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PROSPECTS AND LIMITATIONS OF INTEGRATED WATERSHED MANAGEMENT IN KENYA: A CASE STUDY OF MARA WATERSHED

A THESIS

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AUTHOR

Isaac Wafula Wamalwa

Kämnäsvägen 5 E: 125

SE-22646, LUND.

SWEDEN.

@yahoo.com

SUPERVISOR

Johanna Alkan Olsson PhD

Lund University Centre for Sustainability Studies

Lund University.

SWEDEN.

.alkan_olsson@lucsus.lu.se

Abstract

For several decades, Integrated Watershed Management has been suggested and tried in several countries in the world, as an effective way to address complex water resource challenges. However its implementation has not been successful in most cases, due to various barriers. In Kenya, this approach is new and requires appropriate strategies to overcome these barriers and stimulate effective integrated watershed management. To design suitable and effective strategies, there is need to understand institutional features at various spatial levels, which promote or hinder integration and coordination. This paper therefore explores the prospects and barriers of integrated watershed management of Mara, by examining the existing complex set of biophysical and socio-economic conditions, stakeholders attitudes and perceptions, arrangements for participation of stakeholders, available institutional structures and financial plans, and recent policy reforms in water and forestry sectors. Empirical information was gathered from official documents, direct observations, semi-structured interviews with managers, administrators, politicians and households of Mara watershed. Results indicates that, integrated watershed management of Mara is likely to be fostered by the critical biophysical and socioeconomic conditions, suitable institutional structures that are being established, water and forestry reforms, recognition of stakeholder participation and enhanced education of stakeholders, and leverage of resources from NGOs. However this efforts are likely to be hampered by disparity of views and perspectives, egoistic tendencies of influential leaders, inadequate financial plans, lack of effective coordination mechanisms, ineffective multi-stakeholder process, unwillingness of the local community and the politicians if there interests are not addressed, and lack of legitimacy for the institutional structures that are being created. This study therefore suggests adoption of multi-stakeholder forums for building understanding and bridging the disparity of views, the need to address the legitimate interests of the local community and politicians, and enhanced level of understanding among stakeholders on the interactions and interdependencies among the variables of the ecosystem. Finally the study recommends the need for a more effective coordination arrangement such as elevation of the CAAC to the level of a coordinating agency instead of relying on a single government agency like WRMA as provided for by the water act 2002 at the catchment level. In conclusion as much as the new water sector reforms provide legitimacy, impetus and a framework for integrated watershed management in Mara and other water catchments in Kenya, implementation may still remain a challenge if barriers are not identified and addressed.

Key words: Integrated watershed management, Mara watershed, prospects, Limitations

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Abbreviations

AWIs	Agriculture –Wetland Interactions
CAAC	Catchment Area Advisory Committee
CFA	Community Forest Associations
COMIFORM	Community Based Integrated Forest Resource Conservation and Management
DPSIR	Driver-Pressure-State-Impact-Response
ESDA	Ewaso Ngiro Development Authority
FAO	Food and Agriculture Organization
GAWI	Guidelines on Agriculture, Wetlands and Water Resources Interaction Project
GBM	Greenbelt Movement
INTREPID	Integrated Trans-Boundary River Management Policy Development Project
KFWG	Kenya Forest Working Group
KWS	Kenya Wildlife Service
LVEMP	Lake Victoria Environmental Management Programme
NEMA	National Environment Management Authority
NELSAP	Nile Equatorial Subsidiary Action Plan
NEPAD	New Partnership for Africa's Development
NGOs	Non Governmental Organizations
TVA	Tennessee Valley Authority
UNEP	United Nation Environment Programme
UNO	United Nations Organization
WHO	World Health Organization
WRMA	Water Resources Management Authority
WRUA	Water Resources Users Association
WWF (EARPO)	World Wide Fund for Nature (East Africa Regional Programme)

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1.0. INTRODUCTION

Well functioning watersheds are not only vital for conservation of water resources, but also offers several other important ecosystem services and goods such as wood fuel , timber, carbon sequestration, biogeochemical cycling, soil formation, prevention of soil erosion, regulation of floods and hurricane surges, and acts as spiritual and cultural sites (Millenium Ecosystem Assessment, 2005). These services and goods support ecosystems, contribute to environmental stability and also sustain socio-economic development (Wood & Van Halsema, 2008; Millenium Ecosystem Assessment, 2005).

In spite of the crucial nature of watersheds to sustainable development, their impairment is a common feature worldwide not at least in Africa and Kenya. This impairment is as a result of high population, increased demand for food and rapid economic growth (Wood & Van Halsema, 2008), and has led to several challenges such as ecosystems destruction, threatened livelihoods, water scarcity and subsequent conflicts (Wood & Van Halsema, 2008; Cave et al., 2003; Bruijnzeel, 2004). In Kenya, the problem of watershed degradation is well illustrated by extensive deforestation of the Maasai Mau (Obare and Wangwe , 2008), and significant land modifications in the Mara watershed, with subsequent impacts on land and water resources, vital for ecosystems functioning, livelihoods and socio-economic development in Kenya and Tanzania (Mutie et al., 2006).

Previous water management efforts that were sectoral, technological and centralised have proved inadequate, because they failed to recognize and appreciate the intricacies and inter-relations of ecosystems (Pereira, 1973). Consequently, integrated watershed Management has been suggested as a solution and has been tried for decades in several countries in the world (Bowden, 1999; Mitchell, B., 1990; Bulkley, 1995; Lant, 1999; Pereira, 1973).In Kenya, new water reforms were introduced in 2002 (Kenya Gazette, 2002).These reforms culminated in the development of a new institutional framework for integrated watershed management, where the country was divided into six hydrological regions (WRMA, 2008). In line with the new reforms, there are efforts towards integrated watershed management in various major catchment and sub-catchment areas in the country including Mara (WRMA, 2008).

1.1. Problem definition

In spite of the fact that integrated watershed management has been widely accepted, and considered as an effective way of managing watershed resources particularly water, the implementation of this approach in practice remains a challenge, with management efforts and scientific studies largely remaining disjointed and disorderly (Bowden, 1999; Mitchell, B., 1990; Bulkley, 1995; Lant, 1999; Pereira, 1973) . This is due to poor integration and coordination, which is either fostered or hindered by a complex set of environmental and socio-economic and institutional factors at various spatial levels such as "(1) legislation and regulations, (2) policies and guidelines, (3) administrative structures, (4) economic and financial arrangements, (5) political structures and processes, (6) historical and traditional customs and values and (7) key participants or actors" (Mitchell, B., 1990).

The question is, are there chances that integrated watershed management will be successfully implemented in Kenya? Are there hindrances? In case, there are hindrances, could there be effective ways to address them and ensure successful implementation of the new reforms.

To address these questions and overcome the deficiencies in implementation, it is in this thesis stated that there is a need for stakeholder involvement in the comprehensive assessment of the complex set of environmental, socio-economic factors and various institutional arrangements for the inclusion of the diverse views and attitudes of stakeholders (Mitchell, B., 1990).

1.2. Rationale for the study

While new reforms in the water management sector offers a window of opportunity for integrated watershed management in Kenya, there could be lapses that may lead to its failure as observed in many other cases in the world (Mitchell, B., 1990). Similarly, lack of understanding of the available opportunities and limitations for effective and coordinated management of Mara watershed is a recipe for fragmented, ineffective integrated watershed management resulting into further degradation of the watershed, ecosystems, and deterioration of livelihoods of communities living in the watershed.

1.3. Aim of the Study

This paper examines the existing institutional factors in the Mara watershed such as stakeholders' attitudes and perceptions, mechanisms for participation of stakeholders, available institutional

structures and financial plans, and the recent policy reforms in water and forestry sectors. This paper also involves stakeholders in the comprehensive assessment of complex biophysical and socio-economic conditions of Mara watershed. This is aimed at understanding barriers and prospects of integrated watershed management in Kenya, while focusing on Mara watershed. Based on this understanding the study aims to provide useful information, to design effective strategies for overcoming barriers and improvement of the current water policy, in order to ensure effective transition towards integrated watershed management of Mara and other water catchments in Kenya. The study is also anticipated to contribute knowledge on effective integration process that remains inconsistent in theory and practice (German et al., 2006).

1.4. Research questions

1. What are the prevailing biophysical, social, economic and institutional conditions in Mara watershed context?
2. What are the prospects for integrated watershed management in the Mara watershed?
3. What are the challenges associated with integrated watershed management within river Mara context?
4. How can these challenges be addressed in order to stimulate effective integrated watershed management in the Mara river catchment?

2.0. Definitions of concepts

To gain understanding of the concept of integrated watershed management, this section defines and discuses four key concepts, that are crucial for any study dealing with this matter.

These concepts include *Integrated Watershed Management, Watershed, integration* and *participation.*

2. 1. Watershed

A *watershed* is defined, as the surface area bordered by rise in elevation of land, where water is gathered and drained into a water body such a marshland, watercourse or lake. The concept is also used, to refer to a *river basin*, *catchment area or drainage basin* (Pereira, 1973). The need to manage water resources at a watershed level is based on the argument that management of water resources on administrative and political boundaries could not effectively address water resources that spanned beyond them, such as Trans-boundary river basins.

2.3 Integration

Mitchell, B., (1990) and Born & Sonzogni, (1995) define "integration" in terms of four characteristics. They include *comprehensive, interconnective, strategic* and *coordinative*, where the *comprehensive* feature involves, consideration of a wide range of aspects within the watershed, argued to promote a more detailed understanding of the problem (Mitchell, B., 1990). The *strategic/operational* feature, entails focusing on more vital and pressing issues for ease of planning and implementation (Mitchell, B., 1990). While the *interconnective* feature lays emphasis on the relationships among all the variables within the watershed. This assumes a lot of interaction and multi-level communication across various academic disciplines, sectors, organisations, actors, policies, legislations and spatial levels, between informal and formal knowledge, management and policy making (Bowden, 1999; Mitchell, B., 1990; Hedelin, 2007). The coordinative feature considered key to integrated watershed management, focuses on harmonising a wide range of solutions in addressing the watershed challenges (Mitchell, B., 1990).

2.4. Participation

Participation is popularly defined as involvement of people in issues that affects them (Mitchell et al., 1997).It is argued that participation of stakeholders is crucial in several ways; first the process facilitates knowledge taping from a variety of sources, including informal ones acquired on a much longer time frame as compared to scientific knowledge, particularly from the people closely linked to the resource (Gadgil et al., 1993). Secondly it is considered vital in gaining a comprehensive picture of problem or issues in question, based on varying perspectives (Hemmati 2002 in Hedelin, 2007).It is also maintained that participation helps in generating better decisions, based on critical analysis of all shades of opinions including scientific information by various actors through the mechanism of "discursive rationality" (De Marchi & Ravetz, 2001).It is also argued that participatory process also facilitates garnering of support from various stakeholders including the politicians and the community, critical for the success of integrated watershed management (Mitchell, B., 1990). It is further suggested that effective development and management of water resources, can be realised by "the level of government nearest the problems and most capable of effectively representing the vital interests involved", as opposed to the traditional approach that was centralised and technocratic that failed to put into consideration socio-economic concerns (Bulkley, 1995) .

While participation is considered as a way to enhance capacity for tackling complex water resource challenges, there various setbacks which undermine the process and hence render it ineffective. It is argued that involvement of stakeholders doesn't necessarily mean that there views will be taken into consideration due to varying levels of influence (Hedelin, 2007) .At the same time varying and conflicting interests, pose difficulties in the efforts to reach consensus (Mitchell, B., 1990). In order to overcome conflicts, caused by diverse shades of opinions by various stakeholders in watershed management, and achieve integration, Mitchell, B., (1990) suggests two approaches that can be used. The first approach requires the identification of common social choices around which all efforts and agencies can converge to implement. The other approach involves trying to reconcile individual goals of different stakeholders. He however prefers the first approach because of difficulties in reconciling the different goals. Hedelin (2007) also adds that for effective participation to be achieved there must be ways to create understanding of the complex environmental issues involved in watershed management among stakeholders, and adequate mechanisms for dealing with power differences. To achieve integration and effective participation in watershed management, Mitchell, B., (1990) points out the need for structured coordination among various actors and institutions across spatial and temporal scales.

