA set up a financing window referred to as WDC through which the WRUAs access funds (WSTF, 2015).

Role of WRUAs

A WRUA is an association of water users, riparian land owners, or other stakeholders who have formally and voluntarily associated for the purposes of co-operatively sharing, managing and conserving a common water resource.

The Water Resources Management Rules 2007 describe various roles for which a WRUA is established. These include ppromotion of controlled and legal water use; Promotion of good management practices which make efficient and sustainable use of the water resources; Safeguarding the reserve flows for downstream ecological demands and basic human requirements; Reducing and solving water use conflicts, and promotion of catchment conservation measures to improve water quantity and quality.

The rules further stipulate that a WRUA must be a legally registered entity before it can be recognized by WRMA and listed in an official WRMA Register. Further, the rules indicate that a WRUA may enter into Memorandum of Understanding (MoU) with WRMA to further elaborate roles, responsibilities and working arrangements for collaborative management of the water resource at river basin. According to the rules, failure to honour the MOU may lead to a WRUA's de-registration with WRMA, and despite the WRUA's registration by the Register of Societies, the WRUA would no longer be supported by WRMA.

2.2.5 Characteristics of Institutional arrangements

Characteristics of institutions refer to the formal and informal processes; rules (legal framework) and the norms and beliefs (Gupta, Termeer, et al., 2010) of institutions that govern the manner in which institutions operate and interact with each other. Pahl-Wostl (2009) describes formal processes as those that have links to official government bureaucracies, regulatory frameworks or legally binding contractual agreements that are codified while Informal processes refer to socially shared rules or cultural norms that do not necessarily have to be codified or written down and are usually enforced outside the legal sphere. Scholars note that the influence of institutions on actors' roles and performances is a fundamental issue in literature on institutions and natural resource management, where discourse on interactions of river basin institutions is done based on administrative and ecological units (Borowski, Le Bourhis, et al., 2008).

With regard to institutional arrangements at river basin level, some scholars posit that characteristics of institutional arrangements include; first, clearly defining institutional boundaries well matched to the basin boundaries to facilitate effective decision making. Second, recognising the communities of interest at the sub basin level to enable for inclusivity and representation of all stakeholders, and third, availability of a stakeholder forum for information sharing and conflict resolution (Billi, Quarto, et al., 2007).

There are dimensions that can be used as a base for examining characteristics of environmental governance regimes as proposed in literature which can be adopted for examining institutional arrangements in water resource management. The four dimensions as proposed by Pahl-Wostl (2009) are:

- Institutions and the relationships and relative importance of formal and informal institutions
- Actor networks with emphasis on the role and interactions of state and non- state actors
- Multi-level interactions across administrative boundaries and vertical integration
- Governance modes such as bureaucratic hierarchies, markets and networks (Pahl-Wostl, 2009)

Other scholars such as Mernard and Saleth (2012) suggest that water governance encompasses a wide array of elements used in general governance frameworks and these elements include constitution of a given country, laws and statutes, political arrangements, availability of resources including financial, infrastructure, technology and human capital among others. The performance of water sector institutions is dependent on the interactions of these elements. On the one hand this implies that the interaction process is influenced by factors that are both exogenous and endogenous to the water sector and its institutional arrangements. On the other hand; it implies that these interactions also influence how these institutions interact with each other and with other institutions outside the water sector. Some scholars have noted that community groups in water management require an enabling legal environment, a friendly support policy and law enforcement authorities, in order for them to become established (Bandaragoda, 2000).

The effectiveness of governance (institutional) arrangements can be examined from both qualitative and quantitative perspectives. Indicators of effective governance as proposed by Rogers and Hall (2003) include transparency, accountability, participatory, communicative, integrative, efficiency, incentive compatibility, sustainability and equity. Mernard and Saleth (2012) note that some of these (efficiency and equity) can be addressed quantitatively but the rest are addressed qualitatively. However, the effectiveness of particular elements of governance such as legal, policy and organizational aspects can be addressed using economic and technical variables that include those based on pricing, cost recovery, user efficiency, conflict reduction, supply adequacy and coverage and the reduction of unaccounted for water (Menard and Saleth, 2012).

In order to examine the link between institutions and performance, Bandaragoda (2000) proposes a nested framework depicted below, which covers the three important elements in the institutional framework namely policies, laws and organizations and is similar to that adopted by Salineth and Dinar (1999).

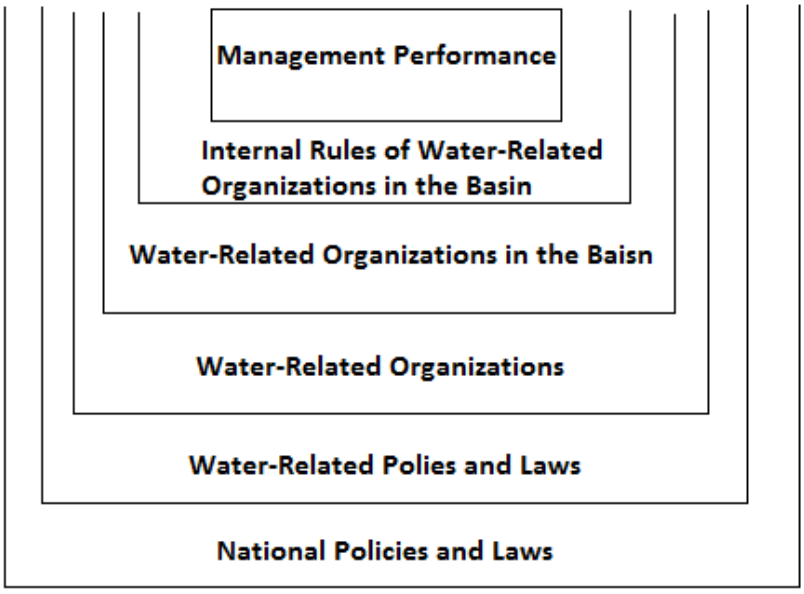

Figure 5: Nested Institutions and management performance

Source: (Bandaragoda, 2000)

Scholarship suggests that a nested system is polycentric and connotes the principle of co-management because it is made up of multiple decision making centres that retain considerable autonomy from one another making coordination of decisions and actions across the system reliant on nature of interaction and collaboration between multiple actors (Marshall, 2007). Other scholars also share this view as they observe that local management actions are nested within broader organizational setup, policy levels and wider socio-cultural, political, economic and ecological contexts (Patterson, Smith, et al., 2013, Ostrom, 2011). This perspective of nested system mirrors the perspective for which this study will examine the institutional arrangements for river basin management.

2.2.6 River Basin Organizations (RBOs)

Conceptualization of river basin as resources unit of management is not new as rivers and their source basins have been the site of human occupation and a focus of management for

many years since the earliest riverine civilizations of the Nile, Yangtze, Indus, Tigris and Euphrates but the idea of river basin emerged as a locus of research and natural resource management practice much later, following the rise of regional geography and its sense of place in the early 20th century (Hooper, 2005). Since then and following advancement in integrated paradigm for water resources management, governance of river basins is changing and has seen the establishment of specialized organizations referred to as River Basin Organizations (RBOs) which can be authorities, trusts, commissions, committees or others that are set up by political authorities or in response to stakeholder demands, to deal with water resources management issues at river basin or catchment level (Hooper, 2005).

Water Resources Users Associations (WRUAs), Water Users Associations (WUAs), water councils and other water committees established at the river basin level also fall under this category of RBOs. RBOs can be seen as the solution to the commons dilemma since the problems in a river basin are everyone's but no ones, therefore RBOs through their various functions of water allocation, resource management and planning, education of basin communities and conflict resolution among others can be used to address this commons dilemma (Hooper, 2005). However, it is essential for these RBOs to have clear mandates and functions, be financially viable and operate in accordance with the principles of good governance considering both upward and downward accountability (Gupta, Pahl-Wostl, et al., 2013) if these RBOs are to effectively carry out tasks for which they were established to do.

2.2.7 Water Resource Users Associations (WRUAs)

The notion that one of the major components of recent water reforms at the basin or catchment level has been the regionalization of river basin management to the lowest appropriate level, as widely advocated in the Dublin principles has garnered much support from scholars. This is because these lowest appropriate levels usually imply the involvement of stakeholders in the basin, including water users (Dinar, Kemper, et al., 2007). The competing needs of water users and the interactions between upstream users and downstream users also emphasizes the need for adoption of this approach, so as to establish useful linkages and put in place mechanisms that can facilitate dialogue and conflict resolution amongst different water users within the river basin. The need for water management on hydrological boundaries has also been triggered by the growing competition for water or by the need to cooperate in an upstream-downstream relation for flood control or both (Jaspers, 2003).

Bandaragoda (2000) further elaborates on possible conflicts that may arise within a river basin by noting that conflicts can be related to water allocation and management between different water users and among different geographical units within the basin or conflicts can also arise in decision making due to differences in boundaries. Adjacent WRUAs may therefore experience conflicts due to shared resources.

Sokile et al (2013) notes that Water Users Associations (WUAs) are cooperative associations of individual water users who wish to undertake water related activities for their mutual benefits. Literature on (WUAs) in Mexico indicates that they began forming following macro-economic crisis of the 1980s, where reforms in irrigation sector witnessed massive transfer of public irrigation systems to user groups who formed the WUAs in irrigation projects compared to South Africa where the WUAs established in the sugarcane zone and public irrigation projects, and have been proposed for establishment elsewhere in the country with the role of water distribution, cost recovery and system maintenance (Saleth and Dinar, 2000).

Most countries all over the world have a legal framework that establishes and enables WUAs to operate. Some laws have specific provisions on WUAs enshrined in law or have a separate WUA law and this shows that there is a particular interest on and commitment to WUAs (Salman, 1997). Salman (1997) further notes that due to lack of specific laws on WUAs, countries such as India have relied on other laws such as Cooperatives Societies Act and Societies Registration Act, which may have little or no consideration for WUAs and may not be able to deal with complex issues of WUA.

Some authors associate the introduction of WUAs in many countries with international organizations. Many countries in Africa and Asia have undertaken water sector reforms because of pressure from international donors to adopt water management frameworks that encourage stakeholder participation, promote gender balance and multi-sectorial collaboration and as a result established WUAs, WRUAs, water councils and other water committees at the sub catchment level to manage water resources at the river basin level.

In countries such as Turkey, Azerbaijan and Uzbeskistan, this argument holds as introduction of WUAs has been driven by the World Bank, United Nations Development Programme (UNDP) and the United Nations Economic Commission for Europe (UNECE) (Mukhtarov, Fox, et al., 2014).

In China it also follows that WUAs were introduced by the World Bank through pilot water management programmes (Wang, Huang, et al., 2010), while in Kenya WUAs began forming in the late 1990s following increasing awareness campaigns on IWRM globally, and were supported by the Laikipia Research Programme under the Ministry of Water and Development (Kiteme and Gikonyo, 2002). Later on, enactment of the Water Act 2002 formally established among other institutions, Water Resources Users Associations (WRUAs) as fora for conflict resolution and cooperative management of water resources in catchment areas (K'akumu, 2008).

Literature indicates that both WRUAs and WUAs are established to participate in monitoring, water allocation, conflict resolution and catchment management function and does not provide any distinction between the terms WRUA and WUA. For the purpose of this study therefore, these two terms will be used interchangeably to mean one and the same thing.

According to Sokile et al (2003), water management involves development of stakeholder's participation and transfer of state competence to water user associations through availability of a complete and complex institutional framework (Sokile, Kashaigili, et al., 2003). However, despite the presence of 'complex' institutions to facilitate capacity building of WUAs to effectively undertake water management at river basin level, many developing countries are still grappling with the concept. The water sector in most developing countries is coupled with multiple problems such as duplication of roles and responsibilities in various institutions, which affects the ability of these institutions to carry out their mandates effectively.

Despite WUAs having received wide scholarly opinion that they are the long awaited solution to inter-sectorial water management, it is argued that they are not panacea to water management considering concerns to do with the ability of these WUAs to incorporate gender issues, opinions of other water users, the extent to which they serve as pro poor and their ability to solve water use conflicts among other issues (Sokile, Kashaigili, et al., 2003, Sokile and Van Koppen, 2004). As more WUAs are encouraged to form, efforts to learn from and promote local institutions is lacking, and formal institutions are rigid and not willing to incorporate opinions from the grassroots (Sokile, Kashaigili, et al., 2003).

On the contrary, water associations in Sweden have generally been collaborations between municipalities, industries and other concerned organizations but have not gained status as legitimate planning actors making their role in decision making somewhat unclear (Franzen, Hammer, et al., 2015). However, to ensure stakeholder participation in water management in accordance to WFD, Swedish water authorities in the South Baltic River Basin District for example, have established water councils at the local catchment level as a means to create trans-sectorial and trans-disciplinary platform for integrated water management to facilitate a common understanding and identification of water problems and solutions (Franzen, Hammer, et al., 2015).

2.2.8 Implementation Capacity

According to the Webster online dictionary, implementation has been defined as *'the act of accomplishing some aim or executing some order, providing a practical means for accomplishing something'*. Accordingly, implementation has been viewed as having a double meaning; '*to give practical effect to'* and *'to fulfil'* on the other hand thereby implying two things of objective and outcome and consequently satisfying the casual function and the accomplishment function (Lane, 1993). Other definitions of implementation as given by Durlak and Dupre (2008) refer to implementation as what a program entails when it is delivered in a particular setting. Less recent definitions of implementation from political science scholars Williams (1971) and Van Meter and Van Horn (1975) is that implementation refers to whether an organization is able to gather resources needed in such a way as to carry out the organizations objectives and as such looks at the factors that enhance or constraint achievement of policy objectives.

The concept of implementation capacity has been referred to by Butler (2003) as the mechanisms used by those leading change to shape and influence policy implementation and the behaviour of other stakeholders in the organizational network. Butler (2003) equates implementation capacity to Greenwood and Hinings' (1996) notion of capacity for action, where both notions embrace the availability of skills and resources within an organization and their mobilization by multiple actors. Implementation capacity is perceived to explain the location of decision making in greater detail by going beyond structural relationships to explore critical incidents. Specifically, the concept explores the mechanisms used by leaders to dictate strategy or policy implementation in a manner that affects the behaviour of other stakeholders in the organizational network (Butler, 2003). It follows then that communities should display some level of competence to enable them participate in planning processes, develop workable work plans, ensure effective and efficient use of public funds and bring benefits to the entire community and when people do not have the needed skills they are not able to participate effectively in IWRM initiatives (Chifamba, 2013).

There are several views on capacity as described in literature. According to Honadle (1981), capacity viewed from a public administration perspective relates to qualities of administration such as politics, informal processes and participation. Capacity is defined by the ability to:

- Anticipate and influence change
- Make informed decisions about policy
- Develop programs to implement policy
- Attract and absorb resources
- Manage resources and evaluate current activity to guide future action (Honadle, 1981).

Some aspects of this perspective on capacity such as ability to attract, manage and use resources as well as anticipate and influence change very are useful even for communities and can be applied in assessing capacity of community organizations such as WRUAs. Ivey, Smithers et al (2004) notes that evaluative frameworks for capacity assessment exist within literature in the fields of public administration and resource management where indicator questions are used to ascertain financial, managerial and technical capacity of local organizations. Johnstone et al 2000 suggests that capacity assessment can address the multiple actors involved in local water management and planning by considering the capacity of a watershed community.

Community development and public health scholarship discusses capacity as being synonymous with empowerment and defines capacity building as being an increase in the ability of a community to define, assess, analyse and act on matters affecting them, based on the resource opportunities or constraints (ecological, political and environmental) and the conditions in which people or groups live (Labonte and Laverack, 2001, Gibbon, Labonte, et al., 2002). In this regard, community capacity has been perceived as comprising the following parameters:

Participation
Leadership
Organizational structures
Problem assessment
Resource mobilization
Asking why
Links with others
Role of outside agents
Programme management

Table 1: Nine Domains of Community Capacity

Source: Laverack (1999)

Some of the parameters listed in the table above are useful in defining what makes up implementation capacity in this study. Participation as adopted from the work by Laverack (1999) is considered basic and central to community capacity and is closely connected or interdependent with leadership as on the one hand participation requires strong leadership and on the other hand leadership requires strong participant base. Discourse on participation by other scholars, emphasize on the need for citizen participation in local affairs in order to enhance commitment, bring about good governance, reduce isolation of some members within the group and facilitate change for improved quality of life (Labonte and Laverack, 2001). Age and gender have been found to determine participation according to a study done by Martinez and Mcmullin (2004) while other scholars note that age and gender increased the possibility of joining community environmental groups but not volunteering for activities within the group (Larson and Lach, 2008). Participation in community organizations through attendance of meetings and involvement in community activities are among the aspects that the study will look into since participation provides the necessary cohesiveness needed to establish useful social networks and foster cooperation among members to bring about change in society.

According to Labonte and Edwards (1995), organizational structures refer to the infrastructure that runs the interactions of good public participation. They have further been

described as including decision making and conflict resolution mechanisms and processes based on levels of hierarchy within the community group (Labonte and Laverack, 2001). The ability to mobilize resources from both internal and external sources is enhanced or supressed by the type of organizational structure in place, and this has an effect on self-reliance and sustainability of the group. Further, the type of linkages a community group has with external organizations determines a great deal the support mechanisms available to them, and presence of outside agents is an important link between the community and external resources (Labonte and Laverack, 2001).

In water management scholarship there is argument that much capacity related research in the water sector came about following the United Nations Development Symposium that was held in Delft, The Netherlands in 1991, where three components of capacity building were identified which include an enabling set of institutional arrangements, community participation and development of human resources and organizations (Ivey, Smithers, et al., 2004, Hamdy, Abu-Zeid, et al., 1998). This approach to conceptualizing capacity acknowledges the importance of interrelated characteristics of the larger social, political, economic and institutional environment, community related factors and the nature and resources of particular organizations (Ivey, Smithers, et al., 2004).

In line with this, there is recognition of the increasing awareness among water professionals and academia on the capacity of people, communities and institutions to effectively manage water resources not only at present but also for future generations. They further posit that, the capacity of communities in water management is generally determined by the interactions with upper tier political and institutional arrangements, specifically regarding the characteristics of institutions and the relationship among water sector agencies, groups and individuals involved in water management; and the availability of financial, human, information and technical resources (Ivey, Smithers, et al., 2004). A perception regarding existence of a connection between leadership in a WUA and the higher tiers of politics in order to ensure continuous flow of funds for community based activities was noted among WUA members in the findings of a study done to establish efficacy of community based water management in Uchira WUA in Tanzania (Cleaver and Toner, 2006).

