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Assessment of potential buyers in a payment for ecosystem services scheme in the Mara River Basin, Kenya and Tanzania

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The findings, interpretations and conclusions expressed in this study do neither necessarily reflect the views of the UNESCO-IHE Institute for Water Education, nor of the individual members of the MSc committee, nor of their respective employers.

I would like to dedicate this work to my families,
their support and encouragement is what got me here:
Méndez Castillo
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and Tito

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ABSTRACT

The trans-boundary Mara River Basin (MRB), between Kenya and Tanzania, supports human populations, the ecosystem and economic activities such as agriculture, tourism, mining, and aquaculture within its 13,504 km^2 area. Given the basin's accelerated degradation and its economic and social importance to both riparian countries, its regional importance as being part of the Nile River Basin, and its global conservation significance since it supports the Mara-Serengeti ecosystem. A payment for watershed services scheme has been suggested to halt the anthropogenic degradation along the basin by promoting more effective land and water management practices. At the same time, the scheme provides a means to equitably share benefits within the basin's stakeholders.

The research goal is to identify who should pay for the watershed services in the MRB and the conditions under which they would be willing to participate. The results are intended to assist in the development of an appealing business plan for the involvement of the stakeholders as potential buyers in the conservation program. 31 interviews and 19 surveys were carried out among 40 actors in the MRB, including 26 accommodation facilities, 4 commercial farmers, the Narok County Council and 9 governmental and private entities that work in the basin. Results identified enabling conditions for the establishment of a Payment for Ecosystem Services in the MRB such as: potential buyer's awareness of the situation of the MRB, a water management policy that motivates multi-stakeholder discussion and participation, and service user's willingness to participate in the scheme. Further research on the services that are being exchanged and their link to stakeholder's economic activities is needed to motivate participation.

Keywords: Mara River Basin, Payment for Watershed Services, Potential Buyers

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AWF:	African Wildlife Fund
CAAC:	Catchment Areas Advisory Committee
CBD:	Convention of Biological Diversity
CBO´S:	Community Based Organizations
CMS:	Catchment Management Strategy
EAC:	East African Community
EFA:	Environmental Flow Assessment
ENSDA:	Ewaso Nyiro South Development Authority
GDP:	Gross Domestic Product
GEF:	Global Environment Facility
GLOWS:	Global Water for Sustainability Program
KATO:	Kenyan Association of Tour Operators
KWS:	Kenyan Wildlife Service
LVSCA:	Lake Victoria South Catchment Area of the Kenya Water Resources Management Authority, Ministry of Irrigation
MC:	Motogori Conservancy
MDGS:	Millennium Development Goals
MEA:	Millennium Ecosystem Assessment
MMNR:	Maasai Mara National Reserve
MOT:	Ministry of Tourism
MR:	Mara River
MRB:	Mara River Basin
MRBMI:	Mara River Basin Management Initiative
MRBWRUA:	Mara River Basin Water Resources User Association
MSE:	Mara-Serengeti Ecosystem
NCC:	Narok County Council
NEMA:	National Environmental Management Agency
NGO´S:	Non-governmental Organizations
OCOC:	Ol Choro Oiroua Conservancy
OOC:	Olare Orok Conservancy
PES:	Payment for Ecosystem Services

PWS:	Payment for Watershed Services
SNP:	Serengeti National Park
TP:	Tourism Partners
TTF:	Tourism Trust Fund
WRMA:	Water Resources Management Agency
WSRB:	Water Service Regulatory Board
WRUA:	Water Resources User Association
WWF-	World Wildlife Fund
EARPO:	East African Program

1 INTRODUCTION

Ecosystem services have become increasingly important in preventing environmental degradation due to the recognition of the dependency human well-being and development has on their surrounding ecosystem's health and the benefit it provides. As highlighted by the Millennium Ecosystem Assessment (MEA) and the Convention of Biological Diversity (CBD) the rapid changes in ecosystems due to human activities are exacerbating poverty. Furthermore, the effects of environmental degradation limit the achievement of the Millennium Development Goals (MDGs) (MEA, 2005; De Groot et al., 2002).