2.5. Integrated Watershed Management.

Based on different understanding of these concepts, different people have given diverse definitions of integrated watershed management. For example Mitchell, B. (1990) contends that integrated watershed management involves consideration of wide ranging relations among water, environmental and socio-economic aspects in the management of a watershed. While Margerum, 1995) points out that integrated watershed management requires all-inclusive assessment of all interactions in a watershed system with aim of formulating measures for management of significant areas and relationships. In spite of the different definitions, there is a common understanding that integrated watershed management entails holistic approach, effective participation of all stakeholders and coordinated management of water catchments (Mitchell, B., 1990; Cobourn, 1999). The need for integration is based on the argument that the society, land and water systems in the catchments are interconnected to form one complex system, with various variables that are interdependent and therefore can not be addressed separately (Pereira, 1973;Mitchell, B., 1990).It is also argued that intricate communications between various land based activities and aquatic ecosystems significantly affect the water resources (Pereira, 1973).

This approach was suggested as a solution, due to failure by the traditional approaches to handle complex water resources challenges such as non-point source pollution, loss of wetlands and their ecosystem services, loss of biodiversity, uneven supply and demand of water over space and time, conflicts among competing uses and users of water in both developing and developed countries .It has been adopted for decades in several countries such as New Zealand, U.S.A and U.K (Bowden, 1999; Mitchell, B., 1990; Bulkley, 1995; Lant, 1999; Pereira, 1973) . This shift was underscored by Dublin recommendations adopted by Rio de Janeiro conference on Environment and Development (ICWE , 1992). This is a departure from previous approaches that were narrow and sectoral, and failed to recognize and appreciate the complexity of ecosystems, as evidenced by disorderly approaches among various academic disciplines and fragmented institutional structures, with policies and regulations that overlapped, diverged or conflicted (Ballweber, 1995; Lant, 1999; Bulkley, 1995) .

Similarly in Kenya, failure by the past institutional and policy frameworks to deal with complex water challenges, attributed to impairment of watersheds resulting from changes in forest cover and land uses, the government introduced reforms in the water sector and forestry sector, after a wide consultation with several stakeholders (Kenya Gazette, 2002). These reforms marked a paradigm shift from the traditional approaches that was narrow, sectoral and based on government priorities, with regulatory and technical prescriptions that had failed to put into consideration socio-economic and political concerns, and other important linkages such as energy, wildlife and agriculture (WRMA, 2008).The reforms led to the establishment of integrated watershed management in Kenya.

Even though the concept is widely accepted in many parts of the world, and central in European Union Water Framework directive[1] (Hedelin, 2007) and Africa water vision plan under NEPAD[2] initiative (Mutua , 2008), it still faces many challenges in policy and practice. This is partially due to inadequate understanding of the concept, which makes it hard to formulate objectives and indicators for assessment of progress (Ballweber, 1995; Mitchell, B., 1990). It is also blamed on inadequate funding for a wide range of watershed management activities , lack of knowledge about the roles of different stakeholders, lack of effective coordination and implementation mechanisms,

[1] European Union Water Framework Directive refers to act of European Union Parliament that provides for establishment of an institutional structure for integrated water resources management in member countries. It was enacted in the year 2000. http://ec.europa.eu/environment/water/water-framework/index_en.html

[2] NEPAD initiative is a collaboration of African countries aimed at improved economic and political governance.http://www.nepad.org/

Inadequate information for sound decision making and competing and conflicting aspirations and goals among different interest groups, agencies and stakeholders (Mitchell, B., 1990). Several experiences have also shown operational problems, posed by broad plans, which lack specific focus on concrete issues, and which often leads to oversight of some significant areas (Mitchell, B., 1990).

3.0. RESEARCH METHODS AND MATERIALS

This section includes the background information of the study area, stakeholder analysis of Mara watershed, methods of data collection, and scope and limitations of the study.

3.1. Study Area

The study covered the Kenyan side of Mara catchment , which runs from around Maasai Mau forest, at the upper catchment areas of river Nyangores and Amala Rivers (tributaries of Mara River), and spans down to the boundary between Mara National Reserve and Serengeti National park on the border of Kenya and Tanzania(Kithome, 2007) see Figure 1b below. Administratively the Mara water catchment is under the Narok and Bomet districts as shown in Figure 1 below, where most of the managers, administrator and politicians interviewed are based. However with regard to household survey, the study was limited to households drawn from around Maasai Mau forest and Muloti area, close to the confluence of river Nyangores and Amala on the boundary between Bomet district and Narok district as shown in Figure 1 below.

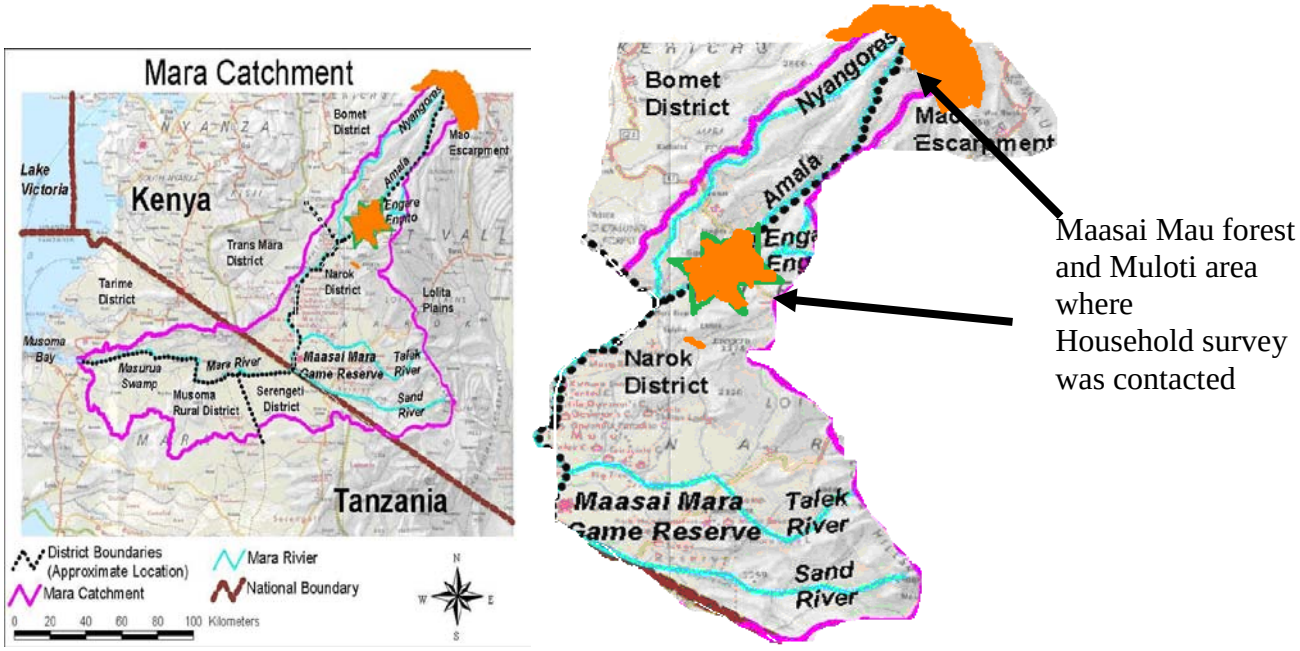


Figure 1 a & b; showing the map of the Mara Catchment (a), study area (b)
Source:(Kithome, 2007)

The entire Mara watershed encompasses a land area covering 13325 km^2 around river Mara, which measures approximately 400 km in length, from its head waters at Maasai Mau in Kenya, to the discharge point at Musoma bay in Lake Victoria on the side of Tanzania (Kithome, 2007). The river is a source of water for domestic use and irrigation to 1.1 million residents in Mara watershed and has a high potential for hydropower generation. The river also serves ecosystems of international reputation like Mara National reserve and Serengeti National park (Kithome, 2007).

The watershed is marked with a higher elevation of about 3000 m above sea level in the upper catchment areas of Mara river in the Mau forest complex with rising and falling topography which gives way to flat terrain of about 1100 m above sea level in the downstream areas of Musoma in Tanzania. The mean annual rainfall depends on altitude and is estimated to be 1700mm in Mau escarpment as compared to 600 mm at Musoma. There are two peak seasons of rainfall in April – September and November –December (LVBO, 2008). The watershed is characterised with richness in natural resources and favourable climate, which have led to migration of people into the basin particularly in the upper parts leading to high population with subsequent land use and cover changes (Mutie et al., 2006).

The area around and in Maasai Mau forest, a trust land under Narok county council and part of the expansive Mau forest complex, has undergone extensive deforestation in the past three decades attributed to timber companies, and communities living around and inside the forest illegally. The communities include the *Maasai*[3]*, Kipsigis*[4]*, Kikuyu, Kisii, and Ogiek community*[5]. These groups migrated there at different times, ranging from five decades to a few years ago (Thenya and Kiama, 2008) .

These forest supports the local community in terms of building materials, wood fuel, and pasture during dry periods, fruits, honey and medicine, and is an important site for spiritual and cultural purposes (Nkako et al, 2005).The forest also serves as an important habitat for birds and wild animals , besides the potential for tourism development(Nkako et al, 2005)

[3] One of the most dominant communities among those living illegally in the forest in Maasai Mau. They consider the forest their land, because it falls in Narok district which is predominantly made up of members of this community. They consider other communities aliens in this forest.
[4] Another dominant tribe living illegally in the forest who migrated from Bomet district
[5] This is a community which considers Maasai Mau forest their ancestral land. They derive their livelihoods from the forest because they are basically hunters and gatherers. However they were evicted from the forest by the government before they went back. They have filed a case against the government since 2002 and up to date it has not been concluded (Towett, 2002).

Mara watershed, was selected for the study, because is one of the catchment areas in Kenya, which has undergone, extensive deforestation (Obare and Wangwe , 2008), and significant land use changes in the recent past, affecting considerably the water resources(Mutie et al., 2006). It is also one of the catchment areas with high levels of poverty (Kithome, 2007), various ethnic groups with diverse cultures which are often involved in conflict backed up with strong political influence[6]. Secondly, there are several efforts to bring into operation the concept of integrated watershed management by the government and NGOs under the context of recent policy reforms.

3.2. Data Collection

After locating the study area, the study undertook a stakeholder analysis in order to identify the suitable and key stakeholders to be interviewed with regard to integrated watershed management of Mara. This was followed by collection of both primary and secondary data by using both qualitative and from quantitative approaches, through means of semi-structured interviews, collection of official documents and direct observations. During the collection of data the following procedure was followed: "….. Gaining access and making rapport, Purposeful sampling, collecting data, recording of information, Resolving field issues, and Storing data" (Creswell, 2007)

3.2.1. Stakeholder Analysis

As mentioned previously the flaws of previous approaches to water management is to a large extent due to the top down approaches and little consideration of the views and perceptions of a broader group of stakeholders. As a consequence to remedy these flaws it is important to make an analysis of the relevant stakeholders. In this section a stakeholder analysis is therefore performed, aimed at categorising stakeholders in the Mara water shed and exploring potential areas of conflict or interaction, considered useful in developing strategies for intervention (Grimble & Wellard, 1997).
Stakeholder analysis is an important tool, that is used to select and assess information about any *individual* or *group* interested, or involved in an issue, and may have influence on the end result of an issue, or suffer from the consequences of it (Mitchell et al., 1997). The ideas for how to structure this analysis came from the literature, and the data used comes from the field studies in Maasai Mau and Mara river watershed.

In the first place the stakeholders were categorised, based on their *role* (Clarkson, 1995) and *interests* (Mitchell et al., 1997), as *primary*, *secondary*, and *key stakeholders* (Clarkson, 1995).