There is growing recognition for functional distinction between decentralization to enable for stakeholder participation in local water management and centralized mechanisms essential for coordination and enforcement (Saleth and Dinar, 2000). In other academic discourse, institutional networking has been identified as an important factor that enhances the implementation capacity of local communities engaged in ecosystem management and management of natural resources, because institutional networking encourages close collaboration and information sharing among local community groups, municipalities as well as state departments in central government involved in natural resource and ecosystem management. Xu et al (2005) refers to this as polycentric management networks since some of the institutions involved are nested across scales (Fabricius, Folke, et al., 2007).

A study carried out to examine the conditions necessary for effective user organization in management of water systems in irrigation and water supply and sanitation sector in Philippines, Mexico and Pakistan identified several exogenous and endogenous factors that affect the implementation capacity in management of water systems. The exogenous factors include: a supportive policy and legal environment, strong incentive for farmers, well defined roles, rights and responsibilities, clear property rights, appropriate technology and benefits from participation. The endogenous factors identified relate to the internal conditions of the WUA in terms of their membership as this determines the rights and responsibilities of members within the WUA, leadership roles, gender issues, size of the organization as well as

their technical capacity (Subramanian, Jagannathan, et al., 1997). Leadership that has a vision to drive an organization forward is important for local community groups, and Fabricuss et al (2007) notes that leadership is essential to bring members of an organization together and the ability to manage or solve conflicts among members is essential.

In another study done to establish efficacy and performance of WUAs in irrigation sector in India, six parameters were used which included transparency, conflict resolution, equity, relationship, participation and efficacy. Performance and implementation capacity can be used interchangeably since both terms make reference to the results of an organization as measured against intended outputs, goals and objectives. The parameters listed above were defined as follows: Transparency was examined with regard to the manner in which record are kept and overall operations of the WUA. Conflict resolution was looked at in terms of resolving disputes that arise among WUA members within the WUA. Equity was examined with regard to the relationships among the WUA and other stakeholders such as the state department of irrigation, NGOs working in the area and the farmers within the WUA in relation to water distribution. Participation was looked at in terms of members' attendance in WUA meetings, and efficiency related to the overall operation and maintenance of the irrigation systems (Bassi, Rishi, et al., 2010).

Despite these parameters having been applied in the irrigation sector, the same can be applied to WRUAs in an urban environment where issues to do with water allocation and equity may vary due to differences in volumetric discharge of water but nonetheless, parameters such as conflict resolution and participation can still be applied in examining efficacy of WRUAs in terms of their ability to undertake actual implementation of ecological conservation activities in river basins.

2.2.9 Summary of Key Concepts

2.2.9.1 Institutional Arrangements

Based on the discussions in the literature review, Institutional Arrangements can be summarized as governance structures and organizations. They are a set of working rules and roles that determine who is eligible to make decisions in a certain arena, in the case of this study; river basin management. Rules are the existing regulations, laws and policies that govern water resources management, while roles refer to the roles and responsibilities of organizations related to management of water resources at river basin level.

Institutional arrangements are needed to enable for stakeholder participation, water resources management on hydrological boundaries, an organisational setup in river basin and sub basin authorities with their respective by-laws to incorporate decision making at the lowest appropriate level.

2.2.9.2 Implementation Capacity

Butler (2003) refers to implementation capacity as availability of resources and skills within an organization. These resources can be technical in terms of skills, capacity building, financial which has to do with availability of funds and mobilization of resources or information resources in terms of access and distribution. Chifamba (2013) notes that some level of competence is needed to enable communities to effectively participate in IWRM initiatives. These variables have been selected because literature considers them a significant part of implementation in terms of whether or not an organization is able to gather resources needed in such a way as to carry out the organizations objectives.

Reviewed literature has also discussed implementation capacity from various disciplines and what is common among various scholars is that implementation capacity is made up of many variables. Accordingly and for the purpose of this study therefore, the concept Implementation Capacity can be described as comprising of several internal variables that are affected by exogenous factors such as laws and policies. These internal variables that describe implementation capacity include the following: organization structure that defines membership categories, leadership and size, an important element that runs the interactions of good public participation considering issues of age and gender. Participation is considered basic and central to community capacity and is interdependent with leadership as on the one hand participation requires strong leadership and on the other hand leadership requires strong participant base. Leadership is important because it can bring members of an organization together and drive the organization forward. The last element of implementation capacity is conflict resolution that shows how disputes relating to equitable access to water and sub basin boundary issues are resolved.

Following this implementation capacity for the purpose of this study is conceptualized as comprising of six key variables namely; organizational structures, participation, conflict resolution, technical capacity, financial resources and information sharing.

2.3 Conceptual Framework

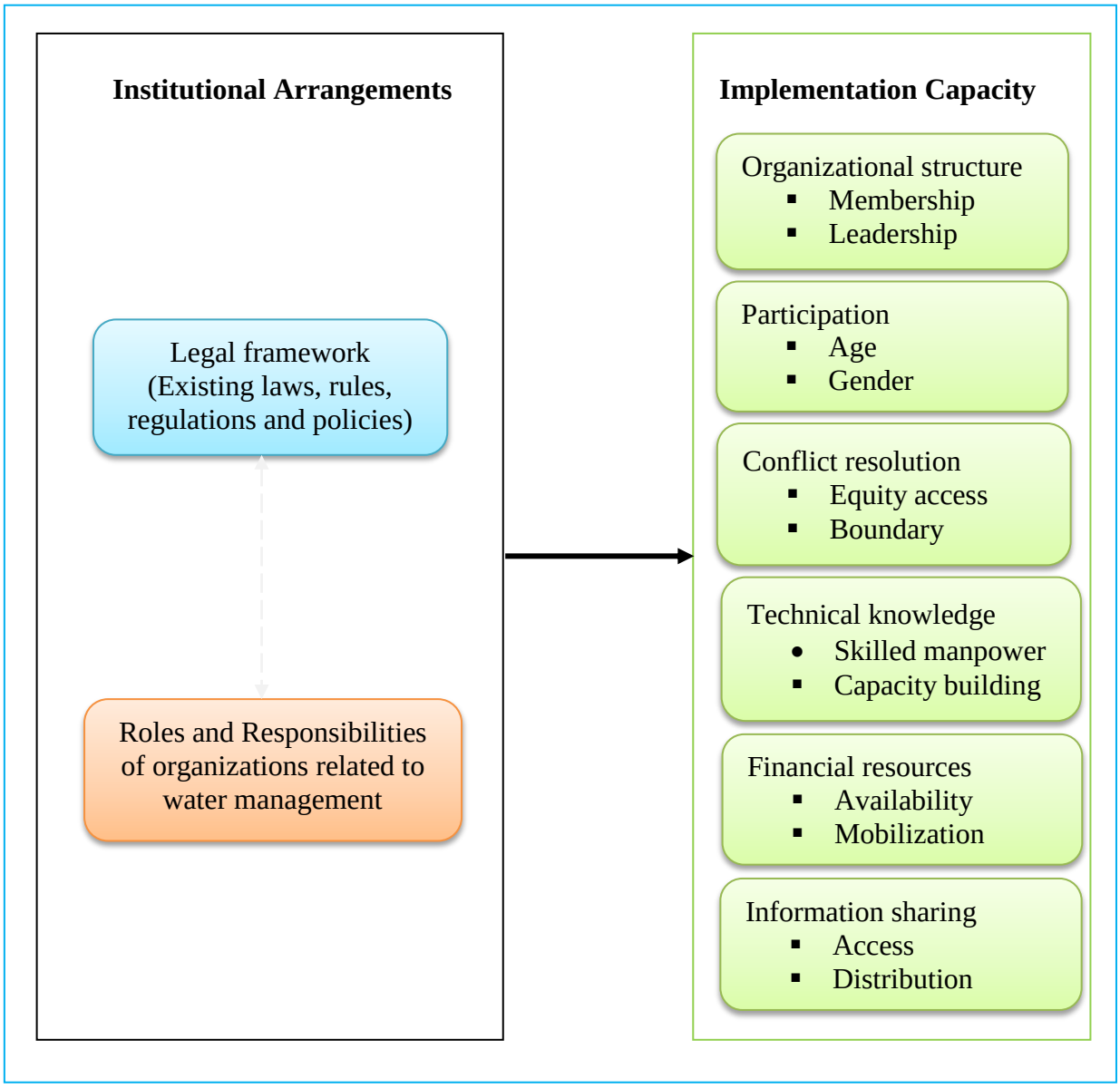

Figure 6: Conceptual Framework

Source: Author (2015)

The review finds Bandaragoda (2000) Nested institutions framework to be applicable in examining institutional arrangements for river basin management in this study as it covers the three important elements in institutional framework namely policies, laws and organizations. Laws, rules, regulations and policies are collectively grouped as legal framework in the diagram above.

From the literature review, scholars have noted that community groups in water management require an enabling legal environment, a friendly support policy and law enforcement authorities to enable them to grow and become established, and it is for this reason that the researcher has selected two variables namely; legal framework to represent laws and policies, and roles and responsibilities of organizations related to water management under the concept Institutional Arrangements.

Norms and beliefs discussed as part of Institutional arrangements in literature was not selected as a variable in the conceptual framework because of inadequacy in measurement approaches in reviewed literature, and also due to the possibility that aspects of norms and beliefs may manifest and be measured through some of the other formal variables selected.

With regard to implementation capacity, the author has combined various selected elements from literature (as depicted in the diagram above) that have been identified to best suit the description of implementation capacity intended for this study. Salman (1997) notes that for a WRUA to be established as a legal entity, there has to be a law to authorize its establishment, and by laws to describe the manner in which the organization will operate as well as the manner in which conflicts will be resolved among other things.

Consideration for gender and stakeholder participation are discussed in literature as necessary for IWRM and therefore river basin management at the lowest appropriate level. Participation is empowered through provisions in laws and policies as discussed by various scholars, and also evident in the Kenyan case through the Water Aact 2002, which provides a framework for stakeholder participation in water resources management.

The link between laws and participation in the conceptual framework will enable the researcher to examine how these laws or policies ensure stakeholder participation as an aspect of implementation capacity of WRUA. The researcher is of the view that WRUA's organizational structure, participation of members and their conflict resolution mechanisms are a key component of what makes up implementation capacity for WRUA, and this is affected by existing laws and policies hence the relationship depicted in the diagram above.

In the same breadth, the roles and responsibilities of water related organizations determine their priorities based on their mandates and this from the researcher's point of view may affect the ability of these organizations to render technical and financial assistance to WRUAs, in addition to information sharing hence the relationship depicted in the diagram above. The technical and financial capacity as well as information sharing are the other key elements of the concept Implementation Capacity that have been selected for the study.

Chapter 3: Research Design and Methods

3.1 Introduction

This chapter describes the research design and methods that were used in the study.

3.1.1 Revised Research Questions

The main research question for the study is:

How do the current institutional arrangements influence the implementation capacity of Machinjoni WRUA in river basin management?

In order to answer this question and hence provide an explanation on how the current institutional arrangements influence implementation capacity of Machinjoni WRUA in river basin management, the following three sub questions will apply:

1. What are the key characteristics of current institutional arrangements related to river basin management in Machinjoni?
2. What is the level of implementation capacity of Machinjoni WRUA in river basin management?
3. How do legal framework and roles and responsibilities of organizations in water management affect the level of implementation capacity of Machinjoni WRUA in river basin management?

3.1.2 Research Type, Approach and Strategy

3.1.2.1 Research Type

This research is explanatory study as it seeks to explain the relationship between institutional arrangements and their influence on implementation capacity of Water Resource Users Associations (WRUAs) in river basin management, the case of Machinjoni river basin in Kitale town. The explanation of the current institutional arrangements involved a description of the existing institutions in Machinjoni river basin in terms of their roles and responsibilities towards river basin management, a description of the level of implementation capacity of Machinjoni WRUA in river basin management and an explanation on how interactions with institutional arrangements enable or constraint Machinjoni WRUA's capacity to implement catchment management activities in the river basin.

3.1.2.2 Research Strategy

The research strategy selected for this study was qualitative case study because it enables for a phenomenon to be examined within its context using a variety of data sources (Baxter and Jack, 2008). A case study is a detailed investigation on a specific and complex phenomenon set within its real world context. Case study was identified as the most appropriate strategy for this study because of the nature of variables in the study. The independent variable (Institutional arrangements) cannot be isolated from the context within which it is situated and as such to explain the relationship between institutional arrangements and their influence on the dependent variable (implementation capacity), case study was selected as the preferred research strategy. Furthermore, data is investigated within the situation in which it takes place. This proximity to reality and the learning process that occurs during the research process enables for better and in depth understanding (Flyvbjerg, 2006) of the phenomenon under study, an attribute that is unique to case study. The case study strategy is also regarded

most appropriate strategy for this research because there is no possibility or intention to control events or situations.

Yin (2003) notes that there are three conditions that warrant the use of case strategy namely; questions requiring an explanation of 'how' and 'why' as such questions deal with relationships; explanations of existing events when applicable variables cannot be isolated; and the degree of focus on the current event, all of which are applicable in this study. In addition, the unique strength of case study as a research strategy lies in its ability to deal with multiple evidences such as documents, interviews and observations (Yin, 2003) as compared with any of the other strategies such as experiments and surveys.

Further, the study is a single holistic case design as it involved a single unit of analysis namely; Machinjoni river basin in Kitale town. The study sought to explain how existing institutional arrangements in machinjoni river basin influence the implementation capacity of the WRUA in river basin management thereby necessitating further the use of case study strategy.

Challenges of case study

According to Yin (2003), the main challenge with case study is that it provides little basis for scientific generalization which makes it difficult to generalize the findings of the study to other similar situations. However, this was overcome by triangulating the study with other data sources in order to confirm validity of the process.

Case study has also been criticized for allowing bias or researcher's influence during data interpretation (Yin, 2003, Zainal, 2007), however Flyvbjerg (2006) and other scholars have argued that the question of subjectivism and bias towards verification applies to all other methods and not just case study alone. Accordingly, this concern on researcher's bias was revised to indicate that "the case study contains no greater bias toward verification of the researcher's preconceived notions than other methods of inquiry. On the contrary, experience indicates that the case study contains a greater bias toward falsification of preconceived notions than toward verification" (Flyvbjerg, 2006). Nevertheless, the researcher had an open mind throughout the research process and reported evidence gathered fairly in order to limit the bias.

Validity is also a challenge experienced with case study research. Validity is the ability of the selected research instrument to actually measure what it is intended to measure and interpret the findings in the right manner. Reliability of data is another challenge because of the open design and different data collection methods employed and therefore the research process was transparent with step by step documentation on how the research was undertaken, and the use of multiple data sources or triangulation of data to ensure consistency.

Despite associated challenges, case study is still commonly used in social science research, therefore the trends identified in the case study may add to academic discourse on institutional arrangements and WRUAs in river basin management.

3.1.3 Operationalization: Variables and Indicators

3.1.3.1 Operationalization

3.1.3.1.1 Institutional Arrangements

Institutional Arrangements can be summarized as governance structures and organizations. They are a set of working rules and roles that determine who is eligible to make decisions in a certain arena, in the case of this study; river basin management. Rules are the existing laws and policies that govern water resources management, while roles refer to the roles and responsibilities of organizations related to management of water resources at river basin level (Jaspers, 2003, Ostrom, 1990)

Accordingly and for the purpose of this study, Institutional arrangements will refer to the legal framework and the roles and responsibilities of organizations related to water management.

3.1.3.1.2 Implementation Capacity

Butler (2003) refers to implementation capacity as availability of resources and skills within an organization. These resources can be technical in terms of education, capacity building, financial which has to do with availability of funds and mobilization of resources or information resources in terms of access and distribution. These variables have been selected because literature considers them a significant part of implementation in terms of whether or not an organization is able to gather resources needed in such a way as to carry out the organizations objectives.

Implementation Capacity can be described as comprising of several internal variables namely; organization structure that defines membership categories and leadership, an important element that runs the interactions of good public participation considering issues of age and gender. Participation is considered basic and central to community capacity and is interdependent with leadership as on the one hand participation requires strong leadership and on the other hand leadership requires strong participant base. Leadership is important because it can bring members of an organization together and drive the organization forward. The last element of implementation capacity is conflict resolution that shows how disputes relating to equitable access to water and sub basin boundary issues are resolved.

Implementation capacity for the purpose of this study therefore is conceptualized as comprising of six key variables namely; organizational structures, participation, conflict resolution, technical capacity, financial resources and information sharing.