In Kenya, the acknowledgment of the influential role natural resources play in the country's level of development and economic prosperity has lead to major changes in the legal framework. Policies such as the Water Act of 2002 recognized the pivotal role of water to development and therefore set integrated water resource management as an approach to prevent further degradation on catchments around the country. The Mara River Basin (MRB) is one of these areas where human mismanagement is posing a threat to regional socio-economic activities and a globally important ecosystem (WRMA, 2009; KNBS, 2008; GLOWS, 2007).

The Mara River (MR) is a trans-boundary watercourse which flows 395 Km from the Kenyan highlands into Tanzania before discharging into Lake Victoria and turning into part of the Nile River Basin. Through its ecosystem functions and services the Mara River basin supports human populations, the ecosystem and economic activities such agriculture, tourism, mining, and aquaculture within its 13,504 km^2 area (GLOWS, 2007; Hoffman, 2007; Gereta et al., 2003). An example of the importance of ecosystem services in the MRB is the critical role the river plays in supporting the savannah ecosystem and the annual migration of animals. This constitutes the backbone of a thriving tourism industry that contributes to Kenya's and Tanzania's GDP by 12% and 16% respectively (Hoffman, 2007; Thirgood et al., 2004).

The annual migration from July to October is the largest in the world. It includes the movement of approximately 2 million wildebeest, zebras, gazelles and their predators along the Mara Serengeti Ecosystem (MSE) searching for water and food. Here the perennial nature of the Mara River plays a fundamental role by becoming the main source of drinking water for migrating wildlife during the dry season. (WRMA, 2009; Thirgood et al., 2004; Sinclair, 1998)

Studies done in the Mara River Basin have identified an accelerated deterioration on the catchment, specially its headwaters. This poses a threat to the river's flow and therefore diminishes the river's ability to continue providing year-round benefits to downstream users and ecosystems. Among the main ecosystem functions in the MRB headwaters are efficient rainwater infiltration and soil conservation, which together ensure that there is the largest possible quantity of clean water in the river during the dry season. These functions translate into benefits to institutions and individuals in the basin inter alia: i) providing good water quality for communities, agricultural activities, tourist facilities, mining industry; ii) maintaining the Mara-Serengeti ecosystem, and iii) reducing flash floods and droughts (GLOWS, 2007; Mati et al., 2005; Gereta et al., 2003).

Major causes of the MRB's degradation are a result of population growth and the associated increasing demand for agricultural land, drinking water, sanitation, construction materials and fuel (wood and charcoal). These increasing demands put pressure on resources and have promoted deforestation and other land use changes, unsuitable waste treatment and inappropriate agricultural practices in the area (WRMA, 2009; Hoffman, 2007; Mati et al., 2005; Krhoda, 2001).

Given the anthropogenic nature of the factors affecting water flows a Payment for Ecosystem Service (PES) scheme has been suggested as a possible mechanism to reduce future deterioration of the Basin. The PES scheme in the MRB will seek to motivate upstream farmers and other land managers to modify their current practices in order to eliminate excessive water abstraction, improve agricultural practice to enhance rainfall infiltration, and decrease erosion and agricultural run-off, and restore forested areas. Given that the upstream land managers (mostly small scale farmers) will be providing a service to downstream users through the modification of their

current practices, under the PES scheme, interested downstream users of that services would be asked to provide a monetary incentive to the upstream service provider. PES schemes that focus in improving watershed services through land management practices are referred to as Payment for Watershed Services (PWS) (Smith, 2006).

In order to prepare a suitable PWS scheme, scholars have highlighted key aspects that need to be studied and defined in the MRB; they are: i) defining the category and organization of the ecosystem service which would be traded under the PWS scheme; ii) defining the service provider (who are they, whether they will be willing to participate in the scheme and under what conditions); iii) defining the service buyer (who they are, their willingness to participate in the scheme; and iv) defining the suitable institutional arrangements to facilitate the exchange of the service and the payment (Engel et al., 2008; Pagiola, 2007; Smith et al., 2006; Wunder, 2005).

Recent studies in the MRB have been aimed at defining the ecosystem services that could be traded in the PWS scheme and describing the processes and functions that generate them. Through the assessment of the environmental flow requirement, researchers are estimating the flow regime that must be maintained to support the ecosystem and basic human needs (GLOWS, 2008). Other studies have aimed at identifying the cost and location of better agricultural practices among the subsistence farmers' plots in the middle catchments (Atisa, 2009). Additionally, studies have determined the willingness of subsistence farmers to participate as service providers and water service users´ willingness to participate as potential service buyers (Hashimoto, 2008).