[6] Based on author own experince

Table 1: Primary Stakeholders of Mara Watershed Management

Primary stakeholders	Interests	Resources/perspectives	Threats to integration
Mara water users association	Representative of the community's interests(water, food) and acts as agent of change and awareness creation	Local knowledge &values	Low/ tribalism, values, customs, language
Ogiek community	Mau Forest is there ancestral land, rely on it for settlement, hunting and, gathering	Local knowledge/values	low
Community Forestry Associations	Partnership in Forest conservation with govt, representative of the community's forest rights such as Timber for building, wood fuel, grazing and fodder, medicine, honey, spiritual and cultural sites	Local knowledge &values	Low/ tribalism, values, customs, language
Politicians	Votes, livelihoods of their constituencies	Financial, policies and laws	High Lack of political will
National Environment and Management Authority (NEMA)	Responsible for overall coordination of matters with regard to environment in Kenya	Environmental standards	Low
Water Resources Management Authority	Water resources agency under new reforms, Coordination, catchment management Allocation of water good quality and quantity of water	experts, Financial	Low/Narrow focus on water Mngt, No clear coordination mechanisms.
Kenya Forest Services	Sustainable management and use of forestry resources	Experts, Financial	Low
Other government departments. Agriculture, wildlife, Energy	Management and implementation of sectoral goals and policies such as tourism, food security, supply of hydropower	Financial and experts	Sectoral culture, administrative guidelines
Narok county council	Own Maasai Mau forest, collect revenue, Develop the forest for tourism	Financial, resources, good will	High/ due to political influence
Ewaso Ngiro development Authority	Responsible for development of the Region including Maasai Mau region	Financial	High/political influence

3.2.1.1. Primary stakeholders

Primary stakeholders (see Table 1 above) referred to those who are either direct beneficiaries from forestry, land and water resources, or those who are responsible for the management of these resources, or those who are responsible for the problem, and are therefore significantly either affecting or affected by the Maasai Mau deforestation, land use changes and degradation of water resources in Mara river. *Primary stakeholders* also refer to those who are of critical consideration in efforts towards integrated watershed management.

3.2.1.2. Secondary stakeholders

Secondary stakeholders stands for those, who are not directly affecting, or affected by the land use changes, Maasai Mau deforestation and water degradation in Mara, but have interest and influence such as Non-Governmental organisations (NGOs), the members of the media fraternity and groups who represent various interests, that may not be of critical consideration, but may be important in the process of integrated watershed management.

The stakeholders under this category include Kenya Forestry Working Group (KFWG)[7], Green Belt Movement[8], and World Wide Fund for Nature (WWF)[9], Nile equatorial Lake Victoria subsidiary Action Programme (NELSAP) under Nile basin initiative[10], UNEP[11] and timber companies. Most of these stakeholders have been on the forefront, in campaigning and lobbying for conservation of Maasai Mau forest and Mara watershed. For example the KFWG together with WWF and Green Belt Movement, were able to halt the excision of forest land by the government, in 2001(Nkako et al, 2005). They have similarly succeeded in lobbying for the removal of illegal settlers in Mau forest in 2005, before they went back through political patronage in 2007 (personal communication with WWF respondent).

[7] NGO made of several interest groups who are concerned with conservation of forests in Kenya. http://www.kenyaforests.org/

[8] An international NGO based in Kenya involved in conservation of the environment through community empowerment. Considered a stakeholder in Mara, because of its involvement in Maasai Mau forest conservation under COMIFORM project see appendix 2.

[9] Actively involved in conservation efforts in Mara river under Mara Basin Initiative. Refer to Appendix 2: Stakeholders of Maasai Mau and Mara watershed.

[10] Undertaking a Mara river Basin Trans-boundary Integrated Water resources Management and development project. Refer to appendix 2 for more information

[11] UNEP is considered a stakeholder in Mara watershed because it is funding and coordinating the conservation of Maasai Mau forest through a community based project (COMIFORM) see appendix 2

3.2.1.3. Key stakeholders

On the other hand, *Key stakeholders* refer to those who can either be primary or secondary stakeholders, but have very significant powers or influence, and are therefore critical in addressing the issues of Maasai Mau and Mara river watershed and enhancing integrated watershed management. These stakeholders include the local community, the local authority, WRMA, Kenya Forest service and National Environment and Management Authority and NELSAP, WWF and Kenya Wildlife Service and UNEP.

3.2.1.4. Importance of stakeholders in Mara integrated Watershed Management.

The studied Mara watershed stakeholders were further categorised into three broad groups and ranked according to their significance (Mitchell et al., 1997). The significance of various stakeholders (Table 2), to the process of integrated watershed management of Mara, was done, based on the qualities, such as *Power/influence, legitimacy, urgency* as indicated by Mitchell et al., (1997) and *support* according to Savage et al., (1991). Where *power* means the capacity for a stakeholder to influence the accomplishment of what is planned. While *legitimacy* is the right of claim, and *urgency* refers to the timeliness of attention that a stakeholder requires and the crucial role the stakeholder plays (Mitchell et al., 1997). The ranking is considered important in order to determine the most critical relationships to address, because it is practically impossible to satisfy all stakeholders' demands (Mitchell et al., 1997).

According to Mitchell et al., (1997) stakeholders can be classified as "Latent" referring to those who are of low importance to the organization, because they posses only one of the three characteristics (*urgency*, *power* and *legitimacy*) or "Expectant", having a higher importance, than the *latent* by virtue of being in possession of two of the three qualities or "definitive" having the highest degree of importance to the organisation, because they posses all the three features. According to Mitchell et al., (1997), the *latent* group of stakeholders can be further classified into three. *Dormant;* involving those who have power but of no or little effect to the goal of integration, because they do not have legitimacy and urgency. *Discretionary;* including those who have l*egitimacy* but have no *urgency* and *power*. *Demanding;* including those who may have the *urgency* but of low rating because they do not have *legitimacy* and *power* (Mitchell et al., 1997).According to Mitchell et al., (1997), the *expectant* group can also be further subdivided into *dominant,* wielding both high influence and stake or, *dependent* with high stake and urgency but having low influence, or *dangerous* with *urgency* and *power* but have no *stake* in the Mara issue.

Table 2: Importance of Stakeholders in Mara Watershed Management

Stakeholder	Urgency	power	legitimacy	support	importance
community	high	low	high	Mixed	Dependent /dominant
Government agencies	high	high	high	Mixed	Definitive
NGOs	high	Low/high	low	High	Demanding /Dangerous/
Politicians	high	high	high	Mixed	Definitive

According to Table 2 on the importance of stakeholders, it can be deduced that the local community have the *urgency* and *legitimac*y but they have no *power* and therefore are *dependent* on the benevolence of the process to ensure their interests are taken care of, and that their inputs in terms of values, perspectives and local knowledge respected. On the other hand, the local community's decisions and commitment is critical to the success of the process. Therefore they can wield a lot of power, in the event of refusing to cooperate, and in that respect shift into dominant stakeholders. On the other hand the political elites such as the Narok county council and ENSDA, they have all the three attributes, *power*, *urgency and legitimacy* and are therefore *definitive* or high priority stakeholders whose interests must be addressed and their support secured, before any meaningful progress towards integrated watershed management can be achieved. At the same time politicians are not a homogenous group and they can easily show mixed support, which means they have the potential to derail the process or facilitate the success of integrated watershed management of Mara. Government agencies on the other hand, are also classified as definitive stakeholders, because they posses all the attributes and can determine whether integrated watershed management in Mara river will succeed or not. While NGOs are considered *demanding* because the have urgency but do not have legitimacy and power. However, because of financial resources and the network at various spatial levels at there disposal, they can equally be powerful and therefore end up becoming *dangerous stakeholders.*

3.2.2. Semi-Structured Interviews

Semi-structured interviews, often referred to as an "interview guide" (Bryman, 2004) were administered to three categories of interviewees namely natural resource managers, politicians and

the local community within two smaller areas within the Mara catchment (see Figure 1). *Purposeful sampling* was used in selecting the interviewees from all categories (Creswell, 2007)

The semi-structured interview guide administered to all categories of interviewees, had similar questions, for ease of comparing the different views on issues except one interview guide that was specifically tailored for experts drawn from both government agencies and NGOs involved in management of various watershed aspects (see appendix 1). Some of the questions in the interview guide were closed, and the respondents were given options from which to make choices, in order to minimise errors in information collection and coding. This kind of approach was preferred because of ease of analysing the empirical information. However a few questions were left open as various divergent and unexpected views were expected (Bryman, 2004). In conducting the interview flexibility was exercised in the interview to allow further questions that were not on the interview guide. In recording of information field notes were used. Recording of the interview was impossible because of the sensitive nature of the subject matter. Data collection for the study was carried out between 2nd February 2009 and 6th March 2009

3.2.2.1. Interviews with Natural resource managers, administrative officers and Politicians

Natural resource managers, Administrative officers selected for the interviews, were those dealing with various key management aspects of the Mara watershed resources such as water, land, forestry and wildlife and those who administer the Kenyan side of the Mara watershed from Bomet and Narok district **(Note that study was specifically focused on the Kenyan side of Mara watershed, however administrative boundaries do not rhyme with the watershed boundaries).** It is worth noting that some of the WRMA officials responsible for management of Mara watershed were based from Kericho and Kisumu districts 50-100 miles away from Mara watershed. This is due to the large hydrological boundaries designated under the new water act in 2002(WRMA, 2008).

However, too interview these category of managers and administrative officers was considered vital to the study because they are high priority stakeholders whose views and attitudes can significantly either foster or hinder integrated watershed management in Mara (see Table 2). At the same time they are responsible for the implementation of policies, for financial arrangements and arrangements for inclusion of stakeholders, which has significant influence on the integration process. The culture of organisations and professional backgrounds of the managers is also significant as noted by (Mitchell, B., 1990).

Natural resource managers and admnistrators were interviewed on their views and knowledge with regard to biophysical and socio-economic conditions, attitude to integrated watershed management and on various other issues such as administrative structures, financial plans, and arrangements for participation of stakeholders. The managers and politicians' category comprised of officials of Non-Governmental organizations, Government Departments and civic authorities involved or operating around the study area (see Table 3). Out of the 20 interviewed managers and politicians 15 or 75% were managers from various national agencies and 5 were local authority politicians based in Narok and Bomet towns as indicated below in the Table 3

Table 3; Respondents (Managers, Administrators and Politicians)

Name of the Agency	No of resp./category	Administration centre
LVEMP	1 Manager	Kericho Town
Kenya Forest Service	2 Managers	Bomet and Narok Town
Department of Irrigation	1 Managers	Bomet Town
Department of Agriculture	2 Managers	Bomet and Narok town
Department of Fisheries,	1 Managers	Bomet Town
ENSDA	1 Managers	Narok Town
WRM	3 Managers	Kericho,Kisumu and Narok
World Wide Fund (WWF)	2 Managers/NGO	Narok Town
NEMA	1 Managers	Bomet Town
Narok County Council,	1 politicians	Narok Town
Bomet County Council,	2 politicians	Bomet Town
NELSAP	1 Managers/NGO	Musoma town
COMIFORM PROJECT/ ENSDA	2 Manager/politician	Narok

Politicians selected for the study, were local authorities and members of parliament whose political boundaries cover parts of the Mara watershed. This included Narok Municipal council officials who are responsible for Maasai Mau forest management and Bomet municipal council who cover most of the areas around river Nyangores and Amala rivers (see figure 1).

It was considered imperative to seek the views of politicians because they are *definitive stakeholders* (see Table 2), who wield significant influence that can either derail or enhance integrated watershed management of Mara watershed. This also supported by (Mitchell, B., 1990) and (Blomquist & Schlager, 2005) who argue that "political legitimacy" is critical for the success of any watershed management initiative, and lack of political support accounts for failure of most integrated watershed management efforts. At the same time Maasai Mau forest degradation has been greatly influenced by political elites (personal communication with WWF respondent).

Politicians were mainly interviewed on their views about biophysical and socio-economic conditions and attitude to integrated watershed management. The analysis of the bio data is as follows; Gender: Out of 20 respondents under this category, 20% were females (4) whereas 80% were males (16). This was inferred to mean that men dominate the managerial positions as compared to women. Age: Taking an age strata of 5 years and taking the minimum to be 26 years and the highest to be 50 years and an age bracket of 5 years, it was discovered that two respondents (10%) fell in the 26-30 year age bracket, five respondent (25%) fell under the 31-35 year age bracket 7 respondents (35%) fell under the 36-40 year age bracket, one respondents (5%) fell under the 41-45 year age bracket and 5 respondents (25%) fell under the 46-50 year age bracket. Level of Education: Out of the 20 respondents, one respondent (5%) had attained primary education, one respondent (5%) had attained 'O' Level education, one respondent (5%) had attained 'A' Level education, three respondents (15%) had attained a Diploma, eleven respondents (55%) had attained the first degree i.e. Bachelors and three respondents (15%) gad attained second degrees i.e. Masters Degree. This meant the management is well able and trained for their respective roles. Operational District: Out of the 20 respondents interviewed, 7 respondents (35%) were operating from Bomet Town, 9 respondents (45%) were operating from Narok Town and 4 respondents (20%) were operating in Kericho, Kisumu and Musoma town (see Table 1).