3.1.3.2 Variables and Indicators

Table 2: Operationalization of variables and indicators

Concept	Variables	Sub Variables	Indicators	Description	Data sources	Data collection instruments
Institutional Arrangements	Legal framework	Laws, rules regulations and policies	Existing laws, rules, regulations and policies for river basin management	A description of available laws, rules, regulations and policies for water resource management nested at National, regional and river basin level (basis for river basin management)	Government press, WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA	Secondary (Document analysis)
	Application of legal framework	Specific conditions guiding implementation capacity of WRUAs	Legal provision for conflict resolution and user participation	Whether or not conflict resolution and user participation have been provided for in law and the extent to which it is done or not and existing gaps	WRMA, NEMA,WRUA, Reports, laws, rules and policies	Semi-structured Interviews/ Focus group discussion
			Legal provision for technical and financial capacity	Whether or not technical and financial mechanisms have been provided for in law and the extent to which it is done or not and existing gaps	WRMA, NEMA,WRUA, Reports, laws, rules and policies	Semi-structured Interviews/ Focus group discussion
			Legal provision for organization structure and information sharing	Whether or not organization structure and information sharing have been provided for in law and the extent to which it is done or not and existing gaps	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA, reports, laws, rules and policies	Semi-structured Interviews/ Focus group discussion
		Coordination	Presence of a lead agency with specific mandates to coordinate	Whether or not there exists a single body that coordinates the other stakeholders in river basin management and how this coordination is done	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA, reports, laws, rules and policies	Semi-structured Interviews/ Focus group discussions

	Roles and responsibilities of organizations related to water management	Present actors in water management at river basin level	Presence of actors, their roles and responsibilities, goals, interests, and priorities	List of organizations presently involved in water management, their roles and responsibilities, goals, interests and priorities in relation to river basin management and how such interests and priorities affect implementation capacity of WRUA	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA, reports, laws, rules and policies	Semi-structured Interviews/ Focus group discussions
		Effectiveness	Level of actor understanding and clarity of regulations/ mandates	Find out how well actors understand regulations and their mandates, and whether overlaps in regulations and mandates exist that may lead to duplication of efforts	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA, reports, laws, rules and policies	Semi-structured Interviews/ Focus group discussions
			Level of stakeholder perceptions on effectiveness of the existing laws, rules, regulations and policies	The manner in which decisions are made, the processes involved and to what extent these laws are enforced, rules and regulations adhered to and policies implemented	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture, and Public health and sanitation , WRUA, KEETA, reports, laws, rules and policies	Semi-structured Interviews/ Focus group discussions
		Stakeholder networks	Number of MOUs and Contracts signed between WRUA and other actors and among actors	Presence of partnership agreements between and/or among actors and perceptions on actor willingness and support	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA, reports, laws, rules and policies	Semi-structured Interviews/ Focus group discussions
		Inclusiveness	Frequency of County invitations for all related water actors to participate in decision making processes	WRUA members perception on level of WRUA management participation in decision making processes and stakeholders perception on involvement of WRUA management in decision making process	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA	Semi-structured Interviews/ Focus group discussions
Implementation Capacity	Organizational structure	Leadership	Leaders ability to enforce laws and influence stakeholders	WRUA members and other actors perceptions on WRUA leadership capacity to influence change, solicit	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and	Semi-structured Interviews/ Focus group

				favors from politicians, vision to drive the WRUA forward	Public health and sanitation , WRUA, KEETA	discussions
		Membership	Membership categories	Composition of membership in WRUA	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA	Semi-structured Interviews, Focus group discussions, Document Analysis
			Level of WRUA members and stakeholder participation in meetings and group activities	Frequency of meetings held, turn out of members at meetings, which stakeholders are invited to group activities and meetings and their level of involvement in planning and actual implementation of activities	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA	Semi-structured Interviews/ Focus group discussions
			Objectives and functions of WRUA	Actual WRUA objectives and functions in comparison with those described in water management rules	WRUA	Focus group discussions/ Document analysis
	Participation	Gender	% of men and women in leadership and participating in group activities	Gender representation in WRUA management and project activities	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA	Semi-structured interviews, Focus group discussions, Document analysis
		Age	% of youth attending group meetings and activities	Find out whether mentoring of youth by older generation is there or not, as youth aged 18 – 45 are important in ensuring continuity of the group in future.	WRMA, NEMA County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA	Semi-structured interviews, Focus group discussions, Document analysis
	Conflict resolution	Equity access	Number of legal and illegal abstractors within the river basin	Sharing of water between upstream and downstream users in terms of legal and illegal abstractions of water from the rivers	WRMA, County Govt. dept. of Water, WRUA	Semi-structured Interviews/ Focus group discussions
		Boundary	Frequency of	Evidence of collaboration with	WRMA, NEMA, County	Semi-structured

		demarcation	collaboration with neighbouring WRUAs	neighboring WRUAs e.g joint meetings, joint activities, invitations to participate in each other's activities, agreements	Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA	interviews, Focus group discussions, Document Analysis
			Demarcation or delineation of river basins or sub catchments	Availability of maps indicating demarcated river basins or sub catchments	WRMA Maps	Secondary
		Conflict resolution mechanism	Constitutional provision	Provision and process of resolving conflicts in the WRUA constitution	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA	Semi-structured Interviews/ Focus group discussions, Document analysis
			Agreements or resolutions made to resolve conflicts during meetings.	Conflicts experienced may include Water use conflicts, boundary demarcation conflicts and conflicts during election of WRUA leaders	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA	Semi-structured Interviews/ Focus group discussions, Document analysis
	Technical knowledge	Skilled manpower	% of skilled manpower	Assess the level of skills/competence among WRUA members which is important for effective participation in planning processes, develop workable work plans, ensure effective and efficient use of public funds and bring benefits to the entire community	WRMA, NEMA, County Govt. depts. of Water, Agriculture, Environment and Public health and sanitation , WRUA, KEETA	Semi-structured Interviews/ Focus group discussions, Document analysis
		Capacity building	Number of capacity building trainings attended	Assess the level of competence among WRUA members and the technical support provided by other actors to build WRUA skills and knowledge to effectively discharge their duties	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA	Semi-structured Interviews/ Focus group discussions, Document analysis

	Financial resources	Availability	Bank statements of WRUA indicating cash flows and available cash balance	Evidence of available funds and use of funds for WRUA projects and activities	WRMA, County Govt. depts. of Water, Environment and Public health and sanitation , WRUA, KEETA	Semi-structured Interviews/ Focus group discussions, Document analysis
		Resource mobilization	% of proposals successfully funded	Ability of WRUA to mobilize resources for various activities	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA	Semi-structured Interviews/ Focus group discussions, Document analysis
		Sources of funds	List of sources of funds	Both internal (WRUA registration fees and savings) and external sources (actors providing funds to WRUAs, donations and grants)	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA	Semi-structured Interviews/ Focus group discussions, Document analysis
	Information sharing	Access	Types of channels for receiving information	Ways in which WRUA and other actors receive information amongst each other, and the form in which the information is (formal or informal)	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA	Semi-structured Interviews/ Focus group discussions
			Timely receipt of information	Information received in time from actors in water management to WRUA and vice versa	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA	Semi-structured Interviews/ Focus group discussions
		Distribution	Types of channels for distributing information	The various channels for distributing information such as telephone, email, text messages, letters, public announcements through local media or through the chief ‘s meetings with villagers	WRMA, NEMA, County Govt. depts. of Water, Environment, Agriculture and Public health and sanitation , WRUA, KEETA	Semi-structured Interviews/ Focus group discussions

3.1.4 Data Collection Methods

This research used two types of data collection methods namely primary and secondary data collection.

3.1.4.1 Primary Data

Primary data is the data that was collected from firsthand experience in the field, and involved the use of three qualitative sources namely; Semi structured interview, Focus Group Discussions and Observations. The selection of these methods was warranted by the nature of the research strategy being a single design case study thereby requiring the use of qualitative data collection methods.

Semi structured interview

This is useful for collecting data especially when there is some knowledge already on the topic of interest but more information is needed to enable for meaningful explanations. This method was considered most appropriate type of interview for the national agencies NEMA and WRMA, county departments of Environment, Water, Agriculture and Public Health and Sanitation as well as for KEETA NGO that were interviewed. Reasons why these institutions were purposively targeted for semi structured interviews include the following; first, the research is an explanatory case study which requires in depth information in order to arrive at meaningful explanations, hence the choice to use semi structured interviews for the interviewed respondents in the selected institutions. Second, the researcher was familiar with some of the respondents in these institutions and took advantage of this as it was somewhat easier to arrange for and secure one on one interview with the respondents and also in some cases pre-existing rapport enabled respondents to give in depth information on questions posed. Third, the limited research period, limited financial resources and busy work schedules of the respondents could not allow for the researcher to organize and hold focus group discussions with all the respondents in the targeted institutions due to logistic implications, hence the choice of semi structured interviews. Finally, because the researcher already had some knowledge based on the concepts studied during literature review and also based on the researcher's own experience and professional background in water resources management, more information was required in order to derive meaningful relationships between institutional arrangements and the implementation capacity of the WRUAs in river basin management, hence use of semi structured interviews.

Semi structured interviews also provided considerable flexibility during the interview process, a very useful trait that enabled the researcher to gain additional information through supplementing the question guide prepared prior to the interview whenever necessary.

Focus Group Discussions

This is a qualitative data collection method where a researcher meets with a group of participants with common characteristics, usually between five and ten people to discuss a given research topic. These are effective for eliciting data on cultural norms of a group and generating broad overviews of issues of concern to the cultural groups or sub groups represented (Mack, Woodsong, et al., 2005). This method was selected for WRUA and those Non-WRUA members that live on riparian land within the river basin, to provide broad overview on issues related to WRUA and RBM as well as information that would be used as a source for triangulation of data gathered from semi structured interviews and secondary data. The three Focus Groups Discussions held were useful to bring WRUA members together since they have common characteristics, to a participatory discussion that generated a lot of knowledge and opinions on their perceptions on various aspects of

stakeholders, WRUA management and their participation in river basin management activities. Non WRUA members were also engaged in Focus Group Discussions to get their views on the same.

Observations
These are useful for collecting data in its existing context. Observations of the participants enabled the researcher to identify and note sensitive information based on the behavior of the respondents. In addition, direct observations of the study enabled for identification of catchment management interventions that have been carried out and the general status of the river basin.

3.1.4.2 Secondary Data

Secondary data is the data that has already been collected by others and maybe available in published or unpublished form. This study used the following qualitative data sources:

- Related journals and articles
- Analysis of existing laws and policy papers for RBM in Kenya
- Government reports and documents on initiatives undertaken in Machinjoni river basin
- NGO project reports on activities carried out in Machinjoni river basin
- WRUA project reports, Constitution, SCMP document

The secondary data sources described above were accessed through written requests to the concerned organizations. The researcher is an employee of WRMA; one of the organizations that was interviewed and has pre-existing rapport with some of the respondents in the targeted institutions therefore took advantage of this situation to gain access to required documents from WRMA and other organizations related to water management. These documents were found to contain very useful information in providing insight into what has already been done and recorded in relation to the research question. The use of secondary data was also to enable for triangulation of data with the primary sources.

3.1.5 Sample Size and Selection

This study used purposive sampling technique to draw a sample from the population of possible respondents because it was significant for the research that only the most relevant and knowledgeable people on the subject matter be engaged as respondents and also because of limited time for carrying out data collection.

For Semi structured interviews, both Governmental and an NGO that are considered to be most relevant in river basin management based on their mandates were identified, and depending on availability of respondents, persons considered to have the most relevant knowledge in institutional arrangements for river basin management within these organizations were selected. This was based on their years of experience, their positions and relevance expertise in RBM. Experience across the board varied from 1 year to 20 years and positions varied from management to field staff, but due to the wishes of the respondents to remain anonymous and also because of low staffing levels in most of the institutions interviewed, details of each respondent and their respective experience and expertise cannot be disclosed. The researcher intended to interview as many persons in the selected organizations as possible, until the researcher reached saturation point where the respondents answers would start being repetitive. Nevertheless due to low staffing levels in most of the county departments selected for interviews, the researcher was able to interview the respondents as follows: For primary data 16 semi-structured key informant interviews with purposively selected experts directly involved in RBM and 3 Focus Group Discussions were carried out making a total

of 19 interviews. Interviews were carried out for 2 National government agencies based at the county level namely WRMA and NEMA; 4 County Government departments as follows: Water, Environment, Agriculture and Public Health and Sanitation. For local NGO operating in Machinjoni sub catchment 1 interview was done with KEETA project, and 3 Focus Group Discussions with 3 groups of Machinjoni WRUA namely; Management Committee, Ordinary members and Non-WRUA members living within the sub catchment.
These institutions were identified as stakeholders in water management at river basin level based on the expert knowledge and experience as well as on the SCMP of Machinjoni WRUA which points them out as relevant stakeholders. There are many more organizations that could have been selected for interviews, but due to limited time for data collection only those considered most relevant and competent were selected.

Organization	**Type**	**No. of Respondents**	**Data collection method**
WRMA	National Government	3	Semi-structured Interview
NEMA	National Government	2	Semi-structured Interview
Department of Water	County Government	2	Semi-structured Interview
Department of Public Health and Sanitation	County Government	3	Semi-structured Interview
Department of Environment	County Government	2	Semi-structured Interview
Department of Agriculture	County Government	3	Semi-structured Interview
KEETA Project	Local NGO	1	Semi-structured Interview
Machinjoni WRUA Management committee members	WRUA	10	Focus group discussion
Ordinary WRUA members	WRUA	7	Focus group discussion
Non WRUA Members	WRUA	7	Focus group discussion

Table 3: List of Interviewed Respondents Expert Institutions

For the Focus Group Discussions with Machinjoni WRUA, purposive quota sampling technique was used where three categories of respondents were identified as follows: WRUA management committee, Ordinary WRUA members and Non WRUA members. The management committee consisting of ten members was selected because the WRUA management committee structure comprises of four sub committees of five persons each. The sub committees include; Executive, Finance, Procurement, Monitoring and Evaluation, and one youth representative making a total of twenty one in leadership position, who make up the overall management committee of the WRUA. Following this, the researcher selected 5 members of the executive committee because they are the official office bearers knowledgeable, informed and responsible for the day to day running of the

WRUA and are also in contact with stakeholders. One person considered to be most knowledgeable on WRUA issues was selected from the other three sub committees and the youth representative bringing the total number of respondents for the management committee focus group discussion to nine. The tenth member was purposively selected from procurement committee because of her knowledge and experience in WRUA related issues. This brought the total number of respondents for the first focus group discussion with the management committee to ten.

It was the intention of the researcher to engage a group of ten respondents in the focus group discussion with ordinary WRUA members, but only seven of them were available for the discussion based on their formal and practical knowledge and experience in RBM as well as the ability of each of those members to clearly articulate WRUA related issues. The second focus group discussion therefore comprised of seven purposively selected active ordinary WRUA members. The third category of Focus Group Discussion was that of Non-WRUA members, who comprised six persons living along the riparian land within the river basin, which were available for the discussion. This group was purposively selected with the help of the WRUA secretary who keeps the register of members and therefore knows the residents who are not registered as WRUA members.

3.1.6 Validity and Reliability

Generalization of findings to the entire population is not possible with purposive sampling. However, the intention of using purposive sampling in this study is not to generalize the research findings but rather to generate new knowledge on how institutional arrangements influence implementation capacity of WRUAs in river basin management based on the most knowledgeable, reliable and competent respondents.

Regarding internal validity and reliability, the research process for the semi structured interviews and focus group discussions made use of an interview guide that had clear, unambiguous and non-leading questions, so as to minimize bias, prejudice and socially desired responses. The interview guide was tested prior to the actual interviews. The research process was interactive and insightful whereby as the researcher collected the data, there was learning, data analysis and theoretical reflections simultaneously going on throughout the process.

Additionally, member checks that involve confirmation of researcher's interpretation against the respondent's opinions was done to ensure reliability, and triangulation with secondary data sources and focus group discussions was done to confirm findings and ensure consistency.

3.1.7 Data Analysis

The qualitative data that was collected from the field was analysed using Atlas TI software. This software is useful in interpretation of text and has the capacity to deal with large amounts of texts, typical of interview scripts, field notes and other textual sources (Muhr, 1991). The voluminous qualitative data in form of interview scripts and field notes that was collected from the field was structured, clustered and coded based on indicators of the study using Atlas TI. Further interpretations and explanations for the data gathered as well as analysis of secondary data including laws, policies, journals and government report and documents was done by the researcher.

Chapter 4: Research Findings

This chapter will present and discuss the findings of both primary and secondary data in order to answer the research questions related to institutional arrangements and their influence on implementation capacity of Machinjoni WRUA in RBM. Primary data was collected through semi structured interviews with key informants while the secondary data was collected through compiling, assessing and analysing current laws, regulations, rules, policies, plans, reports and related studies done elsewhere.

4.1 Discussion of Findings

In establishing a linkage between the current institutional arrangements and their influence on the implementation capacity of Machinjoni WRUA in river basin management, the researcher examined and made an analysis of current legal framework used in RBM, the linkages and agency support to WRUA by government departments and of a local NGO, the roles and responsibilities of these organizations and their legal basis for involvement in RBM as well as the level of operations of Machinjoni WRUA in terms of their technical and financial capabilities, participation, their organization structure and stakeholder collaboration.

4.1.1 Institutional Arrangements for RBM in Machinjoni River Basin

Institutional arrangements for river basin management in Machinjoni River basin was done through content analysis of current policies, laws, regulations and rules in Kenya and also examining the roles and responsibilities of various organizations involved in water management.

4.1.1.1 Characteristics of current institutional arrangements related to river basin management in Machinjoni

4.1.1.1.1 Current legal framework used in RBM

River basin management in Kenya is done based on IWRM principle using catchment management approach, and has been mandated through various laws, rules, regulations and policies. These laws are embedded in two levels of management namely national and county governments. The National Water Policy which is currently under review came into effect in 1999, upon adoption by parliament as Sessional Paper No. 1 of 1999, and the policy addressed both development and management of water resources as well as conservation of water resources countrywide. The policy set in motion agenda for reforms in the water sector in Kenya, and accordingly established the Water Act 2002. The policy put emphasis on stakeholder participation in water resources management and especially the participation of local and non-state actors.

From the findings, legal framework for RBM is available and there are sufficient legal provisions for involvement of various actors in RBM from a national perspective. However, with devolution of some core functions such as catchment management to the county government, the water sector lacks a clear sector specific policy and legal framework to operationalize devolution of these functions to county governments (WSP, 2013).

From the interviews carried out, all the respondents acknowledged that there is a legal framework in place for water management for which river basin management is a part of. One of the respondents noted that *"Policies and laws are there but enforcement is weak and in some cases lacking completely that's why we struggle with issues of encroachment despite available laws".* Another respondent emphasized on this by reporting that *"Current laws are okay but the challenge is*

implementation. They are good laws but have come too late because there is a lot of encroachment on wetlands, riparian lands. The challenge started when the ministry embraced reforms, initially there were scouts patrolling the river banks, when these were retrenched, the population encroached and now the challenge is implementation and enforcement. The polluter pays principle is very good but the challenge is enforcement".

According to the respondents, the laws in place for river basin management include:

4.1.1.1.1.1 Constitution of Kenya 2010

The COK 2010 is the supreme law in Kenya and since its dispensation in 2010; many changes have taken place and are still ongoing with the implementation of the Constitution. Section 43 of the COK 2010 deals with economic and social rights of the people where their entitlement to clean and safe water is provided for in article 1(d). From the findings it was evident that respondents were aware of this provision and discharge their duties with this in mind as was seen from a respondent who observed that *"access to clean water is an entitlement and a right in the Constitution of Kenya 2010, we may not ensure directly but the legislation is there".*

The County Governments are established in the COK 2010 under devolution of county governments, which introduces two levels of management in Kenya. That is, National and County governments. Articles 10 and 22 of the 4th schedule of the COK 2010 gives County Governments mandate to implement specific national government policies on natural resources and environmental conservation including soil and water conservation as well as protection of the environment and natural resources respectively.

Concerning public participation, section 69 on environment and natural resources, article 1(d) encourages public participation in the management, protection and conservation of the environment. All the respondents reported that the public is always consulted on environmental issues through public forums organized by the county, through public notices and Environmental Impact Assessments.