In the Mara River Basin, the identification of regional potential buyers was done through a stakeholder meeting in 2003. Since then, surveys were applied to tourist lodges, large scale farmers and residential water users by the WWF-EARPO office to establish a baseline of their water usage, their willingness to pay and their preference regarding the institution that should manage the PES scheme. Given that most of the actors identified for the MRB scheme belong to the private sector, the identification of the factors that could motivate them to enter this program is needed in order to facilitate the creation of an adequate business proposal for these stakeholders.

Lessons from on-going PES programs highlighted the importance of assessing actors' ability and willingness to pay. The previous identification of these actors, their interest and positions would enable a win-win negotiation for both providers and buyers. Therefore, the program would have greater chances of becoming more sustainable and achieving long-term funding (Engel et al., 2008).

This research aims to study the participation of tourist accommodation facilities, commercial farmers and the Narok County Council as potential buyers in the Mara River Basin PWS scheme. The results will hopefully assist in the development of an appealing business plan for the involvement of these stakeholders as buyers for the conservation program. The study builds from the information gathered previously by the WWF-EARPO office and starts by identifying potential buyers for the MRB PES scheme. Based on the data and information obtained from the basin and other PES schemes, this report finishes with recommendations for the negotiation stages to follow.

This first section aims at giving a brief background on the research. Section two will provide information on the study area and the institutional and legal framework for management water resources in Kenya. Section three provides the reader with information on payment for ecosystem services and describes the components in order to establish this scheme. It furthers describe the Payment for watershed services in the Mara, its service provider ands potential service buyers involved in this research. This section finalize with the problem statement and research questions. Section four describes the method taken in this research and the conceptual framework use in the analysis. Later, section five presents the results that will introduce the discussion done in section 6. Section 6 provides analysis along four major findings: identification of potential buyers for the PWS scheme in the Mara, stakeholders´ willingness to participate in the PWS scheme, the suggested institutional arrangement to manage the schema and the reasons potential buyers gave for not participating in the payment for watershed services scheme. Section 7 present this research conclusions and recommendation and this reports ends with the list of references and Annexes cited along the study.

2 STUDY AREA

The Mara River (MR) is a trans-boundary river between Kenya and Tanzania (Fig.1), 65% of the catchment lies in Kenya and the remaining 35% in the Tanzania. The physical characteristics and human uses vary along the basin's length. In the upper catchment the MR begins its course in the Mau forest and the Enapuiyapui swamp, were the two largest tributaries, the Amala and Nyangores, drain the landscape and support the river´s baseflow (Gereta et al. 2003). This area is characterized by abundant rainfall (1400mm/year) and is covered by a mixture of bamboo forest dissected by small-scale farmers, rural settlements and furthers south an expanding tea plantation (Krhoda, 2001).

Figure 1. Location of the Mara River Basin and its main tributaries, Kenya and Tanzania

In the middle catchment the river provides water for two types of agricultural systems subsistence mixed farms of about 2.0 to 5.0 ha where maize, wheat, bean and vegetables are the main crops and large commercial farms which grow maize and wheat by means of rainfed and irrigation systems (Krhoda, 2001).

Further downstream the Mara River flows to pastoral lands of the Maasai tribe, where

sheep, goats and zebu livestock are reared. Afterwards, it enters two world-renowned protected areas- the Maasai Mara National Reserve (MMNR) and the Serengeti National Park (SNP). Here, the Mara is joined by two other tributaries, the Talek and the Sand River which flow westwards from their headwaters in the Loita Hills. In these areas the land cover varies from savannah grassland to Acacia woodland depending on the moisture availability.

According to Thirgood et al. (2004), the best-known phenomenon in the Mara-Serengeti Ecosystem (MSE) is the annual migration of approximately 2 million wildebeest, zebras, gazelles and their predators across the African plains. In Sinclair's description of the phenomena, the wildebeest concentrate during the wet seasons of December to May on the southern grasslands of the SNP. In May or June they move northwest and concentrate in the northern woodlands of the SNP. As the dry season progresses around August to November, the migrants move north to the MMNR. Because of its perennial nature, the Mara River becomes the main source of drinking water for migrating wildlife in the Mara Serengeti Ecosystem during the dry season. With the beginning of the rains, the migration returns south into Tanzania's plains.