3.2.2.2. Interviews with the Local Community

The interviews with the local community involved a survey of 34 households residing around the Maasai Mau and Mara river watershed along Amala, Nyangores and Mara Rivers in Bomet and Narok district as shown in figure 1. The initial target was to interview 40 households but this could not be achieved because of the sensitive and political nature of the study. Access was not easy and required cautiousness. It was only after establishing rapport with the some of the civic leaders and local administrators, through one of the government officer familiar with them, that access was achieved, though to a limited extent. At some point some of those approached for interviews refused and issued threats. The household survey sought to understand the socio-economic forces that influenced the research subjects, in settling in these critical and vulnerable ecosystems through in depth interviews. The researcher went further to explore the kind of activities that were being undertaken by those living in Maasai Mau and Mara river watershed. The study also sought to understand how the households benefit and is affected by the biophysical changes taking place within Mara watershed attributed to land use changes in Mara watershed and deforestation at

Maasai Mau. The participants were also interviewed on their attitude to integrated watershed management.

The participants selected in household survey were those who live near, rely and are causing the deforestation of Maasai Mau (see fig 1). Other participants selected included those who live close to river Mara at Muloti (see also fig 1), whose land practices are affecting land and water resources of river Mara. Participants were selected from various ethnic backgrounds, social classes, political affiliations, age groups, academic backgrounds to ensure representation of all the diverse views and perspectives considered significant to integrated watershed management (Mitchell, B., 1990). Persons from the local community were selected for the study because they constitute *dependent stakeholder* with high stake in integrated watershed management of Mara (see Table 2). They were also selected because sometimes they can shift into *dominant stakeholders* and hence become significant in either promoting or thwarting the efforts to integrated watershed management of Mara (see Table 2).They were also identified as relevant to the study, because their knowledge, support and commitment is critical to the success of Mara watershed management.

The sample characteristics are as shown below. Local Stakeholders: Bio data; Gender; Out of the 34 local stakeholders contacted, all of whom were drawn from the Mara River, all the respondents (100%) were males. This appeared gender insensitive but it also reflects the fact that in the area under study all significant decision making rest upon the males who happen to the heads of the household units. Age, out of the 34 respondents contacted, the youngest was 22 years of age whereas the oldest was 70 years of age. Considering an age group or strata of 5 years, 4 or 12% were in the 20-25year age bracket, 4 or 12% were in the 26-31 year age bracket, 12 or 34% were in the 32-37 year age bracket, 6 or 18% in the 38-43 year age bracket, 4 or 12% in the 44-49 year age bracket, 2or 6% in the 56-61 year age bracket and 2 or 6% in the 68-73 year age bracket. Even though the majority (12) of the respondents were found in the 32-37 year age bracket and two respondents of 70 years, the true picture of the Mara River and the consequences of the Maasai Mau degradation over years would have come up clearly if more of the old people were contacted. Education, the two 70 year old respondents (6%) did not have formal education, 12 or 35% of the respondents had attained primary level education, 10 or 29% had attained secondary level education, 4 or 12% of the respondents had gone up to tertiary level and 6 or 18% had attained university. Location; the stakeholders were mainly drawn from Muloti and around Maasai Mau (see figure 1)

3.2.3. Official documents

The documents which were collected for the study includes papers of previous studies performed in the Mara watershed, official policy documents on recent Water and Forestry reforms. The Water policy document was obtained form government printers in Nairobi at a fee while forestry policy was sourced from annex 2 of (Ludeki et al.,, 2006). Water policy was selected for the study because it underpins the shift towards integrated watershed management in Kenya. While Forestry policy was considered vital to the study because 60% of forest in Kenya is found in five major "water towers" in Kenya and is considered to be significant to water resources conservation (Mogaka, 2006). These policy documents are currently the only policy documents, which provide for integrated Natural resources management in Kenya.

3.2.4. Direct observations

The study gathered more information from direct observations during my travel in various parts of the watershed.

3.2.5. Scope and Limitation

The study focussed on six main factors based on the authors experiences from other case studies and pre-knowledge of the Mara region, considered more significant and relevant to the study:

(1) Inherent biophysical and socio-economic conditions of Mara watershed. (2) Key stakeholders in Mara watershed. (3) Mechanisms of participation of stakeholders, (4) institutional structures in Mara watershed., (5) Recent policy reforms in water and forestry sector. (6) Available financial plans.

The study area was limited to the Kenyan part of the Mara water catchment, even though the entire watershed extends up to Musoma in Tanzania. This was due the expansiveness of the watershed, which would have required more time and resources that were limited. However some stakeholders interviewed, had experience of issues covering the entire watershed.

There are also various policies and regulations that govern the management of different aspects in the watershed; however the study focused on Water policy and Forestry policy documents, because they provide guidelines with regard to management of water and forestry degradation, considered as cardinal aspects in Mara watershed

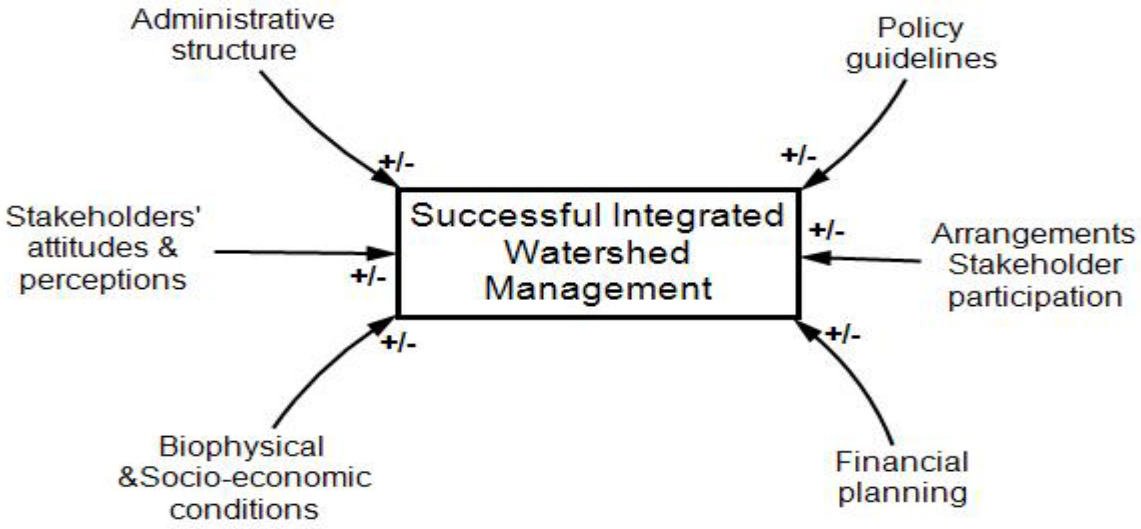
4.0. DATA ANALYSIS AND ANALYTICAL FRAMEWORK

In order to address the objectives of the study, the data was analysed by reading through field notes, documents and interview questionnaires reflectively while taking notes. This examination of the

empirical data thereafter resulted in a categorisation, where the responses and other data was put in several groups through coding, i.e. giving a name to the group. Thereafter relationships between the codes were established in line with the research questions of the study. This was followed by re-categorising the data in a more general way focussing on the specific case (Yin, 2008). In order to assess and categorise the collected empirical material, criteria that enable us to assess reason for success or failure of integrated water management has been suggested by (Mitchell, B., 1990) and (Hedelin, 2007). In the following section a simple analytical framework has been developed using these criteria.

4. 1. Analytical Framework

Because of the complex interactions and interdependence between the physical environment and socio-economic development there is need for integrated approach in the management of natural resources. However in most cases management efforts remain divided and disorganised across sectors and spatial levels leading to ineffectiveness (Mitchell, B., 1990). To achieve integration there is need for effective harmonisation, dependent on several "institutional arrangements" which pose obstacles or serve as a possibility for integration (Mitchell, B., 1990), and therefore form the basis for analysis in this study. Note that this analytical framework does not capture all the necessary criteria for assessing integrated watershed management, it however reflects the most critical and relevant factors for assessment of Mara Basin.



+ represents enhancement of integrated watershed management
- represents hindrance to integrated watershed management.
Figure 2: Analytical Framework for Assessment of Integrated Watershed Management.
Source: Author

4.1.1. Biophysical and socio-economic conditions in Mara Watershed

Mitchell, B., (1990) argues that, prevailing local circumstances can either foster cooperation or otherwise. Environmental problems, such as water scarcity and others that are trans-boundary in nature, like Mara river degradation, which can only be addressed collectively, tend to compel cooperation among stakeholders. On the other hand it is difficult to cooperate in addressing environmental problems under conditions where poverty abounds (Mitchell, B., 1990).

4.1.2. Stakeholders attitudes and perceptions

According to Mitchell, B., (1990) , the disposition of stakeholders to integrate efforts, counts much more than a good institutional arrangement for collaboration. Positive attitudes of stakeholders especially of politicians and those in positions of influence in the community give "legitimacy" to the integration efforts vital for their success (Mitchell, B., 1990). The different attitudes are influenced by administrative directives in government and NGOs, diverse ethnic backgrounds, social classes, professional backgrounds and cultural differences in communities and organisations (Mitchell, B., 1990). The attitude can also be attributed to egoistic tendencies which often cause stakeholders to be disinterested in the process of integration preferring to focus on individual interests and specific mandates of organisations, regardless of the common concerns in the watershed (Mitchell, B., 1990). This kind of attitude may prove detrimental to efforts towards collaboration.

4.1.3. Arrangements for stakeholder participation

This Institutional component is important to facilitate participation and decision making based on views of everyone affected by an issue. It includes mechanisms of participation and guidelines and norms followed in the process of participation such as who participates, at what phase, how appropriate values are determined, how issues of power differences and conflicts are resolved (Hedelin, 2007; Mitchell, B., 1990; German et al., 2006). These arrangements are vital because, it is argued that to reach sound decisions, secure support and dedication of all stakeholders, vital for effective watershed management, stakeholders involvement is an important pre-requisite (Mitchell, B., 1990). The process of participation is underscored by policies and institutions at various spatial levels (German et al., 2006).

4.1.4. Administrative structure

The well functioning of integrated watershed management is dependent on a relevant *administrative structure*, even though it does not ensure effectiveness (Hunter District water board, 1982, p.24 cited in Mitchell, B., (1990).The *administrative structures* are useful in ensuring integration across sectors (Mitchell, B., 1990).However the nature of the structure remains unresolved because of differences in ecological and other boundaries such as political and administrative, and apparent emphasis on specialisation for high productivity(Mitchell, B., 1990).However Mitchell, B., (1990) suggests the need for structures that can easily be altered depending on the circumstances.

4.1.5. Financial planning

Integrated watershed management involves tackling a wide range of activities that often requires substantial amount of funds (Mitchell, B., 1990). There is therefore need for a well elaborate financial plan for successful implementation of the watershed goals (Mitchell, B., 1990).

4.1.6. Policy guidelines

This component, involves policies and administrative guidelines at various spatial levels, which can either facilitate or inhibit cooperation (German et al., 2006; Mitchell, B., 1990) . Policy guidelines are vital administrative instruments, which provide legitimacy to the integration process, stipulate the structures and mechanisms for integration, and outlines rules for integration or sectoral management such as conflict resolution mechanisms, the roles of actors such as who is responsible for leadership and, financing and objectives to be addressed in the management of watersheds (Mitchell, B., 1990). Policies can therefore, either promote or be a hindrance to integration (German et al., 2006; Mitchell, B., 1990).