Under section 196 on devolved county governments, article 1(b) requires county assembly to facilitate public participation and involvement in the legislative and other business of the assembly and its committees. Accordingly, one respondent stated that ***"****With COK 2010, it has allowed public participation in all decision making processes, failure of which the public will come up in arms to petition hence consultation is key."*

Another respondent added that*"... in COK 2010 it is provided that where acts are to be initiated for public use then the common 'mwananchi'(citizen) must be stakeholders also for ownership".* These statements show that public consultation is considered in decision making processes because also the duty bearers are aware of the consequences for lack of consulting the public on certain issues. All respondents were found to be aware that public participation is entrenched in the COK 2010.

4.1.1.1.1.2 County Governments Act 2012

The Act requires county governments to provide for citizen participation in planning processes based on the principle of reasonable balance in roles and obligations of all stakeholders in decision making processes so as to promote shared responsibility and partnerships as well as facilitate oversight. According to the respondents, the public (WRUA included) is involved in county

planning through various county assembly platforms. Some quotes on public involvement from the interviews with respondents in county matters are as follows:

"They are not included in committees but they participate in decision making through public barazas (forums). There is a county environment technical committee chaired by the CEC (Minister) where WRMA is a member and I believe they articulate WRUA issues".

"WRUAs are always informed; they participate in formulation, budgeting and resource mapping. There is currently an assembly for participatory budgeting where they go out (county assemblies) to seek opinions from communities to be incorporated in county plans and included in policies of county".

"They are included under public participation and county seeks the opinion of the public through public forums for planning purposes". These statements indicate that the county government of Trans Nzoia ensures public participation through the available channels provided for in law.

It was also found that Trans Nzoia County is yet to develop its own laws as required in section 115(2) of the Act as stated by a respondent that *"Currently County Government has not come up with its own laws so we are using the national laws EMCA 1999".*

4.1.1.1.1.3 Environmental Management and Coordination Act 1999

EMCA 1999 is the overall law for environmental management in Kenya. Several sectoral laws were repealed and summed up together in EMCA 1999. EMCA 1999 provides principles of public participation in aspects of policy formulation, development of plans and processes concerning the environment. Some respondents were aware of this and noted that *"There is a section in EMCA 1999 that encourages individuals, CBOs, CSOs and public to participate in river basin management. This has been retained in the draft under review. Composition of county environment committee there is also provision for public participation through NGOs, CBOs, farmers, CSOs. It is highly participatory; Part 3 of EMCA section 5a principle of public participation requires each person to participate in environmental issues, and advocates for a clean and safe environment for all. They also participate in EIAs. EMCA has various provisions for stakeholder participation".* The entitlement to a clean and safe environment and obligation to safeguard and enhance the environment is also there in EMCA 1999.

4.1.1.1.1.4 The Water Act 2002

The Act provides for public participation in water resources management through formulation of Catchment Management Strategy (CMS) in section 15(1), and also through establishment of WRUAs in section 15(5) to be '*fora for conflict resolution and cooperative management of resources'* thereby giving them the legal framework under which to operate.

The Act also establishes Catchment Area Advisory Committees (CAACs) in section 16(1) to play advisory roles in water resource management issues. One of the respondents noted that *"There's provision for public participation in the Act, and WRUA's role is conflict resolution or management. There is that allowance for CAACs, WRUAs we also have stakeholder participation especially in advisory and there's the interlink of working with other stakeholders, in WRUA trainings, protection and conservation of catchments".* This implies that the actor is knowledgeable on the legal provision for public participation.

WRMA retains some of the revenue generated from water use charges and this is ploughed back into resource regulation and management (WRMA, 2015), which is in line with provisions in the Act.

Financial provisions for water services and water resource management is further provided for under section 83 which establishes the WSTF as a financing institution to assist in financing the provision of water services to areas of Kenya which are without adequate water services. WSTF in collaboration with WRMA established a funding window for the WRUAs known as WDC, which provides funding to the WRUAs for capacity building, SCMP development and implementation of activities described in the SCMP.

WDC is a framework that supports investments into water resources management countrywide. The WDC is not a policy but rather a working document or a tool that was formulated in order to operationalize the requirements of water resources management based on the principles of IWRM entrenched in the National Water Policy of 1999 and consequently the Water Act 2002 as well as the National Water Resources Management Strategy (NWRMS) and Catchment Management Strategy (CMS), where WRMA is tasked with the responsibility to support WRUAs. This framework defines the arrangements between WRMA and WSTF regarding funding of water resource management activities through the WRUAs. It provides adequate guidelines for other potential development partners with interest in WRUA activities. It further emphasizes the need for stakeholder participation and collaboration with WRUAs in water resource management (WRMA and WSTF, 2014). The WDC framework shows to some extent the commitment of WSTF and WRMA to support WRUAs in implementation of catchment management activities.

Some respondents were aware of this as was evident through the following responses:

"*If we look at the law, WRUAs get funding from WRMA through WSTF because i think their laws have this provision, but not us".*

"Through WSTF, the basket that sources for funds for WRUAs, WRMA helps WRUAs with proposals to WSTF for funding. WSTF is the funding body for WRUAs".

"WRUAs are financed by WSTF which is an institution established under Water Act 2002 they are a basket fund".

Conflict resolution is provided for in sections 84 to 87, where the Water Appeal Board is established to handle disputes relating to water permits, lodging of complaints and determination of disputes.

4.1.1.1.1.5 Public Health Cap 242

The Act requires all local authorities to protect water supplies from pollution and it gives them the authority to take all lawful, necessary and reasonably practicable measures including if necessary proceedings at law to prevent any pollution dangerous to health of any water supply which the public uses for drinking or domestic purposes. One of the respondents stated that *"In law for example when there is a conflict it is provided that we include all stakeholders, law enforcers, village elders, NEMA, Public health in a case where someone is discharging raw sewage into the rivers. Majorly there is a hearing from the conflicting parties, then NEMA comes in to give guidelines regarding the issue at hand, then law enforcement comes in. If it is our part we read the Act and explain that this and this should be done. If complicated it spills to the courts".*

The law also prohibits bathing and washing of clothes or other things in places that drain into water sources, but from the finding, enforcement of this law is poor because people were found washing and bathing in streams, as depicted in the pictures below, implying a lapse in enforcing of the law that prohibits against such activities:

Pictures: Bathing and washing in streams

4.1.1.1.1.6 Agriculture Act Cap 318

Since repeal of the land and water preservation ordinance Cap 164 of 1948, the Agricultural Act Cap 318 makes reference to the Water Act 2002 in matters relating to protection of water sources and water catchment areas in section 201 on saving of Cap 372, which is now Water Act 2002.

4.1.1.1.1.7 Land Act Cap 280

Section 2 of the Act mandates the land commission to identify ecologically sensitive areas that are within public lands and demarcate them in order to prevent environmental degradation and climate change, and this should be done in consultation with existing institutions dealing with conservation. It is also the responsibility of the land commission as per section 12 of the act to ensure that any public land that has been identified for allocation does not fall within wetlands, along watersheds, rivers, streams or riparian areas. However, according to empirical data, this responsibility is not effectively discharged. A respondent noted in relation to this that *"the National land commission is supposed to assist in demarcation of these wetlands but the survey and land department issue title deeds even for wetlands making it difficult to enforce the law".*

4.1.1.1.1.8 Survey Act Cap 299

Section 21 of the act describes the conduct and duties of licensed surveyors and non-liability of Government. This implies that the government is not liable for the actions carried out by surveyors in the course of surveying land. According to the act, surveyors should undertake land surveying in respect to the rules and regulations provided for in the act and are responsible for corrections and completeness of survey works undertaken by them. The Government is not responsible for any defective surveys done by licensed surveyors, but it does the authentication of the survey plans submitted by surveyors. The Act also gives the government power to undertake occasional field and office checks on the works of licensed surveyors and instruct them to correct any errors made by the surveyor, provided that the surveyor is issued with notice within twelve months after submission of survey plans to government. This means that once the twelve month period expires before notice for correction of errors is sent to the surveyor, survey plans become permanent and government proceeds with issuance of title deeds, regardless of presence or absence of errors in survey plans.

From empirical research it is evident that inadequate field and office checks by government on survey department have caused the approval of many survey plans that had errors such that people

have been issued with title deeds for lands including the riparian areas. Many respondents indicated that this has rendered enforcement of riparian and wetland protection ineffective. One respondent noted that "*Especially lands, you want to ensure that farmers do not cultivate riparian but the lands department gives title deeds up to the middle of the river. When the Chief's Act was in force it was very effective on riparian protection but now riparian land is encroached. People used to leave riparian land but these days the lands survey department demarcates land up to the middle of the river encouraging encroachment".*

Another respondent stated that *"The current crop of surveyors measure people's land up to the middle of the river thereby encouraging encroachment of riparian land. Survey of Kenya does not inform people that the water in their land belongs to the government so we have challenges with riparian land owners because they feel that survey and lands department that issue them with title deeds is superior. Longtime, measurements were done well and the rivers were wide enough because boundaries were well demarcated but today even our river here is just too narrow because of encroachment and it makes it difficult to even plant trees because people claim that the riparian land is theirs".*

4.1.1.1.2 Rules:

4.1.1.1.2.1 Water Resources Management Rules 2007

According to the rules, WRMA is required to inform the public concerning water resources management issues and ensure public consultation in water permit applications and according of which it was reported that public consultations are done whenever a new application for permit is made. Section 10 of the Rules specifically deals with WRUAs and the relationship between WRMA and WRUAs whereby for a WRUA to be considered for registration by WRMA, it should be legally registered and should have a constitution conducive for collaborative management of a particular water resource and which promotes public participation, conflict mitigation, gender mainstreaming and environmental sustainability. Collaboration between WRMA and WRUA is ensured through an MOU between the two parties, where WRMA may then provide for administrative, technical and financial support to WRUA, while WRUA takes on the responsibility for conflict resolution, promotion of legal water use and promotion of catchment conservation and protection measures among others. According to both WRMA and WRUA an MOU was signed between them in 2012 after which the WRUA received funding from WSTF through the WDC framework to undertake capacity building and SCMP development. Through the MOU and contracts for funding, WRMA creates partnerships with WRUA for collaborative management of water resources.

According to section 116(2) of the Rules, '*the riparian land on each side of a water course shall be defined as a minimum 6 metres or equal to the full width of the water course up to a maximum of 30m on either side of the bank. The width of a water course shall be equal to the distance between the top edges of its banks'.* According to the interviews done, some respondents were aware of this rule and were trying to implement it where the riparian farmers were keen to conserve the riparian land but others were not sure how big the riparian area should be or how it is determined. For those riparian farmers who were receptive, the agriculture department was engaging them in activities such as: planting of napier grass and indigenous trees along the riparian, instead of cultivating, while the WRUA was working closely with the riparian farmers in removing exotic tree species of eucalyptus that consume lots of water from the river drying up wetlands and rivers.

Conflicts, as was found out are solved through stakeholder consultations and as put by a respondent, *"The law supports us through some sections that guide us on our mandate and conflict resolution in water resources. When a conflict arises says on someone blocking the river or on encroachment of wetlands and riparian lands, the law provide guidelines on demarcation and the kind of activities to be undertaken in such areas. It provides for stakeholder participation involving Provincial Administration, NEMA, KFS, Agriculture, County Government and others. These organizations also assist in conflict resolution using their relevant laws".*

4.1.1.1.3 Regulations:

4.1.1.1.3.1 Environmental Management and Coordination (Water Quality) Regulations 2006

Pollution of water sources through liquid, solid or gaseous substances is prohibited in the Regulations, but empirical evidence shows that there is pollution in Machinjoni River and its environs and has been going on for years, yet no action has been taken. It was reported that the County Government of Trans Nzoia has no land fill site hence solid waste is dumped in open fields around the town causing environmental degradation. This pollution has not only caused environmental degradation, hygiene and sanitation issues as well as health related problems for the residents in the urban slums of Kipsongo, Mitume and Tuwan in Kitale town, but no actor is taking responsibility.

Pictures: Pollution near water sources

The Regulations also protect riparian land by prohibiting cultivating or development activity within full width of a river or stream to a minimum of 6 metres and a maximum of 30 metres on either side based on the highest recorded flood level. Information gathered from the field revealed that there is encroachment on riparian land of urban streams within Machinjoni sub catchment through erection of commercial and residential structures as well as farming activities along the river banks. This shows that there is lack of enforcement on the parts of the relevant authorities.

Table 4 Analysis of Current Legal Provisions related to RBM in Kenya

Management Level	Technical	Financial	Public/User Participation	Conflict Resolution	Information Sharing	Organization Structure of WRUA
National			Constitution of Kenya 2010 *Sections 69(1d) –Public entitlement and access to clean and safe water, 196 (1b) – facilitation of public participation by the county legislature*		Constitution of Kenya 2010 *Sections 196 (1b) Information sharing through public participation*	
National	The Environmental Management and Coordination Act 1999 (No. 8 of 1999) *Sections 72- Prohibits against water pollution, 75-Issuance of Effluent discharge permits, 93-Prohibition on discharge of hazardous pollutants, 112(4)-Imposition of environmental protection orders to polluters 142(a-c)-Offences related to pollution and the applicable fines*		The Environmental Management and Coordination Act 1999 (No. 8 of 1999) *Sections 3(a)-Entitlement & obligation to safe guard environment, 5(a)-Principles of public participation*		The Environmental Management and Coordination Act 1999 (No. 8 of 1999) *Section 5(a)-Principles of public participation*	
National	The Water Act 2002 (No. 8 of 2002) *Section 94-Prohibits*	The Water Act 2002 (No. 8 of 2002) *Sections 79-Revenue*	The Water Act 2002 (No. 8 of 2002) *Sections15(1)-*	The Water Act 2002 (No. 8 of 2002)	The Water Act 2002 (No. 8 of 2002)	The Water Act 2002 (No. 8 of 2002)

	pollution of water sources, 104-Proceedings for offences , 105-Penalties for offences	*collection, 81-Financial assistance through loans, grants &subsidies, 83-Financial provision for water services*	*Formulation of CMS, 16(1)-Public participation through CAACs, 107-Public consultation for permit application*	*Sections 15(5)-WRUAs as for a for conflict resolution, 84-87-Conflict resolution through Water Appeals Board*	*Section 107-Public consultation for permit application*	*Section 15(5) Establishment of WRUAs*
National	Public Health Act Cap 242 *Sections 129(a, b)-Protect water supplies from pollution, 130(a)-Purification of polluted water supplies*					
National	Agriculture Act Cap 318 *Sections 48-land preservation rules, 201-Reference to Water Act on water management issues*					
National	Land Act Cap 280 *Sections 2-Identification and demarcation of wetlands, 12-Protection of riparian land*					
National	Survey Act Cap 299 *Sections 21-Conduct of surveyors, 31-Government checks on surveyors*					
County			The County Governments Act 2012 (No. 17 of 2012) *Sections 87& 106(4),-*		*The County Governments Act 2012 (No. 17 of 2012)*	

			Citizen participation, 104(4)-Public participation in planning processes, 115(2)-Development of county laws for effective citizen participation		*Sections 87, 104(4),106(4),115(2) information sharing through public participation*	
Regulations						
National	Environmental Management and Coordination (Water Quality) Regulations 2006 *Sections 4-Prevention of water pollution, 6(a)-Protection of water bodies, (b)-Riparian protection, 9-Water quality monitoring*					
Rules						
National	Water Resources Management Rules 2007 *Sections 81-Pollution control, 82-Effluent discharge, 91-Enforcement on pollution, 116-Determination of riparian land, 117-Demarcation of riparian land, 118-Proscribed activities on riparian land*		Water Resources Management Rules 2007 *Sections 7(1)-Public consultation, 10-WRUAsasforum for public participation , 28-WRUA comments on water permits*		Water Resources Management Rules 2007 *Sections 7(2)-Information sharing on WRM issues, 29-Public consultations for water permits*	Water Resources Management Rules 2007 *Section 10(1)-Operations of WRUA*

4.1.1.2 Roles and Responsibilities of Organizations related to Water Management

Empirical evidence suggests that there are various actors in involved in Machinjoni River basin including KFS and KWS which are state agencies and local NGOs such as VI Agroforestry. Nevertheless, the following were identified as the key actors related to RBM in Machinjoni River basin: NEMA, WRMA, WRUA, County government departments of Environment, Water, Agriculture and Public Health and local NGOs such as KEETA.

The roles and responsibilities of these organizations are as discussed below:

4.1.1.2.1 NEMA

As stipulated in EMCA 1999, NEMA is the state agency responsible for coordination of all other lead agencies and government departments as well as non-state actors in environmental management issues. The roles and responsibilities of NEMA in RBM include: Carrying out surveys which are meant to assist in the proper management and conservation of the environment, monitoring and assessment of activities including activities being carried out by relevant lead agencies and undertaking environmental education and public awareness. In addition to this, as the findings indicate in practice and also as mandated by law, NEMA also issues effluent discharge permits and does compliance and enforcement of environmental regulations.

4.1.1.2.2 WRMA

WRMA has various roles and responsibilities as per the Water Act 2002. First, the Authority is in charge of regulation and protection of water resources countrywide from adverse impacts, and is required to liaise with other bodies for better management and regulation of water bodies. The second role is to determine and collect charges for water use and monitoring and enforcing conditions attached to water permit and use. On water permit and use, WRMA is mandated by law to issue water permits and effluent discharge permits. Third involves developing principles, guidelines and procedures for allocation of water. Apart from this, it is the responsibility of WRMA to manage and protect water catchments, identify with stakeholders and delineate catchment areas for gazettement as well as constitute CAACs and support WRUAs in implementing catchment conservation and protection activities. It is also their duty to establish water resources monitoring networks and to gather, maintain and publish water resources information.

In practice however, respondents reported that apart from the roles mentioned above, they were also responsible for coordination of other agencies related to water resource management.

Box 1: WRMA functions related to RBM that are devolved to County Governments as per COK 2010

Under the current dispensation, some of our functions are Exclusive to National Government while others are Concurrent. The functions currently performed by WRMA which have been allocated to national government in Part One of the 4th schedule are:
2. The use of International waters and water resources
19. National public works (some of those relating to water)
22. Protection of the environment and natural resources with a view to establishing a durable and sustainable system of development, including, in particular (c) Water protection, securing sufficient residual water, hydraulic engineering and the safety of dams
24. Disaster management
32. Capacity building and technical assistance to the counties

Our functions which have been devolved to the County Governments under part two of the fourth schedule are:
10. Implementation of specific national government policies on natural resources and environmental conservation including: (a) Soil and water conservation
11. Disaster management

Source: *(WRMA, 2013)*

4.1.1.2.3 WRUA

According to the Water Act 2002, WRUA is established as a voluntary organization for collaborative management of water resources and also as for a for conflict resolution. The roles and responsibilities of WRUA are based on their objectives which are to promote controlled and legal water use, safeguard reserve flows for downstream ecological demands, reduce and solve water use conflicts, promote catchment conservation measures and create awareness on good management practices.