5.0. RESULTS

This section comprises of six parts, corresponding to the factors influencing the integration of water management developed for the analytical framework in the previous section (section 4.1). In the first section a description of the prevailing biophysical issues, socio-economic conditions, based on Mara river stakeholders' perspective is presented. In the second section, Mara stakeholders' attitudes and perceptions to integrated watershed management is high lighted. Third section, gives an account of available arrangements for participation of stakeholders in government agencies and NGOs involved in the management of Mara watershed. In the fourth part, a description of available administrative structures is presented, while the fifth part includes financial plans available for the

integrated process. In the final part recent policy reforms in water and forestry policy are described and analysed in terms of their strengths and weaknesses with regard to integrated watershed management.

5.1. Biophysical and socio-economic conditions in Mara watershed context

Managers and administrators together with politicians gave varying responses among themselves. They however showed agreement on various biophysical changes, causes of deforestation and socioeconomic conditions in the basin as shown in Table 4, 6 and 7 respectively. Most of the interviewed managers and politicians showed a higher awareness and knowledge of the changes, compared to local community most probably because of the low level of education which greatly affects, the level of understanding of the problem (see Table 4).From this findings it is clear that the prevailing biophysical and socio-economic conditions have greatly influenced the adoption of integrated watershed management in Mara. At the same time the socioeconomic conditions such as poverty, high population, corruption and political expediency have negatively affected the efforts towards collaboration. These findings also indicate that Previous management efforts failed to address the Mara watershed biophysical and socio-economic problems, because they addressed individual issues separately without appreciating the inter dependencies

5.1.1. Biophysical changes

Table 4 below shows various biophysical changes in Mara watershed as indicated by stakeholders. Many of the respondents indicated that deforestation, change in climate, land degradation, water quality and water quantity during dry seasons are some of the significant biophysical changes in the watershed (see Table 4).

Table 1: Biophysical Changes in Mara Watershed according to Stakeholders

Biophysical change	No of local respondents	% of respondents	No of Managers /politicians	% of respondents
change in temperature and rainfall	24	67	19	95
Reduction in forest cover	22	61	20	100
drying of rivers	20	55	17	85
Erosion of river banks	18	50	18	90
Increase in surface runoff	18	50	19	95
increase in soil erosion	18	50	19	95
sedimentation of rivers	14	38	19	95
Reduction in water infiltration	14	38	17	85
Ground water decline	12	33	15	75
Pollution of the river	12	33	18	90
Wildlife reduction	10	27	16	80
decline in fish catches	6	16	15	75
Increasing stream flow	4	11	-	-

5.1.1.1. Deforestation

Table 4 also shows clearly that in spite of the varied responses, reduction in forest cover is ranked as one of the most critical conditions. Other findings attest to this fact (see Table 5, figure 3 a & b and 4 a & b. From the interviews the respondents including the local stakeholders, the politicians and the resource managers unanimously accepted that the extent of deforestation had reached critical levels, and indicated that urgent measures should be taken to address the problem including cooperation among the stakeholders. This shows how biophysical changes can influence the need for integrated watershed management as indicated by Mitchell, B., (1990).

Table 5: Forest cover loss inside and outside Maasai Mau across spatial-temporal scales Source; Nkako et al (2005)

Forest Cover Loss Inside and Outside Maasai Mau					
Forest cover loss (Ha)	1973-1986	1986-1995	1995-2000	2000-2003	2003-2005
Outside the boundaries	14,805	3,297	8,044	1,684	3,925
Yearly average	1,139	366	1,609	561	1,963
Inside boundaries	462	98	1,344	2800	3,510
Yearly average	36	11	269	933	1,755

Table 5 above and Figure 3 a and b below shows rapid deforestation, with highest point, occurring from 1999 to 2001(Nkako et al, 2005). This was due to illegitimate extension of ranches bordering

to the forest land which was unlawfully then sold by influential leaders to ignorant people from outside the area particularly those from Bomet district (Nkako et al, 2005).

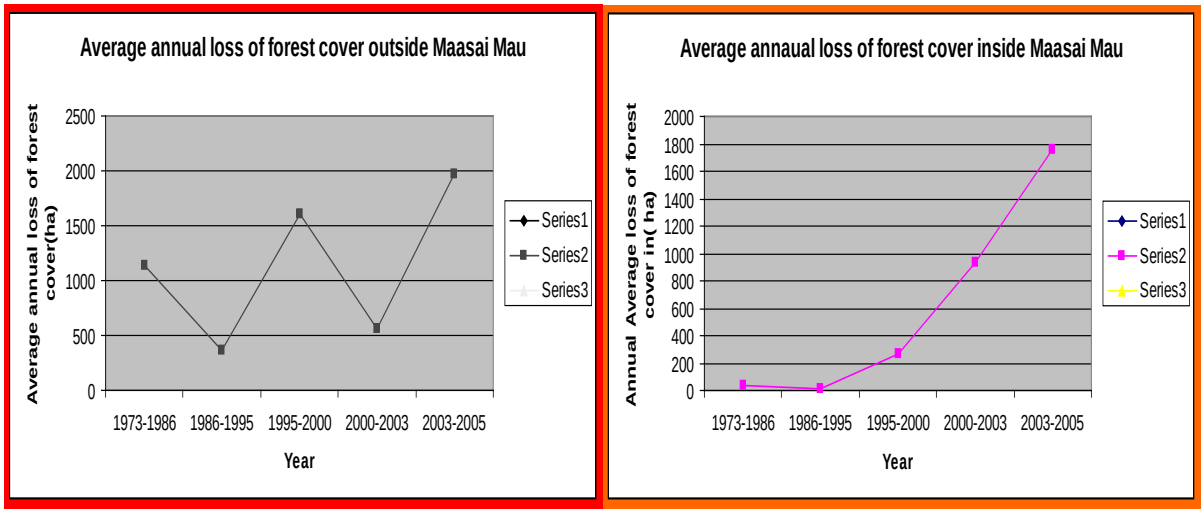


Figure 3 a & b; showing the average annual Forest cover loss outside the Maasai Mau (a), inside the Maasai Mau (b)

Figure 4 a & b: Maasai Mau Forest before (a) and after deforestation (b).
Source; Maasai Mau Report, 2005

The deforestation is attributed to the high population, particularly in the upper parts and subsequent need for more land for settlement and agriculture production (Mutie et al., 2006) .This is illustrated by the environmental concerns raised by the public in the year 2003, over the loss of forest cover caused by illegal settlements, charcoal burning, logging, livestock grazing, especially on the western side of Maasai Mau (Narok south constituency), that forms the upper catchment of Mara River (Nkako et al, 2005) see also figure 4a and b above. Other causes include overexploitation of forests for timber and wood fuel for both household and commercial use, corruption and political expediency as evidenced by excisions of the forest (Nkako et al, 2005).

The respondents from the local community gave the following reasons, in order of ranking, as the causes of deforestation of Mau escarpment including the upper catchment areas of Mara river; poverty (78%), corruption(72%), landlessness (67%), population growth (61%), political influence (61%) while illegal encroachment was given a very low score (22%) see Table 6. This indicates that most members of the communities settled in the forest do not consider it illegal, this may consequently be a reason to the opposition that has been witnessed against evictions.

In comparison, the views of managers differ radically from the local stakeholder's views of the causes of the Maasai Mau impairment. For example, the managers ranked illegal encroachment as number one, whereas the local stakeholders ranked poverty highest. According to managers, the main causes of Maasai Mau degradation include the following in the order of their ranking i.e. All the 20 respondents (100%) indicated that illegal encroachment is the main cause of Mau Escarpment degradation, while 19 respondents (95%) agreed that it is political influence, 15 respondents (75%) said it was poverty and excisions by the government, 14 respondents (70%) said that it was population growth and corruption, while few respondents below (50%) respectively mentioned that it was inefficiency in forest management, landlessness, poor government policy that was responsible. Only 6 respondents attributed deforestation on colonial land and forestry policy

Table 6: Causes of deforestation according to Mara stakeholders

Causes of deforestation	No. Manager/ politician respondents	% of Manager/ politician respondents	No of local respondents	% of local respondents
poverty	15	75	28	78
corruption	14	70	26	72
landlessness	10	50	24	67
population	14	70	22	61
political influence	19	95	22	61
Illegal encroachment	20	100	8	22
Degazzetment	15	75	10	27
Inefficiency in management	11	55	8	22
Colonial land policy	6	30	-	-
Forest policy	9	45	-	-

Previous measures to tackle deforestation involved eviction and establishment of forest boundaries like the case of presidential Ntutu commission in 1986(Nkako et al, 2005). In spite of these measures deforestation has continued unabated due to illegal settlements attributed to lack of

cooperation from the public and politicians. On the other hand the effectiveness of integrated watershed management has been well illustrated by previous successful consensus based approaches. In 2005 through consensus and advocacy, the Kenya Forests Working Group build a consensus among several stakeholders through advocacy, which led to the eviction of people, between may and June 2005 (Nkako et al, 2005). However in 2007 during the election campaign the government allowed those who had been evicted to move back to the area, in exchange for votes, as indicated during the interviews. This is probably due to failure to consider all the other complex issues involved in Maasai Mau such as the legitimate concerns of the community and lack of political good will. Recent attempts to evict those who went back into the forest in response to UNEP survey report have faced stiff opposition from the public and politicians as indicated during interviews.

5.1.1.2. Changes in local climate in Mara Watershed.

The significance of forest cover removal has been explored in detail in many parts of the world and the results show little or no effect to the amount of rainfall (Bruijnzeel, 2004). However, most respondents indicated erratic behaviour in the local climate characterised with an increase in temperature, decline in rainfall and increase in evaporation. According to the local community, the highest significant effect of forest removal was reduction in rainfall, and increase in temperature as evidenced by the ranking of the various effects. 67% of the respondents said forest cover change is responsible for the observed changes in rainfall and temperatures in the basin. Similarly 95% of the managers and politicians attest to this suggestion (see Table 4). The ranking probably reflects that, the most severe impacts occurring in the basin could be local climate change and water level decline in rivers. This is consistent with (Bruijnzeel, 2004) who indicates that extensive deforestation of over 1000km^2 could lead to significant changes in the weather conditions.

5.1.1.3. Land and water degradation in Mara Watershed

The significant deforestation changes and land modification by unsustainable land practices has led to increased soil erosion due to upsurge in surface runoff, leading to loss of soil fertility and subsequent decline in land productivity as indicated by 50% of the local community and 95% of the managers and politicians. The increased soil erosion has consequently also led to sedimentation and water pollution attributed to intensive fertiliser use and agrochemicals in tea and pyrethrum farms in the river basin (LVBO, 2008). Direct observations showed pollution of water due to bathing, washing clothes and cars on the banks of the river and a recent study confirms declining

water quality regime as indicated by change in the composition of invertebrate species in river Mara (LVBO, 2008).

The deforestation and land use changes have also led to dwindling of water resources, contrary to paired catchment studies, which indicated that forest removal paves way for increase in water yield (Bruijnzeel, 2004).All the respondents were of the common view that water resources are dwindling as evidenced by rivers, streams and springs that are drying up. They attributed the phenomenon to low infiltration as result of increased overland flow as a result of exposed land surface (indicated by Satellite images obtained from an aerial survey (UNEP , 2008) see figure 3, depletion of water resources, unpredictable rainfall patterns and extended periods of drought. A recent environmental flow assessment of the river indicates adequate amount of water during rain season but inadequate levels in drought seasons (LVBO, 2008).

5.1.2. Socio-economic conditions in Mara watershed.

Findings from the study indicate that, high population and poverty has led to unsustainable practices that has subsequently lowered the productive potential of natural resources such as land, forest and water in Mara watershed, which has further exacerbated poverty. Therefore integrated watershed management is necessary to deal with the issues of Maasai Mau and Mara because they are interconnected. An estimated population of 775,000 people live on the Kenyan side of Mara river basin (Kithome, 2007). The high population has led to enlarged requirement for water, food, wood fuel, fodder and land for settlement, which has subsequently put pressure on land, water and forestry resources in the watershed (Mutie et al., 2006) .According to the socio-economic characteristics of those interviewed and observations made, most of the population in the watershed may be poor, and relying on subsistence farming and livestock keeping ,with few people practising commercial farming. Even though various stakeholders gave varying responses with regard to socio-economic effects of land use and deforestation as indicated in the Table 7 below. Most of the stakeholders interviewed, indicated decline in food production, increase in water scarcity and water related conflicts as the major effects of land use and cover changes in the watershed. It was interesting to note that in spite of the high poverty in the basin, most the local respondents ranked poverty as one of the least effects of natural resources degradation indicating lack of awareness on the link between the prevailing poverty situation and environmental degradation.

Table 7: Socio-economic conditions in Mara Watershed according to stakeholders.

Socio-economic conditions	No. of local respondents	% of local respondents	No of managers /politiciancrespondents	% of managers/politicians respondents
Low food production	30	83	18	90
Increase in water scarcity	28	77	17	85
Water related conflicts	22	61	15	75
Reduced hydropower generation	18	50	17	85
water related diseases	16	44	1	5
Reduced incomes from tourism	8	22	16	80
siltation of dams	14	38	15	75
Increase in poverty	14	38	14	70

5.2. Mara watershed stakeholders attitude and perception

All stakeholders showed willingness to work together in achieving the solution to issues and problems in Mara river watershed. All (100%) the respondents unanimously agreed that integrated management of the Mara watershed can help in addressing the problem. In spite the diverse interests expressed during the interviews all the different groups of interviewees had a common and shared interest in protecting and conserving the watershed and catchment ecosystems. This attitude is based on increased awareness about the importance of ecosystem services offered by the forest through the Non-governmental organisations and civil societies activities, as best illustrated by the way they have been on the forefront in contending for the conservation of the forests, like the public opposition against excisions of Mau forests in 2001(Gachanja, M.K, 2003).

They suggested that Integrated water management could be achieved, through strengthening of Community Forest Associations and the WRUAs, involvement of all stakeholders or interest groups to realise a multi-sectoral approach in the management of the watershed, incorporating activities to benefit the communities around the forest and which are friendly to forest management such as Bee keeping, simplification of administrative procedures, through inter-agency intervention framework and mechanisms, Facilitating the local community towards afforestation efforts, Education and awareness campaigns in collaboration with the local community. This positive attitude especially from the local community and politicians, presents an opportunity that can be seized for successful management of the watershed.

It is also worthy noting, that in spite of the common stand, among various communities, lack of political good will, and conflicting ethnic interests poses hindrance to collaboration in Mara basin as indicated by one of the respondent. In the course of interviews, it was observed that interviewees from both categories drawn from Narok side of the Mara watershed who are mostly Maasai community were quite cooperative, as compared to those from Bomet side of the watershed both at Muloti and areas of Maasai Mau, this was due to the fact that the area where deforestation is taking place is kind of assumed to belong to the Maasai community who perceived other communities settled in the forest as aliens on their land. Other concerns which stand in the way of integrated efforts among the local community raised by various respondents include high poverty levels, landlessness and high population growth.

5.3. Arrangements for effective representation

5.3.1. Contribution of knowledge from various academic backgrounds

All the managers across the divide recognise the need for knowledge from all academic disciplines, to effectively handle the complex issues of the Basin. They acknowledge the relationship between the environmental issues and socio-economic development in the watershed. Various initiatives such as Trans-boundary integrated project, COMIFORM PROJECT, WWF, WRMA and NEMA have actively tried to ensure that knowledge across disciplines is used in their activities, such as in the case of Trans-boundary Integrated Water Resource Management Project, which involved consultancy experts across the disciplines to undertake a baseline survey on the status of the river and socio-economic assessment.

On other hand, COMIFORM PROJECT had undertaken similar assessments with regard to Maasai Mau. Another recent study on environmental assessment flows involved experts from several disciplines, drawn from WWF and WRMA in collaboration with Global water for sustainability (GLOWS). While WRMA staffs who comprise mainly of Water experts, indicated collaboration with various other experts drawn from several disciplines in planning, development and management of water resources, and important activities such as establishment of “resource quality objectives” and “classification of water resources”. With the new reforms in both water sector and Kenya Forest service there is increased recognition of other relevant knowledge from other disciplines.

On other hand, the government departments did not show clearly how they engage knowledge across disciplines, even though they indicated collaboration in their activities, with other departments. In spite of the increased engagement of the all kinds of knowledge in the process there is a gap in terms of social sciences knowledge in the basin because majority of the experts are drawn from Natural science disciplines (Urama K. C. and Davidson, G. , 2008).

5.3.2. Involvement of diverse knowledge and perspectives of stakeholders.

When asked about involvement of stakeholder knowledge, values and perspectives in the management decisions in the basin the WWF Mara basin initiative respondent, indicated a clear commitment to the views of stakeholders even though there was no way to verify the information. While interview, with COMIFORM project respondent indicated, the use of knowledge from a wide spectrum of participants in the project ranging from charcoal burner groups, wood carver groups community based organisations, NGOs, government officials to staff from the UNEP.On other hand Trans-boundary Integrated Water Resource Management project has embraced stakeholders participation from both Kenya and Tanzania as a way to capture all sources of knowledge, perspectives and values. However, this study was unable to clearly establish whether the project recognises the role of the local knowledge because the respondent was not clear on the mechanism to be adopted in tapping this type of knowledge.

With regard to the government departments there is little room for involvement of other sources of knowledge especially the local knowledge except in the department of Forestry where the new policy provides for partnership of management of forestry resources with the government and other stakeholders

5.3.3. Participation phase of stakeholders

All the respondents from both the government and the NGOs showed awareness on the need to involve stakeholders at the beginning any management initiative. Most of the respondents indicated involvement of stakeholders at the initial stages of the management and development initiatives. According to a respondent from COMIFORM PROJECT stakeholders were involved at the start of the project and they will also be involved throughout the project phases

5.3.4. Criteria for selecting Stakeholders.

There were no specific criteria developed for identification of stakeholders, however most of them indicated involvement of any group or individual who have some interest or are affected, or may have significant influence to the efforts towards conservation or resources in the basin. Respondents

indicated that in the past they had involved stakeholders from the local communities, government agencies, NGOs and other initiatives in the Mara basin from both Kenya and Tanzania. According to a respondent from COMIFORM PROJECT all the stakeholders representing all interests were involved except at the implementation stage where key stakeholders were identified based on experience and net works in the area of implementation.

5.3.5. Criteria of vetting values for inclusion.

All respondents both from the government agencies and NGOs were not clear on how they sort out various values in order to determine the most relevant ones. This in essence indicates either lack of consideration of the different values of stakeholders

5.3.6. Mechanisms for dealing with different levels of influence.

Most of the respondents showed lack of understanding in terms of the effect of power differences on the views of stakeholders as indicated by (Hedelin, 2007). Besides there were no clear mechanisms on how do deal with the power differences. This indicates that, involvement of stakeholders in Mara may not guarantee inclusion of their views and perspectives in final decisions. The integration process in Mara is most likely controlled by elitists and skewed

5.3.7. Education of stakeholders on complex environmental challenges

Probably the most important area that all respondents showed much emphasis was education and enhancement of awareness on the issues affecting Maasai Mau forest and Mara river watershed among all stakeholders. Several initiatives by both the government agencies and NGOs had elaborate programmes on capacity building. For example Trans-boundary Integrated water resource management a project under Nile Basin initiative has a well elaborate program as one of the project components, including COMIFORM Project, The WWF Mara basin initiative. The researcher was privileged to be a participant in one of the community awareness meeting held at Mara water users association premises involving local leaders at facilitated by WWF.

5.4. Administrative structure for Mara integrated Watershed management.

From the findings of this study, a suitable structure for integrated watershed management is yet to be put in place in Mara. However there were indications, and efforts towards establishing a Trans-boundary institutional structure under Nile Basin Initiative programme (NELSAP) refer to appendix 2.Interview with respondents from WWF Nile Basin Initiative and Mara Water Resources Users Association indicated additional plan to set up Mara Trans-boundary Water Resources Users Association. It is worthy noting that the current water policy requires further improvement to give

legitimacy to these structures, in liaison with the political elites to guarantee the success of the current initiatives. However, as indicated by Mitchell (1990), there is need for a structure that is can easily be altered to fit in different circumstances of Management in the Basin.

5.5. Financial plans for Implementation of Mara Integrated Watershed Management.

Currently, most of the activities towards integrated watershed management of Mara are financed under Nile Basin Initiative programme (NELSAP) and WWF Nile Basin Initiative. The government is yet to translate its policy reforms into meaningful actions. However from the water policy perspective the financial arrangements are inadequate, and may not be able to handle the wide scope of activities that are required to be carried out under integrated watershed Management. For successful and sustainable implementation of integrated management plans for Mara and other catchments in Kenya, the government should consider making substantial contributions from budgetary allocations.

5. 6. Policy Guidelines

5.6.1. Water sector reforms and Mara watershed Management

While the new water reforms gives legitimacy and impetus to integrated watershed management, they fail to provide a clear vision and means to realise this goal. The act provides for creation of fundamental institutions for participation; however fails to stipulate clearly the institutional structures for inter agency cooperation, mechanisms for dealing with power disparities, and the agency required to lead. Financial plans are also inadequate, and the scope of objectives to be addressed in the management of watersheds is limited to water resources conservation.

According to the stipulations of the act, Water Resources Management Authority was established, charged with the overall management of water resources in Kenya. The management of the Authority is carried out by a National Board, made up of appointees of the president and the Minister (Kenya Gazette, 2002). Based on the provisions of the act, the country was divided into six expansive water catchment areas, which include *Lake Victoria North***,** *Lake Victoria south* (where Mara river watershed falls**),** *Rift Valley, Athi river, Tana river and Ewaso Ngiro*(WRMA, 2008) The coordination of management, development and conservation of water resources in designated water catchments in the country, is under regional WRMA offices in the respective areas (Kenya Gazette, 2002). The regional WRMA offices are supported by catchment area advisory committees (CAACs) composed of representatives from *government agencies, NGOs, Local Authorities, farmers, and business communities* appointed by the management authority with the

approval of the minister. The role of the CAACs is to give counsel to regional offices of WRMA on issues of water conservation in the catchment areas(Kenya Gazette, 2002).Currently the Lake Victoria South Catchment area, where Mara falls is in the process of finalising on Management strategy(WRMA, 2008). However the Management strategy is marked with many activities, without concrete arrangements for implementation, which may lead its ineffectiveness.

Other institutional structures provided for by the reforms include *Water Resources Users Association* (WRUAs) and *Water Appeals Board* (WAP) (Kenya Gazette, 2002).The *Water Resources Users Associations* (WRUAs) formed in various sub-catchment areas, are mandated with enhancing collaboration of the local communities in the management of water resources(Kenya Gazette, 2002). In Mara a local water users association has bee established, and is actively involved in the water resources conservation efforts (See appendix 2).
Water Appeals Board (WAP) has been established at a national level, charged with the responsibility of settling disputes arising from water users. All the aforementioned institutions at various spatial levels, offer opportunities for involvement of stakeholders including the local community in the management of water resources, during the initial stages of drawing up catchment strategies and implementation. However it is not clear how stakeholders are to be identified even though the act puts emphasis on various users of water (refer to the First schedule of the Act) (Kenya Gazette, 2002).

In terms of capturing interdisciplinary knowledge such as hydrology, engineering, economics, law, communication and psychology, and various values and beliefs as indicated by Hedelin (2007), the reforms are not explicit even though *public consultation* and involvement of stakeholders from various interests such as government agencies, business community, pastoralists, farmers, NGOs and local authorities and local community in *Catchment area advisory committees* and *Water Resources Users Association* offers an opportunity for their inclusion *objectives* (Kenya gazette 2002). However, the extent to which this process incorporates the perspectives of the public is left to the ministry and the water resources management board, which has the final say, with no clear system for tackling power disparities.