WRUAs are formed on sub catchment basis and as such each sub catchment has been demarcated by WRMA for management by a single WRUA. The demarcations provide the boundaries for sub catchments. Accordingly, Machinjoni WRUA is aware of their boundary and those of the neighboring WRUAs which they interact with in the course of implementing activities and has not experienced any conflicts with neighboring WRUAs on boundaries so far.

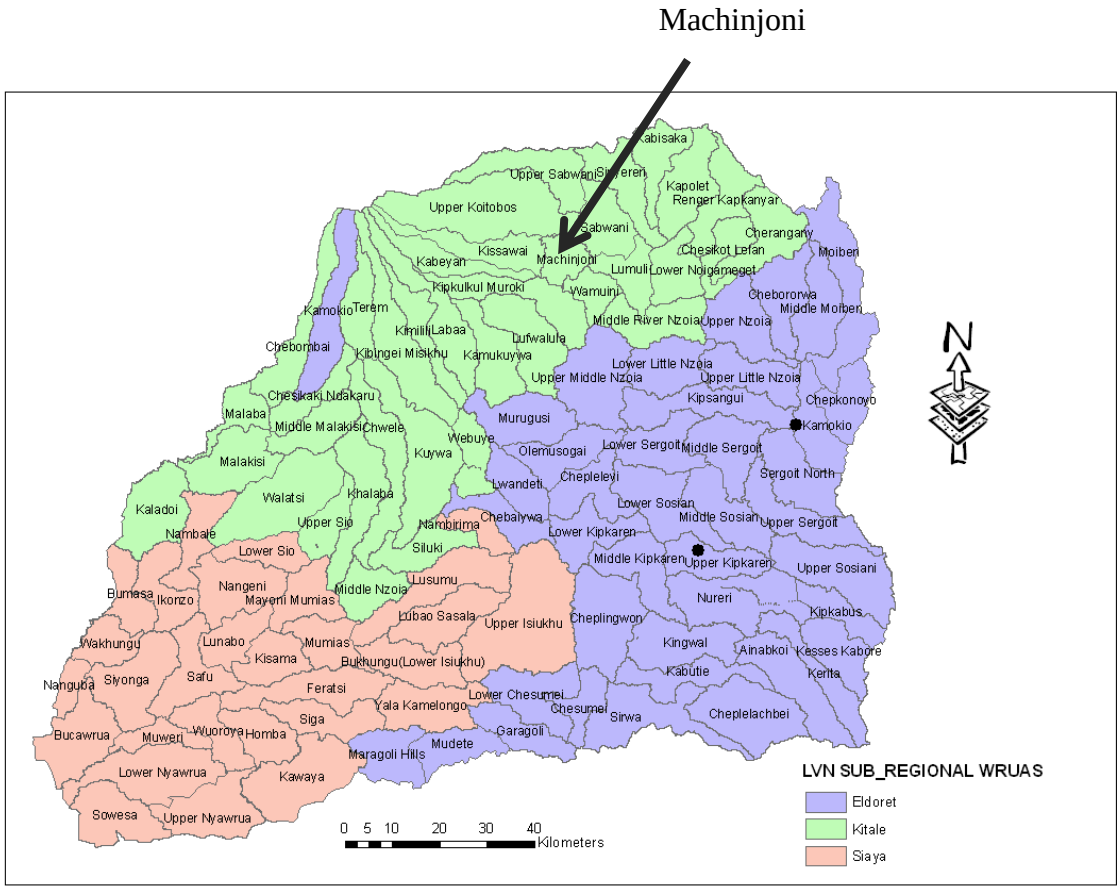

Figure 7 Map showing demarcated sub catchments in Lake Victoria North Catchment Area (Source: WRMA)

4.1.1.2.4 County Department of Environment

The roles and responsibilities of county department of environment is catchment mnaagement as per the COK 2010. According to the findings, it was reported that the department is also responsible for coordination of relevant organizations dealing with environment issues. Apart from this, the department is engaged sensitization and rehabilitation of degraded river banks through tree planting as well as enforcement of relevant environmental laws.

4.1.1.2.5 County Department of Water

As per the Water Act 2002, the Department of water is mandated to provide water services. In practice according to findings, apart from water supply, the department's role is formulation of WRUAs and oversight and general management of water issues.

4.1.1.2.6 County Department of Agriculture

The roles and responsibilities of department of Agriculture that are related to RBM according to Agriculture Act Cap 318 include: Provision of agricultural extension services, promote management and conservation of natural resources and undertaking land development services such as construction of water pans and horticultural food production.

Empirical evidence in addition shows that the department also undertakes regular soil sampling in order to advice farmers on the farming enterprises to undertake, involved in water harvesting structures and implementation of soil conservation measures including laying of terraces, construction of retention and detention ditches among others. The department also advises farmers on bi annual plants to grow for short term benefits

4.1.1.2.7 County Department of Public Health

Department of Public Health is in charge of health inspection and other public health services including food quality and hygiene as per the Public Health Act Cap 242. From the findings, the department is responsible for ensuring hygiene and sanitation in the environment.

4.1.1.2.8 KEETA

KEETA Project is a local NGO operating in Machinjoni river basin. Their roles and responsibilities as per the mission of the organization include capacity building & promotion of nature based enterprises, as well as environmental conservation. As such the NGO is involved in tree planting activities with WRUA, establishment of bee hives and tree nursery as income generating activity for self-help groups and CBOs within the WRUA, and solid waste management through use of a hopper machine that recycles plastic waste into plastic fencing posts.

4.1.1.2.9 Effectiveness

Several scholars including Pahl-Wostl (2009) and Borowski, Le Bourhis et al (2008) observed that most of the time difficulties are experienced in dealing with vertical and horizontal interplay between newly established institutions at basin scale and those organized on traditional administrative boundaries, which proves to be a barrier in implementing integrated management approaches and may lead to overlapping in mandates. This is consistent with the findings for the overlap in mandate regarding catchment management function which includes rehabilitation and restoration of degraded catchments done by both WRMA a national basin scale organization, and NEMA a national organization and newly formed county government that is based on administrative boundaries.

The overlap in mandate is due to the transition, since legally catchment management function has been devolved to the county governments through the COK 2010 and the County Governments Act 2012 but is yet to be repealed from the Water Act 2002 which is still in force pending parliament approval for the Water Bill 2014. This Bill is expected among other things to provide clear guidelines on horizontal and vertical interplay between WRMA and the newly established county governments on water resources management.

According to the existing laws, the roles and responsibilities of each actor that relate to water resource management and consequently RBM are given and apart from overlaps, there is also an issue regarding duplication of roles as in the case of WRMA and NEMA on issuance of effluent discharge permits or licenses where duplication is as a result of roles and responsibilities as given in law. Some respondents reported that they are not very sure of their roles and responsibilities in relation to RBM because the laws are changing in the wake of COK 2010 and current guidelines are therefore not clear. For example, water management has been under Ministry of Environment, Water and Natural Resources nationally, and as a result, the Ministry

at the Trans Nzoia County government had been formulated as such, with the county laying emphasis on environment and not water resource management.

Apparently, formulation of the county ministry in this manner had implications on resource availability for department of environment as compared to the department of water which affected both water service provision and water resources management at the county level. In the month of June 2015, the Minister for Water and Irrigation was sworn into office following establishment of the new Ministry of Water and Irrigation nationally, which is in charge of water management issues. As such, changes are expected at the county level, which are also expected to result in clearer roles and responsibilities for concerned state agencies and county departments for issues related to RBM.

Empirical evidence suggests that duplication of roles and responsibilities is present across many departments and despite those conflicts arising due to overlaps and duplications in law, some of the overlaps and duplication experienced in practice are based on individuals or institutions not knowing where their jurisdiction starts and ends.

The duplication of roles and responsibilities found in practice among various stakeholders is as a result of misunderstanding or misinterpretation of mandates, lack of coordination among various actors and a lack of understanding of IWRM that calls for cooperation of actors at river basin scale.

Water resources management issues are considered part of environmental issues and are too complex to be handled by a single organization. It is due to this complex nature of water that IWRM and consequently river basin approach is advocated by various scholars, with emphasis on effective stakeholder collaboration and coordination.

In practice most of the respondents reported presence of overlaps and duplication in roles and responsibilities of various organizations involved in RBM, and these overlaps and duplications across some agencies and county departments are presented in the following Venn diagrams:

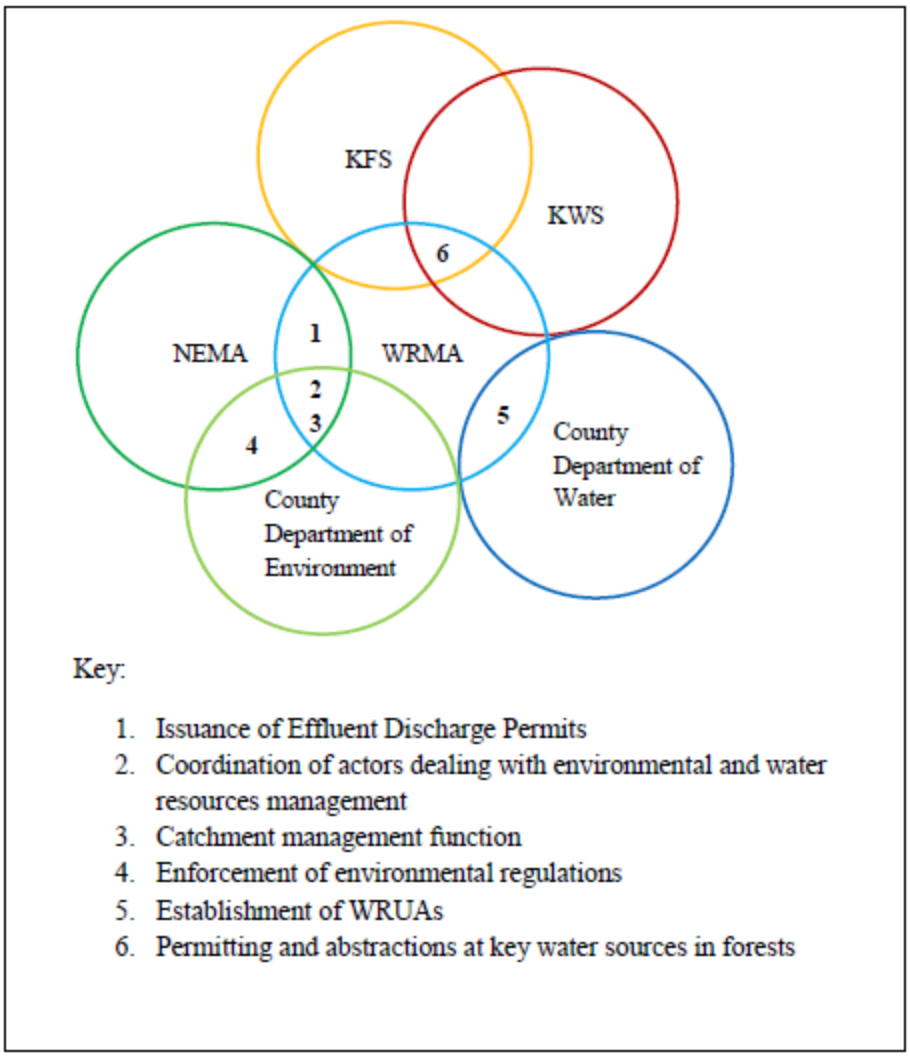

Figure 8 Venn diagram showing overlapping roles and responsibilities of some of the organizations involved in RBM *Source: Author 2015*

Coordination

According to majority of the respondents, WRUA is accountable to NEMA since NEMA is the overall agency in charge of management of environment and natural resources including water. Others argued that WRUA is responsible to WRMA because this is the institution mandated by the Water Act 2002 to establish WRUAs.

In some other respondents' opinion, WRUA should be accountable to government departments and any organization that deals with water and environment issues and should collaborate together with them and not just with NEMA or WRMA. From these findings, it is my opinion as the researcher that there is a misconception of WRUA among stakeholders on the ground. Some county departments interviewed in this study were not aware that WRUA exists, and did not know the roles and responsibilities of WRUA in RBM. Those that were familiar with WRUA reported WRUAs role and responsibility in RBM as that of tree planting and solid waste management.

The presence of a lead agency responsible for coordination of RBM activities according to the findings is lacking, as respondents reported a lack of a single authority in charge of environmental and water issues. As such, there is no coordination of RBM activities among state agencies, county governments departments and non-state actors such as WRUA and local NGOs.

Box 2: WRUA perception on Coordination

It has to be WRMA because of what they have taught us under water department. I feel WRMA should just empower us to undertake conservation and we should be answerable to them. We have been put together with KFS, NEMA and Agriculture and we collaborate with them but they are not able to coordinate us. We are voluntary and we don't get salaries so we get tired of being tossed around. We have no authority as WRUA to undertake our work and there is no recognition. If we were recognized we would have an office where the public could come and report issues. We should be given an office under a department in the ministry, in order for us to effectively undertake our duties. They ask: who is WRUA? They don't know us. We take WRMA as our mother parent and we want them to build us an office so that we are effective.

Our role is to ensure our rivers have adequate clean water for all, have water friendly trees along the rivers, safe water for both upstream and downstream users, proper land use practices and fish ponds along the river banks to avoid downstream flooding, conserve our wetlands through sensitizing communities, capacity building of farmers and members, reduce soil erosion, stop illegal abstractions and avoid diverging rivers. Ensure that water is not polluted by poisons or any other pollution. Currently Machinjoni river is being used as a gateway for sewage and waste from town, it is our duty to stop that, stop encroachment, plant indigenous trees and use current laws and policies to teach community because we are closer to them and so we carry these policies down to the common 'mwananchi' (citizen).

Stakeholder Networks

The study established that stakeholder collaboration in RBM for Machinjoni river basin involves both government and non-governmental actors. However, apart from the MOU between WRMA and WRUA, actors do not have formal agreements amongst themselves on how to plan for and implement activities in the river basin. When one of the actors holds meetings for instance the county department of environment, they invite other government and NGOs including Machinjoni WRUA to the meeting where they share knowledge, exchange ideas and come up with a way forward. Nevertheless, some respondents reported that they only know about some meetings long after they have taken place and are therefore not able to participate. Stakeholder networks are therefore informal, there are no joint meetings for planning and execution of projects for RBM and commitment among stakeholders towards WRUA is not assured.

Findings also indicate that Machinjoni WRUA and the neighbouring WRUAs in Trans Nzoia County namely; Wamuini, Lumuli, Sabwani, Upper Sabwani Kaisagat, Kabisaka and Cherengany have already had a meeting where they agreed to form an umbrella WRUA for Trans Nzoia County WRUAs to strengthen and unite them to lobby for resources from the county government.

Inclusiveness of actors in decision making processes

The findings indicate that the county government of Trans Nzoia includes both government and nongovernmental actors in decision making process by engaging them in meetings, public forums and committees. For instance, there is presence of a county environment technical committee chaired by the Cabinet Executive Committee member (the Minister) where WRMA, NEMA and county departments are members. It was reported that the WRUA is not included in the committee but they participate in decision making through public barazas (forums), where they participate in formulation, budgeting and resource mapping. A respondent added that *"there is currently an assembly for participatory budgeting where the county assembly goes out to seek opinions from communities to be incorporated in county plans and included in policies of county."*

From the findings, frequency of County invitations for related water actors to participate in decision making processes is ad hoc, and when need arises.

4.1.2. Level of implementation capacity of Machinjoni WRUA

In establishing level of implementation capacity of the WRUA, the study looked at the overall set up of WRUA and availability of resources and skills within the WRUA. WDC framework provides guidelines for facilitating establishment and development of WRUAs from infancy to maturity. Infant or level 1 WRUAs are those whose membership is still poorly defined, that are still experiencing conflicts with no solid solutions. Level 2 and above are considered mature and refer to WRUAs that developed their SCMP and are implementing activities with the help of stakeholders. WRUAs above level 2 are expected to be self-sustaining since they are advanced enough and are able to mobilize resources for their running expenses and activities (WRMA and WSTF, 2014)

From the findings, Machinjoni WRUA is mature because it has already undergone capacity building and SCMP development and is already trying to implement various activities described in their SCMP. However due to lack of resources, the WRUA has not implemented activities as planned. Findings indicate that the WRUA not only lacks funds and technical knowhow, but also lack an office where they can converge and carry out their daily operations. Currently the WRUA is operating from a small office space that was given to them by the 'jua kali' community (local artisans) in town, but the office space is too small and they have no furniture to accommodate WRUA members during meetings.

4.1.2.1 Organizational Structure

This is in terms of the leadership of WRUA and membership as discussed below:

4.1.2.1.1 WRUA Leadership

According to some respondents, WRUA leaders are very influential as they are able to collaborate with stakeholders. Other respondents were not familiar with the WRUA and therefore could not comment on how influential WRUA leaders are. One respondent stated that *"the chair is influential and is close to me so it's easy for me to comment but I can't comment on others because they are far, and I don't know them".*

According to ordinary WRUA members who were asked to comment on their leaders, many reported that their leaders are very active and continuously seek support from County government, WRMA and other stakeholders in river bank protection and have successfully gained the support of the department of environment which issues tree seedlings for planting

along the riparian land. However, some of the members felt that their leaders were not capable of successfully mobilizing resources and lobbying for funding from the county government and therefore need to include the youth in leadership positions in order to ensure sustainability of the WRUA upon their retirement.

4.1.2.1.2 Membership

According to findings, WRUA is voluntary and has several categories of membership all of whom must pay membership fee of Ksh. 500.00 upon registration with the WRUA. These categories include:

- Riparian land owners by virtue of their land being adjacent to the river are automatic members
- Abstractor members can be individuals of a project that abstracts water from any of the rivers and streams within Machinjoni river basin
- Non consumptive members are individuals or groups that use water from the rivers and streams for domestic purposes but do not abstract the water
- Observer members are the nonvoting category who have an interest and want to participate in WRUA activities. This can be government officials, NGOs, private companies or individuals
- CBOs and SHGs which are men, women or youth groups registered with social services and upon registration with WRUA, they get one membership or one vote as a group and not as individuals within the group (WRMA. and WSTF, 2014).

Some respondents reported that the membership fee of Ksh. 500 was high for low income residents to pay upfront and that is the reason some of them had not joined the WRUA.