In terms of identifying the *relevant values* (Hedelin, 2007),there are two considerations as provided by the water act 2002 section 15, *class of water resource and resource quality objectives*(Kenya Gazette, 2002). Where classification of water is based on *ecological*, *livelihood* and *commercial*

values in an area (WRMA, 2008). According to this classification system, an area where water is fundamental to commercial purposes, *ecological* and *livelihood values* will be ignored this is particularly evident in urban areas. (WRMA, 2008) while in areas like Maasai Mau where water resources is of high ecological importance *ecological values* will take precedence to *livelihood* and *commercial values*. However in areas where water is of basic importance to livelihoods such as areas with small scale farmers, *livelihood values* shall be the basis of consideration against other competing values (WRMA, 2008). Secondly *resource quality objectives* which refer to set water quality and quantity standards shall be the basis upon which relevant *values* are also determined (WRMA, 2008)

The notable limitations of the Act is the narrow focus on water resources (important linkages to land, wildlife and forests are not clearly indicated), relegation of the local community and the public to passive involvement at the decision making level. Another notable weakness is with regard to coordination. In terms of coordination the Act provides legal authority to Water resources management Authority to act as a lead agency for coordination of all the actors at the catchment areas, however from the act is not clear on the mechanisms. Several respondents indicated lack of clarity, which has led to conflict on several occasions between the Water management authority and NEMA, because the latter has similar coordination mandate.

This act is also not clear on mechanisms of enhancement of awareness and education of the public with regard to water resources management. The act is also silent on the integrated administrative structure, vital to foster integration of various sectors in the watershed. The provisions of the act do not clearly indicate how the costly operations of integrated watershed management as indicated by (Mitchell, B., 1990), will be financed. According to *Part V* of the act, the only concrete source of funds is revenue collected from the users of water, which may be inadequate considering the scale of watershed activities (WRMA, 2008). Other sources include parliament and most probably donations from the private sector and external sources (Kenya Gazette, 2002).

5.6.2. Forestry policy reforms and Mara watershed management.

The recent Forestry sector reforms upon successful implementation will hopefully contribute significantly to watershed management in Mara and other areas in Kenya. This based on the assumption that the new reforms will enhance conservation of forestry resources, which in turn will significantly contribute to conservation of both land and water resources. The act provides for the formation of institutional mechanisms such as the *Kenya forestry service board, Forest conservancy*

committees and *Community Forestry Associations* that facilitate representation of various stakeholders from government agencies, the local community and members of the private sector including those from water sector (Ludeki et al.,, 2006).

According to the act the previous forest government agency was transformed into *Kenya forest service,* mandated with protection, use, expansion and general administration of forestry resources in the country (Ludeki et al.,, 2006). This is to be achieved through *Kenya Forestry Services Board,* whose membership include representatives from various ministries such as *Water, Forestry, Finance, Local authority,* and government parastatals such as Kenya wildlife Services, *National environment management authority,* and *Kenya forestry research institute,* apart from other eight members appointed outside the government, with experience and knowledge in matters of environmental conservation (Ludeki et al.,, 2006). Other functions of the board include establishment of public forests and their margins, harmonization of forestry activities that span across sectors in Kenya and designing of mechanisms for collaboration among various actors see annex 2 of (Ludeki et al.,, 2006).

The Kenya forest service board comprises of key policy makers that represent the major concerns in Maasai Mau and Mara watershed such as the permanent secretary from the *Ministry of Water resources, Director of Kenya wildlife, Director General of National Environmental Management Authority, Permanent secretary in the ministry of local authorities* among other members (Ludeki et al.,, 2006). Notable exception in this board is a representative of the Ministry of Agriculture that constitutes a critical linkage with forestry conservation. This board has the Authority to make a coordinated and integrated action towards addressing the issues currently facing Mau and river Mara river Watershed.

The Forestry *conservancy committees* who comprise of the overall regional government administrator (Provincial commissioner), member selected by the timber industry, and representatives appointed by Forest Associations, Agriculture and Environment departments in the area are charged with enforcement of forestry regulations, development and management of forestry resources in their respective conservancy areas, they also make suggestions with regard to borders of public forests, and ensures that communities gain from forestry resources(Ludeki et al.,, 2006) see annex 2.

Another institutional structure that provides for participation of communities in the management of resources include, *Community Forestry Associations* comprising of members of the community who live near the forest and who may be interested in participating in the management of the forests, with consent from the director of forestry (Ludeki et al.,, 2006). This is in recognition of the importance of knowledge, perspectives and values of the local community in the management of forests. This also ensures that the local communities rights of using the forests such as protection of consecrated areas, gathering of medicinal herbs, honey, timber, grass and grazing, forest raw materials for local industries, recreational activities, educational excursions by the local communities are secured, provided the rights granted, do not compromise the integrity of the ecosystem (Ludeki et al.,, 2006).

6.0. DISCUSSION AND SUMMARY OF FINDINGS

Mara watershed, if well conserved is not only vital to conservation of water resources but offers a myriad ecosystem services and values, which offer vital support to the livelihood of 1.1million people living in the watershed both in Kenya and Tanzania. These services are also crucial to the functioning of ecosystems such as Mara National reserve and Serengeti National park, and subsequently contribute significantly to the socio-economic development of both Kenya and Tanzania.Inspite of the critical role the watershed plays, it has undergone significant impairment.

According to the findings of this study poverty, high population and unsustainable natural resources utilisation have led to considerable biophysical changes in the watershed. These changes include land degradation, forest and wildlife population decline, reduced water yield during dry season and deterioration of water quality. Subsequently these biophysical changes have led to reduced productive potential of forest, land and water resources, leading to increased poverty. This shows the intertwined nature of environment and socio-economic development.

Previous management efforts, which relied on technical intervention by the government, were ineffective in addressing the complexity and the interdependence of these issues in Mara watershed, particularly the link between poverty and environmental degradation. This seems to have fostered the need for integrated watershed management in Mara as illustrated by the current efforts towards integrated watershed management of Mara watershed. This is consistent with Mitchell 1990 who argues that existing biophysical changes, socio-economic concerns can either foster or hinder integrated watershed management. On the other hand the observed opposition to eviction of people

living in the vulnerable ecosystem of Maasai Mau the upper catchment of Mara river attributed to landlessness, high population, and poverty shows that socio-economic concerns of the community can pose hindrances to integrated watershed management as also indicated by Mitchell 1990.

Despite the efforts towards integrated watershed management in Mara findings also indicate little coordination and collaboration among the several actors involved in the management of the basin except in the case of COMIFORM project where the UNEP is coordinating efforts towards addressing Maasai Mau forest problem. Empirical evidence indicates clearly that most government agencies and NGOs address various issues of the Mara watershed separately, without due appreciation of their interconnectedness and interdependence. The separate and fragmented approach in the management of the Mara watershed is underlined with emphasis on individual organizational objectives that is reinforced by policy guidelines, regulations and administrative structures and professional inclinations among various practitioners .

The findings of this study also indicates that most people in Mara watershed recognise the need to come together to address the various critical biophysical and socio-economic concerns. Most of the stakeholders interviewed showed willingness to work together in an attempt to address the crucial issues such as deforestation of Maasai Mau, land and water degradation in Mara watershed besides other issues. This evidenced by 100% of the respondents, who felt that these issues had reached critical levels, and required urgent and concerted attention. The positive attitude of stakeholders attributed to the critical nature of the prevailing conditions is most likely going to bolster the current efforts to integrated watershed management of Mara. However as earlier indicated this positive attitude is not guaranteed as long as the socio-economic concerns are not addressed. Similarly findings indicate that differences in views and perspectives attributed to diverse political affiliations, social classes, ethnic, religious and professional backgrounds is also likely to pose hindrances to effective integrated watershed management of Mara. This was illustrated by the differences in responses during interviews among different communities.Egostic tendencies of politicians and particularly tribal leaders of various ethnic communities such as Kalenjins and Maasais' are also likely to pose obstructions to the process of integration in Mara. It is also worth noting that as indicated by respondents political good will is required if the problem of Maasai Mau and Mara watershed is to be addressed because its partly caused by political expediency and corruption as evidenced during the past election.

In terms of participation there is widespread recognition of the need for involvement of stakeholders among NGOs such as WWF Mara Basin Initiative, NELSAP project and COMIFORM project. They indicated involvement of stakeholders from the planning stages to execution of their activities in order to tap all perspectives and knowledge. Empirical evidence also shows increased recognition of the role of education among the stakeholders as evidenced by lots of effort made by both the government and other organisations towards education and awareness campaigns. This is likely to enhance the improved understanding of the complex environmental issues and their respective roles in Mara watershed and ensure effective participation, an important prerequisite to effective integrated watershed management.

However, most government agencies involved in the management of some of the issues in the watershed still adopt top down approach except for the case of WRMA and Kenya Forest Service and this is likely to hinder integration efforts. At the same time participation of stakeholders as illustrated in the case on NGOs may not necessarily translate into effective integrated watershed management because, it is not clear to which extent the views of stakeholders are incorporated. Findings indicate apparent lack of clear measures for determining the required values and dealing with power disparities. Failure to include the views of the stakeholders may undermine the support, commitment of stakeholders and may lead to poor decisions as indicated by Hedelin (2007) and Mitchell (1990)

The projects and management initiatives being undertaken under WWF Mara Basin Initiative and NELSAP programme aimed at establishing Trans-boundary institutional structures for Water users and other stakeholders respectively are also likely to bolster efforts toward integrated watershed management in Mara by improving inter agency and multi-stakeholder collaboration. In spite of the efforts to establish these suitable structures to facilitate integrated watershed management, the recent water policy reforms do not have any provisions for such a structure. Similarly political and administrative boundaries are likely to pose a challenge to such structures because they do not rhyme with watershed boundaries. Unless these structures are legitimised in policy and supported by the political class chances are that they may not survive for along time even if they are formed as indicated by Mitchell (1990).

The involvement of various stakeholders such as WWF Mara Basin Initiative, UNEP and Nile Basin Initiative (NELSAP) provides leverage of resources that are likely going to enhance the

transition to integrated watershed management of Mara. According to findings NELSAP project funded by a consortium of donors is currently undertaking various activities such as establishing an institutional framework, capacity building, and small scale development projects in Mara. On the other hand the implementation of integrated watershed management in Mara and other water catchments in Kenya is likely to be hampered by inadequate finances as provided under the new water policy.

The current water sector and forestry reforms provide legitimacy and impetus to the efforts towards integrated watershed management, not only in Mara but also in other water catchments in Kenya. They also offer opportunities for improved involvement of stakeholders in policy making and in the management of watersheds. However the policy does not spell out clear mechanisms for ensuring the views of stakeholders are not suppressed as earlier indicated in the case of various NGOs. Much of the power in making decisions entirely remains in the hands of the line ministries with communities and other stakeholders only consulted. It is most likely that decisions will eventually be made by the elites, without due consideration of the views of stakeholders .This may lead to ineffectiveness in the management. Another weakness with the water policy is failure to adequately provide effective coordination arrangements for integrated watershed management. The current provisions of the act consider WRMA as a coordinating agency however WRMA is not representative enough to capture the aspirations of the diverse stakeholders.

7.0. FINAL CONCLUSION AND RECOMMENDATIONS

As much as the new the water sector reforms provides legitimacy, impetus and a framework for integrated watershed management , the transition to integrated management in Mara watershed and other water catchments in Kenya may not be smooth and is likely to be hampered, if barriers are not identified and addressed.

To stimulate effective integrated watershed management in Mara, there is need to focus on critical biophysical issues, which the stakeholders unanimously indicated such as deforestation in Maasai Mau, land degradation, pollution and excessive abstraction of water. There is also need to control migration of people into the watershed, particularly in vulnerable areas such as Maasai Mau. The local community should also be educated on the complex environmental issues in order to address the challenge of low level of understanding shown in section one of prevailing conditions in the watershed. Even though there is some level of awareness among the government agencies and

other organisations about the interactions and interdependencies among the variables of the system, this study recommends the need for further understanding among all stakeholders to stimulate effective integrated watershed management in Mara

The process should also build on the positive attitude among stakeholders to integrate solutions to address comprehensively all the watershed issues. Both formal and traditional mechanisms for conflict resolutions should be also be explored and used to deal with conflicts that may arise. Barriers to integration such egoistic tendencies, lack of clearly spelt out roles among stakeholders should be addressed.

Effective participation should also be promoted to ensure that contributions of stakeholders are captured and not suppressed. This can be achieved through mechanisms that tackle power disparities and enhance education of stakeholders . There is also need for more institutional reforms in most of the government agencies to facilitate effective multi-stakeholder approaches. Important or key stakeholders such as the local community, government agencies and politicians should be involved, and their commitment secured to facilitate effective integrated watershed management of Mara. The study also recommends the need to adopt and promote multi-stakeholder forums, which can bring people together, build understanding and help in bridging the disparity in views and perspectives attributed to diverse political affiliations, social classes, ethnic, religious and professional backgrounds.