It was reported that committee meetings are held on monthly basis, but meetings with WRUA members are held on a quarterly basis and whenever need arises and invitation of stakeholders to meetings usually depends on the type and nature of meeting. For instance, meetings for tree planting events are usually held on the day of the event where WRUA members, community, government departments and NGOs are invited to participate in the activity, but planning meetings are held prior to the event with the sponsoring stakeholder and WRUA management committee. During Annual General Meetings and General meeting for election of leaders, the chief and a representative from government such as WRMA and NEMA or a county department representative are invited as observers, to ensure that due processes were observed during election and handing over is done in a peaceful manner.

Objectives and Functions of WRUA

The objectives of WRUA according to law are: to promote controlled and legal water use, safeguard reserve flows for downstream ecological demands, reduce and solve water use conflicts, promote catchment conservation measures and create awareness on good management practices. Their functions are to act as fora for conflict resolution and collaborative management of eater resources. Empirical findings indicate that the activities undertaken by WRUA are in line with the objectives and functions described in law.

4.1.2.2 Participation

Active participation of members in WRUA activities is important for the growth and unity of the WRUA. Since WRUA is a voluntary association, it is empowered by membership and the more they participate, the stronger they become as a group. It was reported that members participate in WRUA meetings, election of leaders and WRUA activities such as tree planting and awareness creation. Three groups of WRUA members were interviewed where by the management committee reported that they were very active participants in WRUA activities and meetings. The management committee does the planning of meetings, liaising with stakeholders, planning for events and tree planting activities, and invite other members to attend therefore they are directly and actively involved in WRUA affairs. The ordinary members interviewed were in agreement on the active participation of their leaders in WRUA activities, but noted that among the ordinary WRUA members participation is limited. The last group which comprised non WRUA members residing within the sub catchment acknowledged that the WRUA involves them in their activities such as tree planting, but they do not participate in WRUA meetings since they are not WRUA members.

Some of the state agencies and county departments interviewed reported that they participate in WRUA elections only as observers whenever they are invited by the WRUA to attend. They also pointed out that the planning and process of election was entirely done by the WRUA members themselves. Other county departments reported that they are not involved and do not participate in WRUA elections.

Participation of youth as per the findings is ensured through the youth chairman, who is a member of the overall management committee. Therefore whenever the WRUA has a meeting or an activity the youth chairman informs the youth and ensures their participation in group activities. Despite this arrangement for ensuring youth participation in WRUA meetings and activities, some members felt that more needs to be done in terms of having more youth represented in management in order to ensure continuity of the WRUA when the older generation retires from office.

Gender considerations are evident in WRUA leadership as in every sub-committee of five members at least one is female. Women have been incorporated in management through the WRUA constitution which requires gender consideration in management and other WRUA activities.

4.1.2.3 Conflict resolution

Machinjoni WRUA reported that they have not experienced any conflicts relating to sharing of water between upstream and downstream users in the sub catchment. From the information gathered, Machinjoni river is heavily polluted from its source in Kitale town, and other streams within the sub catchment are also polluted resulting from waste dumping and agricultural pollutants from farms rendering the water unfit for human consumption, however it was reported that there are some residents whom due to lack of other water sources use water from the rivers for domestic use. Consequently the WRUA has lodged many complaints regarding the pollution and forwarded those caught polluting water sources to relevant authorities. Sometimes the culprits are taken to court by relevant authorities but due to corruption, the case is dismissed depicting once more a lack of enforcement on the part of the relevant authorities.

The WRUA reported not to have experienced internal conflicts either with members or within the management itself, but pointed out that sometimes during tree planting activities non-WRUA

community members demand for payment before planting trees which becomes a source of conflict, as the WRUA has no money to pay them. Apparently conflicts have also been experienced with riparian farmers during tree planting for river bank protection, as often due to encroachment of riparian land, there is no space left to plant trees along the rivers as some farmers cultivate all the way to the edge of the river.

Regarding conflicts with other stakeholders and specifically state departments, NGOs and WRUA, the findings indicate that no conflicts have been experienced so far with Machinjoni WRUA. Nevertheless, each stakeholder reported that there is a mechanism for resolving conflicts and across the board this ranges from conflict resolution committees within each organization to meetings involving the chiefs in a local public baraza (forum) depending on the nature and magnitude of conflict.

4.1.2.4 Technical and Financial Ability of WRUA

Empirical evidence suggests that WRUAs technical knowledge in water resources management issues is limited and as such require a lot of technical support from stakeholders. All the state agencies, county departments and local NGO interviewed acknowledged that they provide technical knowhow to the WRUA in areas of capacity building and trainings, soil and water conservation structures, riparian pegging and marking and appropriate species for tree planting.

So far the WRUA has only received training from WRMA in form of a capacity building workshop that was held in the year 2012 where they learned about the water sector reforms, their role and objectives in water resources management, and the need for stakeholder cooperation in managing water resources. The knowledge and skills acquired through this training enabled them to proceed with development of their SCMP which describes all the activities they intend to implement for a period of three years in collaboration with stakeholders.

Despite the eagerness and commitment of WRUA to catchment conservation and protection as reported by the respondents, their progress is hampered due to limited technical knowledge and lack of financial resources to undertake the activities. The WRUA has also carried out several conservation activities in Machinjoni river basin with support from various stakeholders and donations from well-wishers as well as through WRUA's own contributions.

WRUAs were found to have distinctly two sources of income namely internal funds obtained from registration fees and contributions from members, and external sources which only comprise of the funds they received from WSTF in 2012 for capacity building and SCMP development as per their bank statements. Apart from this, the WRUA has not received funding from any other organization and this has greatly hampered their capacity to implement various catchment management activities such as tree planting for riparian protection, soil and water conservation structures including terraces and gabions, and awareness creation among others. The WRUA continues to source for funds from county government, WRMA and local NGOs through proposals.

The following table shows some of the activities undertaken by WRUA so far:

s/no.	Activity	Nature of Support from Stakeholders	Name of Supporting Stakeholder
1.	Capacity building and SCMP development	Financial *(Provided funding of Ksh. 790,000.00)* Technical	WSTF/WRMA
2.	Tree planting along the riverbank	Material *(Provided total of 40,000 Tree seedlings)* Technical	Department of Environment KFS
3.	On farm tree planting	Material *(Provided 3000 tree seedlings)* Technical	Elgon downs KFS
4.	Solid waste project for converting plastic waste into plastic fencing posts and pegs	Material *(Provided Hopper machine)*	KEETA
5.	Establishment of tree nursery	Material/Technical	KEETA
6.	Establishment of bee hive	Material/Technical	KEETA
7.	Spring protection	Material *(Hired contractor)*	KEETA
8.	Establishment of fish ponds	Technical	County department of fisheries & LBDA
9.	Cleaning of Machinjoni River	Participatory	Community , WRUA
10.	Livelihood projects (Rabbit rearing, rearing of milk goats, bee harvesting, charcoal casting, bamboo nursery)	Technical	Manor House Agricultural Centre

Table 5 Activities carried out by Machinjoni WRUA in RBM

4.1.2.5 Communication

Communication between stakeholders is there according to the respondents, and their communication channels are through official letters, emails, phone calls, public barazas (forums) as well as social media channels including Facebook and tweeter. The county government of Trans Nzoia for instance, has a Facebook page 'Governor's Corner' which enables the Governor to interact with the public through a web platform.

According to some WRUA members, communication between WRUA leaders and members is not effective because there is very short notice for meetings and most of the time majority of members does not get information on time or at all and therefore they do not attend the meetings. One member reported that "*…they call us through mobile phones or physically visit our homes to inform us of upcoming activities, although the communication is wanting and it is mostly hear say".*

With regard to communication on upcoming events in the county, the findings are that community and stakeholders including WRUA learn about such events through broadcasts on local radio stations like Imani radio, that are usually for creating awareness and invitation of the general public to an upcoming event. Such information is also obtained through grapevine based on hearsay or word of mouth.

4.1.2.6 Information sharing

Information sharing among stakeholders was found to be ineffective as many respondents reported that they were not aware of what the other stakeholders were doing in relation to river basin management. Others reported that they came to know about some meetings, forums or activities after they had already taken place and therefore could not participate in them. Some

county departments were not aware of what or who WRUA was and what kind of activities they carry out and were only getting to know about the WRUA during the interviews with the researcher.

Only a few respondents reported to share information with other stakeholders through circulation of annual work plans, distributing brochures, extension services and through meetings and other public forums and web based platforms.

4.1.3 Influence of Legal framework, roles and responsibilities of organizations in water management on level of implementation capacity of WRUA in RBM

Empirical finding has established that there are some gaps in the legal provisions, which retard the implementation capacity of Machinjoni WRUA in RBM. First is the lack of clear guidelines for actor linkages between national and county government as well as among the actors at county level. Second concerns overlaps and duplication in roles and responsibilities of national agencies and county government departments in RBM. Third, concerns the inadequacy in financial and technical provisions in law. These gaps are further discussed as follows:

The lack of clear guidelines for actor linkages between national and county government as well as among the actors at county level has direct implications for WRUA. The existing legal framework for water management under which RBM is undertaken has enabled for creation of many institutions including WRUA that deal with environmental and water management issues and creation of county governments has introduced another level of government for management of water resources.

With the changes going on in the country and in Trans Nzoia County, there are no clear guidelines for cooperation, collaboration and accountability among these institutions and between institutions at national and county level. As a result both state agencies and county departments are cautious when discharging their duties to avoid overstepping their boundaries or getting into conflict with another department. This results in a situation where these actors play it safe to ensure that they are not in contravention of any of the existing laws and newly established ones.
Consequently, due to lack of a single authority for RBM issues, actors operate within the comfort of their relevant laws with little regard for coordination. No single institution is solely responsible for WRUA because catchment management function has been devolved to the county and as such, WRUA is expected to collaborate with all the relevant stakeholders operating at county level. Findings also indicate that state agencies and county departments expect WRUA to be accountable to them despite their noncommittal nature to WRUA. These two levels of government have also resulted in overlaps and duplications in roles and responsibilities of some actors at national and county government level.

Due to the overlaps and duplication of roles and responsibilities by various stakeholders, and the absence of a clear chain of command between the national government agency in charge of coordination and other state agencies and county departments, there is competition among agencies to remain relevant in the course of discharging their mandates and this is a barrier for coordination because every actor is competing to prove superiority in terms of mandates and therefore none wants to be accountable to another agency.

In the process the WRUA is sidelined because they have the least power play compared to the other actors, and this in turn affects their motivation to undertake RBM activities. Overall, this competition due to overlaps and duplication affects the coordination among stakeholders and also inhibits joint planning and implementation of RBM activities by stakeholders in Machinjoni, including the WRUA. This overlap in mandates and subsequent duplication in roles and responsibilities of the actors in water management is as a result of lack of clear guidelines in the available legal framework.

Despite existence of a national legal framework in support of RBM activities, empirical evidence shows that there is inadequacy in enforcement of laws, rules and regulations especially on protection of water sources and the environment against pollution and encroachment of wetlands and riparian land. For instance, weak enforcement of public health, Water Act 2002 and EMCA 1999 laws and regulations has caused increased pollution in Machinjoni River.

Findings show that the river is used as a gateway for pollution in form of effluent discharge of raw sewage from the towns' leaking sewerage pipes, Machinjoni slaughter house, pollution from fertilizers used for agricultural production on surrounding farms and pollution from washing and bathing in streams and rivers within the sub catchment. This pollution has rendered the waters unfit for human consumption and domestic use although a few residents still use the water for domestic purposes. Conflicts due to upstream downstream sharing of water are not experienced in Machinjoni because the streams and rivers are polluted and therefore their main concern is first protection of the water resource.

Encroachment of wetlands and riparian land along the river banks has also resulted in narrowing of many of the streams and rivers within the sub catchment resulting from excessive siltation from tillage of riparian land which continuously breaks the river banks depositing soil on the river bed thus reducing the depth and width of streams and rivers. This further reduces the amount of water flowing in the river. Encroachment is also found to be as a result of weak enforcement of laws, rules and regulations on the part of responsible agencies and county departments. This deters WRUA's efforts to protect rivers, streams and spring sources within the sub catchment.

The powers and presence of NEMA state agency responsible for enforcement of environmental laws and regulations as per EMCA 1999, and WRMA state authority responsible for enforcement of water regulations according to Water Act 2002 is not adequately felt on the ground and the lack of enforcement has continued to encourage encroachment on riparian areas, making it difficult for WRUA to promote protection of riparian land which is one of the roles and responsibility of WRUA as described in law.

In addition, the lack of enforcement by relevant authorities as suggested by empirical findings affects the WRUA in that they lack confidence in the capacity of these institutions to provide the necessary backstopping needed by WRUA to ensure effective implementation of conservation and protection measures. This also affects how the community perceives the legitimacy of WRUA in undertaking the various riparian protection activities because when the WRUA lacks the support of enforcing agencies, it is perceived as having no influence on disciplinary action on those riparian land owners who are caught contravening the law.

As per the findings, community perception of WRUA as a legitimate actor in riparian protection and conservation is important in ensuring compliance to set regulations but as it is, the WRUA is

seen as being a weak actor with no real power to ensure compliance of riparian regulations on the ground. This kills moral and consequently demotivates WRUA in carrying on with implementation of conservation activities such as tree planting, riparian pegging and marking among others, which they often undertake. The community does not take the WRUA seriously even when the WRUA sensitizes them on the need for riparian protection.

Available legal provisions for technical and financial support to WRUAs by WSTF and WRMA as per NWRMS, Water Act 2002, and the WRM Rules 2007, have enabled for WRUA to be empowered on water resource management issues to some extent, through capacity building and SCMP development which would otherwise not have been the case, had there not been provisions in law for establishment and development of WRUAs. The role of WRMA in establishment and support for WRUA has enabled Machinjoni WRUA to advance from infancy to maturity, but restrictions on availability and use of funds does not allow WRMA to undertake construction of offices for WRUA or provide salaries for WRUA officials because this is not provided for in law. WDC Funding is specifically designated for use in water resources conservation and protection purposes. Lack of legal provision for administration costs under financial support for WRUA to some extent therefore hinders ability of WRUA to effectively discharge their duties and offers no incentive for WRUA to undertake RBM activities.

Stakeholder collaboration and support for WRUA activities is evident both from governmental and NGOs working in Machinjoni area, although support is limited to technical knowhow among county departments and the local NGO, and it is only WRMA which provides funding to WRUAs through the WDC framework in conjunction with WSTF. Presence of WSTF as the only financing institution provided for WRUA in law has rendered the other actors non-committal to funding WRUAs because they have no budgetary provision for the same. This is because of inadequate legal provisions for financial and technical support to WRUA by other actors, including the county government of Trans Nzoia.

Dependence of WRUA on WSTF and WRMA as the major financiers for implementation of SCMP activities through WDC has proved to be unsuccessful since the WRUA has not received further funding for activities since the last funds received through WDC in 2012. This has affected the capacity of WRUA to implement activities due to lack of funding to facilitate implementation of various activities in the river basin. The lack of funding has caused the WRUA not to be as active as they would wish in holding frequent meetings with all its members, and this in turn has rendered some members inactive in terms of participating in WRUA meetings and activities.

The need for availability of funds for WRUAs to enable them implement activities such as tree planting, soil and water conservation activities, awareness creation on environmental management and conservation among others, cannot be iterated. From the interviews it is evident that WRUAs are important grass root institution through which the government can use to realize community involvement in decision making processes and implementation of various activities. However, the lack of funding has rendered the WRUA almost inactive thereby losing visibility of WRUA as an organization among stakeholders.

Some of the WRUA members and non WRUA members who reside within Machinjoni river basin reported to have lost interest in WRUA because they do not see any short term benefits for joining or participating in WRUA meetings and activities, and this is affecting the membership of WRUA yet WRUAs are empowered through membership. A local community member stated

that *"…most people wanted to join but because they had limited fish ponds to riparian land owners I got discouraged".* In one way this implies that the local community is aware to some extent on issues to do with WRUA, but they want assurance of tangible benefits before they join the WRUA. On the other hand, it implies that due to lack of funds to engage in livelihood or income generating activities on the part of WRUA they continue to lose potential members which affects their growth in terms of membership.

WRUA as described in law is a forum for conflict resolution and collaborative management of water resources and has a wide category of membership spanning from individual riparian land owners to organizations like water service providers and CBOs among others. This legal provision offers a platform for local community members to come together and have a sense of ownership for shared water resources. This further provides an opportunity for growth of WRUA in terms of collaboration with stakeholders who have a common interest in the shared water resource, as is the case of Machinjoni River.

Nevertheless, collaboration of stakeholders is driven by their interest and priority as per their respective roles and responsibilities, and this determines whether or not a certain stakeholder joins the WRUA or undertakes activities in collaboration with the WRUA. Unfortunately, the voluntary nature of WRUAs as described in law also implies or denotes that WRUA is a 'free service' organization among some stakeholders, which in turn results in WRUA generally not being taken seriously by some stakeholders and community members and this affects the implementation capacity of WRUA in RBM.

The County Governments Act 2012 gives the counties the mandate to formulate sector specific laws in accordance with national laws, and currently Trans Nzoia County has not formulated any laws to guide RBM activities. As such, RBM issues are cross cutting and are majorly being handled by the county environment department whose focus is currently on riverbank protection through tree planting. Under county department of water, WRUAs have been put in the same category as Water service providers (WSPs) and this has implications on their performance in WRM since their role of resource protection and conservation is overshadowed by that of WSPs which is supplying water. In the same breadth therefore, recognition of WRUAs as an entity is not there and this has implications on planning and budgeting for their activities hence no budgetary provision for WRUA activities at county level.

In light of this, the Water Act 2002 is currently under review and the proposed Water Bill 2014 which is expected among other things to provide clear water sector specific guidelines on how national and county governments will cooperate is pending approval by parliament. The proposed bill maintains the separation of functions between water resources management and water services provision by establishing the Water Resources Regulation Authority (WRRA) and the Water Services Regulatory Authority (WSRA) to be in charge of water resources management and water services provision respectively. WRUAs have also been maintained at sub basin level for collaborative management of water resources and to act as fora for conflict resolution related to the use of water resources.

By virtue of their establishment under the Water Act 2002 and their operation as detailed in the Water Management Rules 2007, WRUAs have legal recognition and operate at the lowest appropriate levels within their sub catchments. They are the vehicle through which community participation in water resource management is actualized and this also makes them a potential platform for politicians implying that they can be affected by politics. Empirical evidence shows

that politics is in play even in formulation of ministries at the county level and emphasis is currently placed on environmental issues and water service provision more that on water resources management which affects the WRUA because their significance in water resource protection and conservation is down played.

According to the findings, Machinjoni WRUA needs recognition at county level in order to facilitate successful implementation of activities with relevant county departments and other stakeholders at county level. Catchment management function was devolved to county governments with the dispensation of the COK 2010. As such, the WRUAs need recognition at county level in order for them to receive and be accorded the necessary technical and financial support required for their activities in RBM. From most of the respondents, it was evident that most county government departments were not aware that WRUA exist, and if they were then they had barely interacted with them to know what part they play in RBM.

Machinjoni WRUA reported that they experience difficulties in implementing RBM activities because of lack of funds. According to the WRUA, they have not received any funding from any organizations since the year 2012 when they received level 1 funding from WSTF amounting to Ksh. 790,000.00 to carry out capacity building and SCMP development. The WRUA acknowledges that the county government has continued to provide tree seedlings to them for river bank protection, but the county government does not provide funds to facilitate the tree planting activities forcing them often to dip into their own pockets.

Lack of provision for funds to facilitate the tree planting activities by county government has also caused conflicts between the WRUA and some community members who often demand for payment before planting trees. Apart from the finding that the county government environment department lacks budgetary provision for direct WRUA funding, it is also evident that despite findings that WRUA is included in decision making processes at county level through public participation in county assemblies and other public forums, this is not enough to ensure WRUA concerns are adequately addressed.

The WRUA needs to be considered and consulted during planning meetings for events such as tree planting in order for the county stakeholders to understand the intricate details including budgetary implications that come with mobilization of community members for tree planting events. As it is, decisions concerning river bank protection by county government are made on behalf of WRUA as is evident with the example of tree planting events and the WRUA is informed at implementation stage which directly affects them in undertaking the tree planting activities with community members. WRUA therefore, needs to be looked at as a key interest group and an important stakeholder and not just as part of the general public.

The stakeholder collaboration in Machinjoni river basin has not led to enhancing the capacity of the WRUA in implementation of RBM activities because many of these stakeholders despite being government departments have no power to effect change, attributed mainly to the lack of clear guidelines in law on cooperation among actors. Power differentials among the stakeholders also affect their ability to effective participation rendering many of them limited to participatory role in meetings. According to the findings, information sharing is inadequate and this has led to lack of awareness on what other actors are doing in RBM and especially on the part of WRUA, such that some actors are not aware of who WRUA is or their significance in RBM. Inadequate information sharing therefore hampers coordination and effective collaboration among

stakeholders at county level. The lack of joint planning and formal partnership agreements among stakeholders has also resulted in a lack of commitment among actors in RBM.

Conclusion

In this chapter, the researcher has described the policies, laws, rules and regulations available for RBM in Kenya and Trans Nzoia County, as well as the roles and responsibilities of the various government actors at national and county level and the roles of non-state actors including a local NGO and Machinjoni WRUA. A description of the level of implementation capacity of Machinjoni WRUA has also been given as per the findings, and analytical explanations on how the legal framework and roles and responsibilities of actors affect implementation capacity of Machinjoni WRUA in RBM.

Summary of the major findings of this thesis are that: there is existing legal framework for RBM in Kenya, and various organizations have been established to handle environmental and water resources management issues both at national and county level. However, county specific laws and regulations for RBM in Trans Nzoia County government are not in place, showing disconnect between national and county government linkages and consequently presence of overlaps and duplications in roles and responsibilities of organizations related to water management at county level.

The study has also established that there are gaps in legal provisions which include; lack of clear guidelines on coordination of actors in RBM both at national and county level and inadequate financial and technical provisions for WRUA. Lack of clear guidelines and structures for accountability among these organizations has resulted in inefficiency in enforcement of laws and a lack of commitment to Machinjoni WRUA by relevant state agencies and county government departments leaving the WRUA confused, not knowing who or which organization to report to and or seek for support from.

The thesis has also established that there is no coordination among state agencies (NEMA and WRMA) and county departments of Environment, Water, Agriculture and Public health in implementation of catchment conservation and protection activities in Machinjoni River basin also resulting from lack of clear guidelines in available laws. Inadequate legal provisions for technical and financial support for WRUAs has resulted in lack of adequate financial resources on the parts of both county departments and WRUA hampers the implementation of catchment management activities within Machinjoni River basin.

Other findings of the study are that the main concern of WRUA in Machinjoni River basin is protection of water resource due to adverse pollution therefore water allocation conflicts are not experienced and WRUA is not adequately involved in decision making at county level which affect their implementation capacity in RBM.

Chapter 5: Conclusions and recommendations

This chapter presents the concluding remarks for the whole study and provides interpretations of findings. Answers for the research question as well as the sub questions according to empirical evidence are also discussed.

5.1 Research Objective

The purpose of this research was to investigate the influence of current institutional arrangements for river basin management in Trans Nzoia County in Kenya, and how their interactions affect implementation capacity of Machinjoni WRUA, a voluntary community association of water users in river basin management.

To achieve this objective, Institutional arrangements have been described in terms of the existing legal framework available at national and county government level, as well as the roles and responsibilities of organizations related to water management at both levels. Level of implementation capacity of Machinjoni WRUA has been measured and described in terms of adequacy of resources held by WRUA both financial and technical skills including the ability of WRUA leadership to secure community and stakeholder support in various aspects. Explanations of the influence of legal framework and roles and responsibilities of water related organizations on level of implementation capacity of Machinjoni WRUA in river basin management are also given.

5.2 Research sub question 1: What are the key characteristics of current institutional arrangements related to river basin management in Machinjoni?

According to reviewed literature, characteristics of institutional arrangements are described in terms of legal framework and related roles and responsibilities of organizations. Accordingly, the research established that legal framework for river basin management in Kenya is available but not adequate for effective management of water resources at river basin level. RBM is currently being undertaken under the guidance of the National Water Policy 1999, which set in motion water sector reforms in Kenya with the aim of separating key functions such as water service provision from water resources management. RBM in Kenya is undertaken based on river basin or catchment approach, in line with IWRM principle.

Most of the policies and laws in the country are currently under review in a bid to align them with the requirements of COK 2010 and newly established county governments. The existing laws for RBM are as follows: EMCA 1999 and its subsidiary legislations such as the EMCA (Water Quality) Regulations 2006 is the overall state law applicable to issues related to environmental management, while on the other hand the Water Act 2002 and subsidiary legislations such as WRM Rules 2007 is the overall state law for water management and has considerations for both water services provision and water resources management. Other relevant laws for RBM include: Agriculture Act Cap 318, Public Health Act Cap 242, Land Act Cap 280 and Survey Act Cap 299.

As suggested by Bandaragoda (2000), stakeholders need to be structured through effective organizational and procedural arrangements so that each stakeholder group is aware of its own and others rights and responsibilities. The study found out that the various laws discussed in the previous sections provide guidelines for respective agencies to undertake activities related to RBM, but have some grey areas subject to interpretation by concerned authorities or agencies.

For instance, these laws do not make explicit reference to EMCA 1999 and consequently NEMA as the coordinating agency for environmental issues for which river basins are part of. As a result, the provisions are subject to interpretation. Also, based on the current water sector policies, laws, rules and regulations governing river basin management in Kenya, there is no clear guidelines on vertical and horizontal linkages between national government actors and their counterparts in county governments. This lack of vertical and horizontal interplay has resulted in lack of coordination among key actors with regard to implementation of various RBM activities At the moment various policies and laws in the country are under review to align them with the provisions of COK 2010 and enable for clear guidelines on interactions between the national and the county governments on issues including water management.

In terms of roles and responsibilities, there is no clear structure for collaboration and accountability for the various organizations related to water management at both national and county level as well as the non-state actors. EMCA 1999 gives NEMA the role of coordination of all lead agencies in environment, but because this is not referred to in the other laws such as Water Act 2002, Agriculture Act and County Government Act 2012 among others, actors do not necessarily regard NEMA as the coordinating agency, but rather a key player in RBM. The National and County government jurisdictions have no clear definitions for actor linkages and collaboration across hydrological and traditional administrative boundaries in play and this has resulted in confusion and misinterpretation of mandates, duplication and overlaps in roles and responsibilities among state actors both at national and county level, as well as the non-state actors ultimately resulting in blame game among key players in RBM.

5.3 Research Sub question 2: What is the level of implementation capacity of Machinjoni WRUA in river basin management?

As Butler (2003) and Chifamba (2013) observe, availability of resources and skills within an organization determine the level of implementation capacity of that organization. Empirical evidence has established that Machinjoni WRUA lacks the necessary financial resources and technical skills needed to effectively carry out conservation and protection activities in Machinjoni sub catchment, and as such require support from stakeholders. The study finds that WRUA's implementation capacity is low because their ability to attract and absorb funds is very low. The WRUA has limited funds and according to their bank statements, they have not received funding from any stakeholder since 2012. Technical support is given to the WRUA whenever an activity is being implemented, but formal training through workshops and seminars to build capacity has not been done by any stakeholder, apart from the capacity building workshop for SCMP development held in 2012 by WRMA.

Literature suggests that some level of competence is needed on the part of community groups such as WRUA in order to effectively implement activities. As seen from evidence, Machinjoni WRUA lacks the necessary technical skills to adequately mobilize resources needed for operations of the WRUA including implementation of activities and despite their active participation in tree planting activities; the WRUA has not implemented many catchment conservation and protection activities. The research findings are in agreement with Butler (2003) and Chifamba (2013) propositions.

The leaders of WRUA are considered influential by some actors, but there are also those actors who are not aware that WRUA exists implying that the WRUA should enhance their visibility on the ground in order to secure their position as legitimate actors in RBM. Membership of WRUA

is growing according to WRUA management due to the continuous mobilization and sensitization that they carry out, as well as awareness creation on WRUA activities in the community through tree planting initiatives and river bank protection.

Participation has also been viewed by scholars like Honadle (1981) as a significant to capacity of an organization. The findings indicate that the WRUA has gender considerations in management and youth participation is ensured in meetings and activities by having a youth leader as a member in the overall management committee who represents youth matters and relays information between youth members and management committees. Despite this arrangement, empirical evidence suggests that there is more active participation among the management committee members of WRUA compared to that of ordinary WRUA members. This is partly attributed to poor communication and information sharing between management and ordinary WRUA members, as some members reported not to be aware of activities on time thus hindering their participation.

5.4 Research sub question 3: How do legal framework and roles and responsibilities of organizations in water management affect the level of implementation capacity of Machinjoni WRUA in river basin management?

As it is, the legitimacy of WRUA as an actor in water resource management is enabled through the Water Act 2002, but their legitimacy as perceived by community and stakeholders on the ground is wanting because WRUA is not receiving the necessary support from departments charged with enforcing their respective laws. As a result WRUA is seen as being weak and not being able to ensure compliance to set rules and regulations for riparian protection and conservation. This finding echoes the observation made by Bandaragoda (2000) that community groups in water management require an enabling legal environment, a friendly support policy and law enforcement authorities, in order for them to become established.

To ensure commitment for financial support of county governments to WRUA, legal provisions for financial support of WRUAs should be included in the laws that the county government of Trans Nzoia is required to formulate in relation to river basin management.

County governments are established alongside administrative boundaries while WRMA, the national agency in charge of water resources management is mandated to discharge its duties under catchment approach basis, which is based on river basins. This has implications on management of water resources between national and county governments and is consistent with the proposition of several scholars including Pahl-Wostl (2009) and Borowski, Le Bourhis et al (2008) that difficulties exists when dealing with vertical and horizontal interplay between newly established institutions at basin scale and those organized on traditional administrative boundaries. This difficulty is a barrier in terms of collaboration and facilitation of technical and financial support to Machinjoni WRUA in RBM.

It is also apparent from the findings and reviewed literature as in the words of Bandaragoda (2000) who suggests that stakeholders require effective organizational and procedural arrangements to enable each stakeholder to be aware of its own rights and responsibilities as well as that of others, to facilitate effective water resources management at river basin level. The presence of multiple actors in Machinjoni River basin does not necessarily mean that there is effective collaboration among them. Apart from the MOU signed between WRMA and WRUA, no formal agreements are in place among actors for implementation of RBM activities and this has resulted in lack of commitment towards the WRUA. This lack of effective collaboration

among state, county and NGOs as actors in RBM has further resulted in inadequate information sharing and consequently a lack of synergy among these actors which negatively affects the implementation capacity of WRUA. Effective stakeholder collaboration requires coordination in order to work. RBM embraces the concept of IWRM which involves collaboration of multiple actors in water resources management. Many hands make light work and therefore coordination of the activities by multiple actors is paramount for effective cooperation.

The duplication in roles and responsibility arising from practice is an issue of interpretation of the legal mandates for each institution. Every institution wants to feel like the supreme and doesn't want to be micro managed and that is why the role of NEMA in environmental management is overlooked by stakeholders in practice despite them being aware that the function of NEMA is coordination. This shows that IWRM is a concept that is not well known to the actors implementing activities on the ground.

From the findings, various reasons have attributed to weak enforcement of laws, rules and regulations, and this impact the WRUA's ability to implement catchment management activities in the river basin. Some of these include; overlapping mandates, misunderstanding and misinterpretation of mandates, lack of information sharing among key stakeholders and WRUA, lack of coordination among stakeholders and lack of facilitation in terms of finances not only for WRUA but also for line ministry departments to enable them adequately discharge their mandates.

5.5 Main Research Question: How do the current institutional arrangements influence the implementation capacity of Machinjoni WRUA in river basin management?

As described by Mumma 2007, institutional set up for IWRM in Kenya is based on the Water act 2002 in which the water sector reforms revolve around four themes namely; separation of management of water resources from water service provision, separation of policy making from daily administration and regulation, decentralization of functions to lower level state organs and stakeholder involvement in management of water resources and provision of water services.

Kenya is currently undergoing radical changes in relation to governance of natural resources as a result of implementation of the COK 2010. With devolution of some key functions in water resource management to county governments, various laws including Water Act 2002 and EMCA 1999 are currently under review, in a bid to align them with the requirements of the COK 2010. This has implications for county governments as well as they are faced with the challenge of formulating county specific laws and regulations in line with provisions in the national legal framework.

The nested arrangements for the legal framework in Kenya between National and County Governments are not well defined because the county governments are newly established entities with limited resources. Trans Nzoia County is yet to develop county specific laws for management of water resources, and as such are using the EMCA 1999 and Water Act 2002, which do not have clear guidelines for accountability of various state and county actors in water management. This impacts on the WRUA because the WRUA is not sure who to report to because with the changes going on in the county and the country as a whole, actors are not sure where their roles begin and where they end. Therefore to avoid overstepping their boundaries

and getting into conflict with one another, there is no single institution taking full responsibility for RBM giving leeway for blame game among the actors.

Currently, the institutional arrangements for RBM are also not adequate to ensure smooth transition of functions from national to county governments, and across various actors both state and non-state actors at the local level. As a result, there is lack of coordination among state actors at national and county level, as well as non-state actors such as NGOs and WRUA, in the course of implementing RBM activities. This lack of coordination arises also from both overlaps and duplication in mandates of various state agencies as given by law, and has consequently resulted in duplication of roles and responsibilities in practise thereby affecting the implementation capacity of Machinjoni WRUA in RBM.

As discussed in this chapter and the previous chapter, this study has used empirical evidence to show that the current institutional arrangements in Kenya and subsequently Trans-Nzoia County both enable and suppress but does not enhance the implementation capacity of Machinjoni WRUA in RBM. Available legal framework and roles and responsibilities of organizations related to water management provide an enabling environment for the WRUA to undertake activities for RBM, but the nested framework of institutions both at national and county level are not well embedded indicating a disconnect in vertical and horizontal linkages between and among these institutions. This presents barriers in terms of lack of coordination, overlapping mandates and duplication of roles and responsibilities, weak enforcement, inadequate information sharing and lack of commitment to WRUA.

The study has also established that Machinjoni river basin is unique because unlike available literature on WRUAs and upstream downstream water use in irrigation projects, this WRUA has the challenge of protecting the water resource from adverse pollution which is already experienced. It sheds light that on sub catchment experiencing adverse water quality issues priority is on protection efforts rather than sharing water between upstream and downstream users and this explains the lack of water user conflicts in the sub catchment.

5.6 Recommendation for further Research

Recommendation for further research on environmental policy decentralization in relation to furthering insights on common property institutions have been made by scholars including Lemos and Agrawal (2006) and Lemos and De Oliveira (2004). WRUA is an example of a common property institution and it is a model for community based water resources management involving stakeholders. Kenya has embraced the concept of WRUA and the drainage basins in the country have already been demarcated and establishment of WRUAs along these river basin boundaries has been on-going since their establishment in Water Act 2002. There is need therefore for further research on sustainability of these WRUAs in RBM given that their structure continues to be maintained in law as vehicles for community participation in water management. Further research comparing the level of implementation capacity of WRUAs could be done in order to establish apart from enabling institutional arrangements and other aspects what successful WRUAs (if any) are doing that can be used as best practices for those still struggling with capacity issues, as is the case with Machinjoni WRUA.

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Annex 1

Annex 1: Interview Guide for Government Agencies

Key Respondent Interview Guidelines

My name is Leah Naliaka Mukiite. I am a student of IHS, Erasmus University. This interview guide is a research instrument for the research on *'Institutional Arrangements and their influence on Implementation capacity of Machinjoni Water Resource Users Association in river basin management, Kitale town, Trans-Nzoia County, Kenya.'* The instrument is strictly confidential and the data collected will be used for academic purposes only.

Date and time of interview:

Data of the respondents:
Name:
Tel:
Email:
Position:
Institution:

Interview Guide for Water Resources Management Authority (WRMA)

Section A: Roles and responsibilities of organizations related to water management

1. Can you tell me what your roles and responsibilities are in relation to river basin management?
2. Are there overlaps or duplication of roles and responsibilities between your organization and other agencies?
3. In your opinion, which institutions are actively involved in river basin management?
4. What are some of the partnership agreements you have with WRUAs and other agencies?

Section B: Linkages and Agency Support to WRUA

Technical capacity

5. In what way do you provide technical assistance to WRUA?

Financial resources

6. What are the funding mechanisms available for WRUA?

Participation

7. How often does your organization participate in WRUA meetings and activities?

Conflict resolution

8. How does your organization ensure equitable access of water to all users in the river basin?
9. What is your experience regarding conflicts with Machinjoni WRUA?
10. How about conflicts with other stakeholders apart from WRUA?
11. How do you resolve conflicts when they arise?

Information sharing

12. What are your communication channels with WRUA?

13. How do you communicate, share information and plan activities with stakeholders?
14. How is Machinjoni WRUA involved in decision making processes?