The study also suggests the need to address legitimate interests of the local community and politicians, in order to gain their critical support and commitment. Livelihood improvement programs addressing poverty issues should be undertaken and communities' interests' such as the need for food, water, fodder and access to spiritual and cultural sites should be guaranteed. Legitimate concerns by the landless, and Ogiek community right of ownership of the forest should also be addressed to achieve concrete progress.

In order to ensure the successful implementation of the new policy reforms in terms of integrated watershed management in Mara and in Kenya. The new water and forestry should include provisions to legitimise administrative structures for integrated watershed management. They should also come up with concrete financial plans for implementation, of a wide scope of integrated watershed activities. These policies should also be further improved to ensure that effective

mechanisms are put in place to deal with power differences and ensure that the communities have a bigger say in the decision making process.

Harmonisation of policies and enforcement of the relevant laws and Acts is also an important prerequisite for ensuring smooth progress in efforts towards integration in Mara. Policy overlaps like that of NEMA and WRMA should be cleared. This study further proposes the need for effective coordination of all the stakeholders and management initiatives in Mara, if effective integrated watershed management is to be achieved. This study suggests the need to elevate the CAAC to the level of a coordinating agency instead of relying on a single government agency like WRMA as provided for by the water act 2002 at the catchment level

Even though interviews of most respondents indicated awareness of the new opportunities for stakeholders, and community participation, prescribed in the new forestry and water reforms there is need for increased awareness among the local community about the new reforms to ensure enhanced participation in the management of watershed resources.

Finally there is need for development of concrete Trans-boundary plan through a consensus process. This plan should draw insights from various successful experiences from other countries such as United States of America, New Zealand and Australia which for decades have pioneered innovative watershed approaches such as Land care (Australia) and stakeholder committees (U.S.A) (Margerum, 1999)

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APPENDIX 1: SURVEY QUESTIONNAIRES AND INTERVIEW GUIDE

Questionnaire for assessing the state of environment of Maasai Mau and Mara watershed and its impacts administered to the Local Community, Managers and Politicians

Dear Respondent

This to request you to kindly take a few minutes to reflect and answer the following questions. Note that the information given shall exclusively be used for the sake of a Masters thesis being undertaken by the undersigned at Lund University in Sweden.

Thank you for your cooperation.

Isaac wafula wamalwa

What is your name? or what is the name of your organisation?

Personal details;

a) Sex Male..... Female .....
b) Age
c) Level of education
d) District

3. What are your priorities as an organisation or as a group or as an individual?

4. In you own view do you think Maasai Mau watershed is being degraded?

a) Yes b) No

5. If you agree, what is your rating of the problem

a) It is very critical and requires urgent attention
b) It is critical but does not necessarily require urgent attention
c) It is not critical it is only exaggerated by the politicians and the media
d) It is not even a problem

6. What do you think are the causes of Maasai Mau forest watershed impairment? **Please tick the correct options** **a)** Colonial policy **b)** Landlessness **c)** Growth of population **d)** Poverty **e)** Inefficiency in forest management **f)** Degazzetment of part of the forest by the government **g)** Poor government policy **h)** Illegal encroachment i**)** Political influence **j)** Corruption **k)** Any other reason

7. Are you affected by Maasai Mau forest watershed degradation?

8. If yes, how are you affected?

9. What benefits do you derive in a well managed watershed with sound soil, water and forestry resources?

10. What are the land uses in Maasai Mau watershed? **Please tick the correct options**

a) Farming b) Settlement c) Grazing d) Tourism e) Any other

11. In what way do you think the land uses are affecting the water resources? **Please tick the correct options. a)** Reductions in forest cover **b)** Increase in surface water runoff **c)** Reduction in water infiltration **d)** Ground water decline **e)** Increase in soil erosion **f)** Sedimentation of rivers **g)** Sedimentation of lakes **h)** Increasing Stream flow **i)** Erosion of river banks and vegetation **j)** Drying of rivers **k)** Recession of lakes **l)** Pollution of the rivers **m)** Decline in fish catches **n)** Wildlife reduction **o)** Changes in rainfall and temperatures

12. Any other way in which water resources are being affected?

13. What do you think happens when forest cover declines? **Please tick the correct options**

a) Water resources available reduce **b)** Water resources available increase **c)** Precipitation increases **d)** Precipitation declines **e)** Maintain increased dry weather flows

14. What do you think are the socio-economic impacts arising from Maasai Mau watershed impairment? **Please tick the correct options a)**Increase in water scarcity **b)** Low food production due to lack of water for irrigation and changes in micro-climate **c)** Conflicts due to water scarcity **d)** Siltation of dams **e)** Reduced potential for hydropower generation **f)**Water related diseases **g)**

Increase in poverty due to low fish catches among the fishermen **h)** Reduced income from tourism due to reduction in wildlife like birds and animals.

15.In your own opinion what do you think should be done to tackle the problem of Maasai Mau and Mara river watershed problem? **Please tick the correct options**

a) Afforestation **b)** Eviction of illegal occupants **c)** Enhanced management of forests aimed at preventing illegal and excessive logging **d)** Stakeholder forums among interest groups **e)** Harmonising the acts

16. What are you doing as an organization to address the problem?

17. Do you think government regulations as provided for by National Environmental Management Authority, Forestry Act, Water resources Management Authority and other relevant acts are sufficient in addressing the Maasai Mau and Mara river watershed problem?

18. If No, what other measures should be taken to solve the problem?

19. Is a water users association as provided for by section 15 of water act 2002 established in Maasai Mau forest and Mara river watershed?

20. Do you think locally controlled management of water resources can help in addressing the Maasai Mau and Mara river watershed problem?

21. What role do you think water resources management Authority is playing in the management of water resources in Maasai Mau and Mara river watershed?

22. Do you think integrated management of the Mau watershed can help in addressing the problem?

23. In what way can integrated management of the watershed be achieved?

24. What are some of the challenges towards integrated management of water resources in the catchment?

23. What do you think should be done to overcome the challenges?

24. In case the communities settled in the Maasai Mau watershed are not evicted what measures should be taken to ensure forests, soils and water resources are conserved?

Questions for Interviewing Managers in Mau and Mara Watershed on Prospects and limitations of Integrated Watershed Managent.

Dear respondent

I wish to kindly request you to take a bit of your few minutes to respond to this questions. The responses are exclusively for a Masters thesis on **Prospects and Limitations of Integrated Watershed Management of River Mara** being undertaken at Lund University in Sweden

Isaac Wafula wamalwa.

1. In your Organisation do you have arrangements for participation of stakeholders
2. Do you involve the of knowledge from all relevant disciplines such as natural sciences i.e. hydrology, limnology, fisheries, forestry and social sciences i.e. economics, communication, psychology, political sciences in your planning, research and implementation of your programmes?
3. In your decisions regarding management and development initiatives in Mara basin do you involve all stakeholders' knowledge including local knowledge?
4. Can you specify mechanisms used?
5. In your work do you consider the values and ideological orientations of the stakeholders?
6. And if you consider them how to you weigh them against other alternative views in your decision making?
7. At what stage of your operations do you involve the stakeholders? And why?
8. What procedure do you use in defining the actors who should be involved,
9. How do you ensure that the views of the stakeholders are not suppressed?
10. The issues of environment are complex however you expect stakeholders to actively participate, how do you ensure that is achieved? Could you outline the mechanisms used in your organisation?
11. In your organisation what is your view with regard to managing the watershed collectively?

12. Are you supported by the management of your organisation to get involved in integrated activities?
13. Do you support the activities of integration in Mara Basin in terms of resources? If you do? In what way to you support them?
14. Do we have an appropriate institutional structure that can facilitate Mara river basin management?

APPENDIX 2: STAKEHOLDERS IN MAASAI MAU AND MARA RIVER BASIN

Management initiatives in Mara watershed

According to the findings of this study, there are several management initiatives that are addressing Maasai Mau deforestation, land and water resources degradation in Mara watershed. These initiatives are being undertaken by the government agencies such as national level efforts by the government task force, departments of Agriculture, and Forestry, Wildlife, Energy, and Environment and local authorities among others. There are also several management efforts that are being undertaken by NGOs and local community groups in the Mara Watershed. The NGO initiatives include Mara river Basin Trans-boundary Integrated project under Nile Basins NELSAP programme, WWF (EARPO) Mara Basin Initiative and COMIFORM PROJECT under the coordination of UNEP.While the local community Initiatives include Mara Water Users Association and Community Forest Association. According these findings the government agencies are involved in their sectoral goals, addressing different issues of the watershed separately. The NGOs on the other hand are also addressing their issues with very little collaboration. Even though there are efforts towards integration, interviews and my own observations indicate little or no collaboration has been achieved between these projects and initiatives. Details about what different groups undertake refer below.

Mara Water Resources Users Association

Mara River Water Users Association is a vibrant local community group which was formed under the provisions of the new water act 2002.The association has its offices at Mulot market centre adjacent to Amala river along the boundary of Bomet and Narok south district. The association comprises of several groups which manage various parts of the river from its head waters to the discharge area at Musoma.The activities undertaken by the association include environmental education and awareness, soil and water conservation, river bank protection and energy saving technologies (Personal communication with coordinator Mara water users association.

Mara river Trans-boundary Integrated Water Resource Management Project (NELSAP)

Is one of the projects under Nile Basin initiative, a partnership of riparian states of Nile River namely Egypt, Congo, Ethiopia, Kenya, Sudan, Tanzania, Rwanda and Uganda. The project covers the entire catchment area of Mara River from its head waters at Maasai Mau in Kenya to where it discharges its waters at Musoma bay in Lake Victoria on the side of Tanzania. The project is involved in establishment of a comprehensive institutional framework for the management of Mara river water resources, improvement of the quality of life of the inhabitants of the river watershed through small scale development projects, enhancement of capacities at all levels for management and development of the watershed, enhancement of community awareness and knowledge and establishment of the river monograph and information database. Some progress has been made in terms of creating a river monograph and informational database. To be able to achieve the twin goals of environmental conservation and socio-economic advancement of Mara watershed the first phase undertook a baseline survey on the status of the river and socio-economic assessment through involvement of consultancy experts (Telephone interview with project respondent in Musoma)

COMIFORM PROJECT

The Community based integrated forest resource conservation and management project(COMIFORM) is jointly being implemented by Narok county council, Kenya forest service, Kenya Greenbelt Movement (GBM),Ewaso Ngiro South Development Authority (ENSDA) and Kenya Forest working group (KFWG) under the coordination of UNEP with the objective of conserving the forest around in and around Maasai Mau forest area through the following activities; initiation and support of alternative sources of livelihoods among communities living around ,reforestation programmes in deforested areas and support of farm forestry, creation of an institutional framework that is participatory based on recent forestry reforms. Development of a management plan for the Maasai Mau forest, introduction of a carbon offset programme and participatory learning of government officials and capacity building of all the stakeholders through stakeholder forums which enhances the awareness and understanding of he issues involved. The project will be accomplished with collaboration of all stakeholders.

World Wide Fund for Nature (EARPO)

World Wide Fund for Nature is an international organisation that operates in various parts of the world including Kenya. The East African Regional Programme (EARPO) is based in Nairobi in Kenya. The organization is currently undertaking an initiative aimed at conserving Mara river. The

Mara Basin river initiative is undertaken from the project offices in Narok town. It is involved actively in the efforts towards integrated watershed management of Mara river, through cooperation with other management initiatives such as Nile basin initiative (Nile equatorial lakes subsidiary Action programme (NELSAP).It is also involved in conservation campaigns for increased awareness on the impacts of stakeholders activities on the Mara ecosystem such as unsustainable farming practices and untreated sewage disposal. It is also involved in promotion of conservation initiatives such as farm forestry and energy conservation stoves, strengthens and facilitates the participation of local communities in water resources management and Forestry resources Management. Current efforts by the project are geared towards establishing a Trans-boundary Water Users Association. They have also been instrumental in spreading the word on the new water sector reforms and other policy provisions like EMCA Act (personal communication with Doris Ombaka, project coordinator WWF Narok and participation in one of their field activities)