Organization structure of WRUA

15. What are the functions, roles and responsibilities of WRUA?
16. How can one become a WRUA member?
17. In your opinion, how influential are WRUA leaders to community and other stakeholders?

Section C: Legal basis for Involvement in River Basin Management

18. Can you tell me which laws support your activities in river basin management?
19. How is conflict resolution and user participation provided for in law?
20. How does your organization ensure stakeholder participation in river basin management?
21. What role do you play when it comes to resolving WRUA related conflicts?
22. How is technical and financial support for WRUA provided for in law?
23. What role does your organization play with regard to election of WRUA leaders?
24. Which institution(s) in your opinion is WRUA accountable to and why?
25. What is your opinion on current laws and policies in river basin management?

Annex 2: Interview Guide for Government Agencies

Key Respondent Interview Guidelines

My name is Leah Naliaka Mukiite. I am a student of IHS, Erasmus University. This interview guide is a research instrument for the research on *'Institutional Arrangements and their influence on Implementation capacity of Machinjoni Water Resource Users Association in river basin management, Kitale town, Trans-Nzoia County, Kenya.'* The instrument is strictly confidential and the data collected will be used for academic purposes only.

Date and time of interview:

Data of the respondents:
Name:
Tel:
Email:
Position:
Institution:

Interview Guide for National Environmental Management Agency (NEMA)

Section A: Roles and responsibilities of organizations related to water management

1. Can you tell me what your roles and responsibilities are in relation to river basin management?
2. Are there overlaps or duplication of roles and responsibilities between your organization and other agencies?
3. In your opinion, which institutions are actively involved in river basin management?
4. What are some of the partnership agreements you have with WRUAs and other agencies?

Section B: Linkages and Agency Support to WRUA

Technical capacity

5. In what way do you provide technical assistance to WRUA?

Financial resources

6. What are the funding mechanisms available for WRUA?

Participation

7. How often does your organization participate in WRUA meetings and activities?

Conflict resolution

8. How does your organization ensure equitable access of water to all users in the river basin?
9. What is your experience regarding conflicts with Machinjoni WRUA?
10. How about conflicts with other stakeholders apart from WRUA?
11. How do you resolve conflicts when they arise?

Information sharing

12. What are your communication channels with WRUA?

13. How do you communicate, share information and plan activities with stakeholders?
14. How is Machinjoni WRUA involved in decision making processes?

Organization structure of WRUA

15. What are the functions, roles and responsibilities of WRUA?
16. How can one become a WRUA member?
17. In your opinion, how influential are WRUA leaders to community and other stakeholders?

Section C: Legal basis for Involvement in River Basin Management

18. Can you tell me which laws support your activities in river basin management?
19. How is conflict resolution and user participation provided for in law?
20. How does your organization ensure stakeholder participation in river basin management?
21. What role do you play when it comes to resolving WRUA related conflicts?
22. How is technical and financial support for WRUA provided for in law?
23. What role does your organization play with regard to election of WRUA leaders?
24. Which institution(s) in your opinion is WRUA accountable to and why?
25. What is your opinion on current laws and policies in river basin management?

Annex 3: Interview Guide for Government Agencies

Key Respondent Interview Guidelines

My name is Leah Naliaka Mukiite. I am a student of IHS, Erasmus University. This interview guide is a research instrument for the research on *'Institutional Arrangements and their influence on Implementation capacity of Machinjoni Water Resource Users Association in river basin management, Kitale town, Trans-Nzoia County, Kenya.'* The instrument is strictly confidential and the data collected will be used for academic purposes only.

Date and time of interview:

Data of the respondents:
Name:
Tel:
Email:
Position:
Institution:

Interview Guide for Department of Water

Section A: Roles and responsibilities of organizations related to water management

1. Can you tell me what your roles and responsibilities are in relation to river basin management?
2. Are there overlaps or duplication of roles and responsibilities between your organization and other agencies?
3. In your opinion, which institutions are actively involved in river basin management?
4. What are some of the partnership agreements you have with WRUAs and other agencies?

Section B: Linkages and Agency support to WRUA

Technical capacity

5. In what way do you provide technical assistance to WRUA?

Financial resources

6. What are the funding mechanisms available for WRUA?

Participation

7. How often do you participate in WRUA meetings and group activities?

Conflict resolution

8. How does your organization ensure equitable access of water to all users in the river basin?
9. What is your experience regarding conflicts with Machinjoni WRUA?
10. How about conflicts with other stakeholders apart from WRUA?
11. How do you resolve conflicts when they arise?

Information sharing

12. What are your communication channels with WRUA?

13. How do you communicate, share information and plan activities with stakeholders?
14. How do you ensure that WRUA are included in decision making processes at the County level?

Organization structure of WRUA

15. In your opinion, how influential are WRUA leaders to community and other stakeholders?

Section C: Legal basis for involvement in River Basin Management

16. Can you tell me which laws support your activities in river basin management?
17. How is conflict resolution and user participation provided for in law?
18. How does your organization ensure stakeholder participation in river basin management?
19. What role do you play when it comes to resolving WRUA related conflicts?
20. How is technical and financial support for WRUA provided for in law?
21. What role does your organization play with regard to election of WRUA leaders?
22. Which institution(s) in your opinion is WRUA accountable to and why?
23. What is your opinion on current laws and policies in river basin management?

Annex 4: Interview Guide for Government Agencies

Key Respondent Interview Guidelines

My name is Leah Naliaka Mukiite. I am a student of IHS, Erasmus University. This interview guide is a research instrument for the research on *'Institutional Arrangements and their influence on Implementation capacity of Machinjoni Water Resource Users Association in river basin management, Kitale town, Trans-Nzoia County, Kenya.'* The instrument is strictly confidential and the data collected will be used for academic purposes only.

Date and time of interview:

Data of the respondents:
Name:
Tel:
Email:
Position:
Institution:

Interview Guide for Department of Public Health and Sanitation

Section A: Roles and responsibilities of organizations related to water management

1. Can you tell me what your roles and responsibilities are in relation to public health and sanitation in river basins?
2. Are there overlaps or duplication of roles and responsibilities between your organization and other agencies?
3. How do you collaborate with Machinjoni WRUA?
4. In your opinion, which institutions are actively involved in water management at river basin level?
5. What are some of the partnership agreements you have with WRUA and other agencies?

Section B: Linkages and Agency Support to WRUA

Technical capacity

6. In what way do you provide technical assistance to WRUA?

Financial resources

7. What are the funding mechanisms available for WRUA?

Participation

8. How often does your organization participate in WRUA meetings and activities?

Conflict resolution

9. What is your experience regarding conflicts with Machinjoni WRUA?
10. How about conflicts with other stakeholders apart from WRUA?
11. How do you resolve conflicts when they arise?

Information sharing

12. What are your communication channels with WRUA?

13. How do you communicate, share information and plan activities with stakeholders?
14. How do you ensure that WRUA are included in decision making processes at the County level?

Organization structure of WRUA

15. In your opinion, how influential are WRUA leaders to community and other stakeholders?

Section C: Legal basis for involvement in River Basin Management

16. Can you tell me which laws support your activities at river basin level?
17. How is conflict resolution and user participation provided for in law?
18. How does your organization ensure stakeholder participation in public health activities at river basin level?
19. How is technical and financial support for WRUA provided for in law?
20. What role does your organization play with regard to election of WRUA leaders?
21. Which institution(s) in your opinion is WRUA accountable to and why?
22. What is your opinion on current laws and policies for water management at river basin level?

Annex 5: Interview Guide for Government Agencies

Key Respondent Interview Guidelines

My name is Leah Naliaka Mukiite. I am a student of IHS, Erasmus University. This interview guide is a research instrument for the research on *'Institutional Arrangements and their influence on Implementation capacity of Machinjoni Water Resource Users Association in river basin management, Kitale town, Trans-Nzoia County, Kenya.'* The instrument is strictly confidential and the data collected will be used for academic purposes only.

Date and time of interview:

Data of the respondents:
Name:
Tel:
Email:
Position:
Institution:

Interview Guide for Department of Environment

Section A: Roles and responsibilities of organizations related to water management

1. Can you tell me what your roles and responsibilities are in relation to river basin management?
2. Are there overlaps or duplication of roles and responsibilities between your organization and other agencies?
3. How do you collaborate with Machinjoni WRUA?
4. In your opinion, which institutions are actively involved in river basin management?
5. What are some of the partnership agreements you have with WRUAs and other agencies?

Section B: Linkages and Agency Support to WRUA

Technical capacity

6. In what way do you provide technical assistance to WRUA?

Financial resources

7. What are the funding mechanisms available for WRUA?

Participation

8. How often does your organization participate in WRUA meetings and activities?

Conflict resolution

9. What is your experience regarding conflicts with Machinjoni WRUA?
10. How about conflicts with other stakeholders apart from WRUA?
11. How do you resolve conflicts when they arise?

Information sharing

12. What are your communication channels with WRUA?
13. How do you communicate, share information and plan activities with stakeholders?

14. How do you ensure that WRUA are included in decision making processes at the County level?

Organization structure of WRUA

15. In your opinion, how influential are WRUA leaders to community and other stakeholders?

Section C: Legal basis for involvement in River Basin Management

16. Can you tell me which laws support your activities in river basin management?
17. How is conflict resolution and user participation provided for in law?
18. How does your organization ensure stakeholder participation in river basin management?
19. What role do you play when it comes to resolving WRUA related conflicts?
20. How is technical and financial support for WRUA provided for in law?
21. What role does your organization play with regard to election of WRUA leaders?
22. Which institution(s) in your opinion is WRUA accountable to and why?
23. What is your opinion on current laws and policies in river basin management?

Annex 6: Interview Guide for Government Agencies

Key Respondent Interview Guidelines

My name is Leah Naliaka Mukiite. I am a student of IHS, Erasmus University. This interview guide is a research instrument for the research on *'Institutional Arrangements and their influence on Implementation capacity of Machinjoni Water Resource Users Association in river basin management, Kitale town, Trans-Nzoia County, Kenya.'* The instrument is strictly confidential and the data collected will be used for academic purposes only.

Date and time of interview:

Data of the respondents:
Name:
Tel:
Email:
Position:
Institution:

Interview Guide for Department of Agriculture

Section A: Roles and responsibilities of organizations related to water management

1. Can you tell me what your roles and responsibilities are in relation to river basin management?
2. Are there overlaps or duplication of roles and responsibilities between your organization and other agencies?
3. How do you collaborate with Machinjoni WRUA?
4. In your opinion, which institutions are actively involved in river basin management?
5. What are some of the partnership agreements you have with WRUAs and other agencies?

Section B: Linkages and Agency Support to WRUA

Technical capacity

6. In what way do you provide technical assistance to WRUA?

Financial resources

7. What are the funding mechanisms available for WRUA?

Participation

8. How often does your organization participate in WRUA meetings and activities?

Conflict resolution

9. What is your experience regarding conflicts with Machinjoni WRUA?
10. How about conflicts with other stakeholders apart from WRUA?
11. How do you resolve conflicts when they arise?

Information sharing

12. What are your communication channels with WRUA?
13. How do you communicate, share information and plan activities with stakeholders?

14. How do you ensure that WRUA are included in decision making processes at the County level?

Organization structure of WRUA

15. In your opinion, how influential are WRUA leaders to community and other stakeholders?

Section C: Legal basis for involvement in River Basin Management

16. Can you tell me which laws support your activities in river basin management?
17. How is conflict resolution and user participation provided for in law?
18. How does your organization ensure stakeholder participation in river basin management?
19. What role do you play when it comes to resolving WRUA related conflicts?
20. How is technical and financial support for WRUA provided for in law?
21. What role does your organization play with regard to election of WRUA leaders?
22. Which institution(s) in your opinion is WRUA accountable to and why?
23. What is your opinion on current laws and policies in river basin management?

Annex 7: Interview Guide for Non-Governmental Organization

Key Respondent Interview Guidelines

My name is Leah Naliaka Mukiite. I am a student of IHS, Erasmus University. This interview guide is a research instrument for the research on *'Institutional Arrangements and their influence on Implementation capacity of Machinjoni Water Resource Users Association in river basin management, Kitale town, Trans-Nzoia County, Kenya.'* The instrument is strictly confidential and the data collected will be used for academic purposes only.

Date and time of interview:

Data of the respondents:
Name:
Tel:
Email:
Position:
Institution:

Interview Guide for KEETA Project

Section A: Roles and responsibilities of organizations related to water management

1. Can you tell me what your roles and responsibilities are in relation to river basin management?
2. How do you collaborate with Machinjoni WRUA?
3. In your opinion, which institutions are actively involved in river basin management?
4. What are some of the partnership agreements you have with WRUAs and other agencies?

Section B: Linkages and Organization Support to WRUA

Technical capacity

5. In what way do you provide technical assistance to WRUA?

Financial resources

6. What are the funding mechanisms available for WRUA?

Participation

7. How often does your organization participate in WRUA meetings and activities?

Conflict resolution

8. What is your experience regarding conflicts with Machinjoni WRUA?
9. How about conflicts with other stakeholders apart from WRUA?
10. How do you resolve conflicts when they arise?

Information sharing

11. What are your communication channels with WRUA?
12. How do you communicate, share information and plan activities with stakeholders?

Organization structure of WRUA

13. In your opinion, how influential are WRUA leaders to community and other stakeholders?

Section C: Legal basis for involvement in River Basin Management

14. Can you tell me which laws support your activities in river basin management?
15. How is conflict resolution and user participation provided for in law?
16. How does your organization ensure stakeholder participation in river basin management?
17. What role do you play when it comes to resolving WRUA related conflicts?
18. How is technical and financial support for WRUA provided for in law?
19. What role does your organization play with regard to election of WRUA leaders?
20. Which institution(s) in your opinion is WRUA accountable to and why?
21. What is your opinion on current laws and policies in river basin management?

Annex 8: Interview Guide for WRUA Management Committee

Focus Group Discussion Interview Guidelines

My name is Leah Naliaka Mukiite. I am a student of IHS, Erasmus University. This interview guide is a research instrument for the research on *'Institutional Arrangements and their influence on Implementation capacity of Machinjoni Water Resource Users Association in river basin management, Kitale town, Trans-Nzoia County, Kenya.'* The instrument is strictly confidential and the data collected will be used for academic purposes only.

Date and time of interview:

Data of the respondents

No.	Name	Mobile No.	Email address	Institution	Position
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Interview Guide for Machinjoni WRUA Management Committee

Section A: Roles and responsibilities of organizations related to water management

1. Can you tell me what your roles and responsibilities are in relation to river basin management?
2. Are there overlaps or duplication of roles and responsibilities between your organization and other agencies?
3. In your opinion, which institutions are actively involved in river basin management?
4. What are some of the partnership agreements you have with other agencies?
5. How does County Government of TransNzoia involve WRUA in decision making process?

Section B: Linkages with Water related Organizations

Technical capacity

6. What kind of technical assistance do you receive from the organizations you collaborate with?

Financial resources

7. Where does funding for your activities come from?

Participation

8. What is the representation of men and women in leadership positions?
9. How do you ensure equal participation of men, women and youth in WRUA project activities?

Conflict resolution

10. What types of conflicts are experienced in WRUA?
11. How do you relate with neighboring WRUAs?
12. How do you resolve conflicts when they arise?

Information sharing

13. How do you communicate, share information and plan activities with WRUA members and stakeholders?

Organization structure of WRUA

14. How can one become a WRUA member?
15. As WRUA, what steps have you taken to increase your visibility as an organization?
16. Can you tell me the activities that WRUA has already carried out?

Section C: Legal basis for involvement in River Basin Management

17. Which laws support your activities in River basin management?
18. What is your opinion on current laws and policies in river basin management?
19. Which institution(s) in your opinion is WRUA accountable to and why?

Annex 9: Interview Guide for Ordinary WRUA Members

Focus Group Discussion Interview Guidelines

My name is Leah Naliaka Mukiite. I am a student of IHS, Erasmus University. This interview guide is a research instrument for the research on 'Institutional Arrangements and their influence on Implementation capacity of Machinjoni Water Resource Users Association in river basin management, Kitale town, Trans-Nzoia County, Kenya.' The instrument is strictly confidential and the data collected will be used for academic purposes only.

Date and time of interview:

Data of the respondents

No.	Name	Mobile No.	Email address	Institution	Position
1.					
2.					
3.					
4.					
5.					
6.					
7.					

Interview Guide for Machinjoni Ordinary WRUA Members

Section A: Roles and responsibilities of organizations related to water management

1. Which institution(s) in your opinion is WRUA accountable to and why?

Section B: Linkages with Water related organizations

Technical capacity

2. How often do you receive trainings from other stakeholders that you work with?

Financial resources

3. Where does funding for your activities come from?

Participation

4. How do your leaders ensure equal participation of men, women and youth in WRUA project activities?

Conflict resolution

5. What types of conflicts are experienced in WRUA?
6. How do your leaders resolve conflicts when they arise?

Information sharing

7. How do your leaders communicate with members about WRUA activities?
8. How do your leaders communicate, share information and plan activities with the organizations you work with?

Organization structure of WRUA

9. What are the functions, roles and responsibilities of WRUA?

10. In your opinion, how influential are WRUA leaders to community and other stakeholders?
11. What steps have your leaders taken to increase visibility of WRUA as an organization?

Section C: Legal basis for involvement in River basin Management

12. What is your opinion on current laws and policies in river basin management?

Annex 10: Interview Guide for Non WRUA Members

Focus Group Discussion Interview Guidelines

My name is Leah Naliaka Mukiite. I am a student of IHS, Erasmus University. This interview guide is a research instrument for the research on 'Institutional Arrangements and their influence on Implementation capacity of Machinjoni Water Resource Users Association in river basin management, Kitale town, Trans-Nzoia County, Kenya.' The instrument is strictly confidential and the data collected will be used for academic purposes only.

Date and time of interview:

Data of the respondents

No.	Name	Mobile No.	Email address
1.			
2.			
3.			
4.			
5.			
6.			

Interview Guide for Non WRUA Members in Machinjoni River basin

1. In your opinion, which institutions are actively involved in river basin management?
2. How do you find out about what is happening in the county in relation to river basin management?
3. In your opinion, what are the benefits of joining WRUA?
4. Why haven't you joined Machinjoni WRUA?
5. In your opinion, how influential are WRUA leaders to community and other stakeholders?
6. Which institution(s) in your opinion is WRUA accountable to and why?
7. In your opinion, how are non-members involved in WRUA activities?
8. How do you relate with WRUA members?
9. Have you experienced any conflicts with WRUA members?
10. How about conflicts with other neighbors who are not WRUA members?