As the Mara River approaches Lake Victoria, it flows into a swampland called the Mara Swamp. From here the Mara River continues until it flows out into Lake Victoria. The economic activities in this area include mining, fishing, human settlements (Hoffman, 2007; Krhoda, 2001). Additionally, the Mara river contributes by approximately 5% to the Lake Victoria's total amount of water and becomes part of the Nile River Basin which is shared by 9 countries (Mati et al. 2005); (Hoffman, 2007).

2.1 Threats to the Mara River Basin

Population growth in the area and its associated demands are threatening the MRB ecosystem functions and therefore its services. Some of the pressures found in the upper MRB are the deforestation in the Mau Forest due to expansion of small-scale agriculture, timber collection for fuel and construction materials. Recent scientific findings suggest that the deforestation of the Mau forest will diminish the flow of the two main tributaries of the Upper Mara River, the Amala and the Nyangores, and in

doing so jeopardize the perennial nature of the river. Since according to Gereta et al. (2003) & Khroda (2001), the Amala and Nyangores tributaries contributed to the low flow of the Mara River. Additional impacts of deforestation include the increasing sediment load and sedimentation in watercourses, decrease soil fertility and loss of biodiversity (GLOWS, 2007).

The Mau Forest stretches from the town of Narok in the Rift Valley province to the Lake Victoria Region. In the 1990´s, massive areas were turned into farmland and allocated to groups for political reasons. The increasing population has exerted pressure in the forest by accelerating its deforestation for agriculture and meeting their increasing timber and charcoal needs (Khroda, 2001). In view of this and acknowledging the importance of the Mau forest for sustaining livelihood at the local, National and International level; the actual government is leading an eviction process.

The eviction process in the Mau Forest arouse clashes among the Ogiek, Kipsigis, Kikuyu and Maasai tribes living in the area; and have transcend into the Kenyan Parliament. These situations have led to a suspension of the eviction process until after a newly formed study group presents its suggestions on how to precede best with respect to the allocation of alternative land to legal and illegal settlers. Currently, Mau forest condition has been addressed at different governmental levels: within the basin, from local groups to create awareness among the settlers on how to prevent degradation in the forest, parliamentary meetings and decision making based on political and other social pressures (US state department, 2008).

In the middle and lower catchment inappropriate agricultural practices, high water extraction for domestic and agricultural purposes and discharge of untreated domestic waste water pose a threat to the water quantity and quality in the river. Hawkins (2003) explained how poor agricultural practices “negatively impact other ecosystem services” as they cause sedimentation, fertilizers and other chemical presence in surface flows, decrease flood control capacity, and massive habitat loss.

Another threat is the middle catchment of the basin is increasingly being converted for agricultural use and human settlement posing new pressures on the basin’s

resources (Ottichilo et al., 2000). According to Hoffman (2007) & Krhoda (2001) the current agriculture trends in the basin point towards the expansion of farming areas in search for higher profits, increasing number of small subsistence farms due to growing population, fencing and other parcel delimitation.

2.2 Kenyan Water Act, 2002

In Kenya, the recognition of the influential role natural resources play on the country's level of development and economic prosperity has lead to major changes in legal frameworks and guidelines. Following the adoption of the National Water Policy in 1999, the Government embarked on a legal and institutional process which culminated in the enactment of the Water Act in 2002 (WREM, 2007).

The Water Act of 2002 recognizes the importance of water as pivotal to development and therefore sets integrated water resource management as a national priority. The Act extends the functions of the Ministry of Water and Irrigation from water supply to integrated water resource management and also provides the enabling legal and institutional frameworks to achieve sustainable water use. Among the major changes brought about by the 2002 Act were i) separation of water resources management activities from water supply and sewerage actions; ii) creation of autonomous regulatory institutions for both managing water resources and water supply, and iii) the definition of catchments areas as the unit to achieve management in the country (WRMA, 2009); (WREM, 2007). In this context the Water Services Regulatory Board (WSRB) was created to manage water and sewerage services (Hoffman, 2007). The explanation of this sector lies outside the scope of this research.

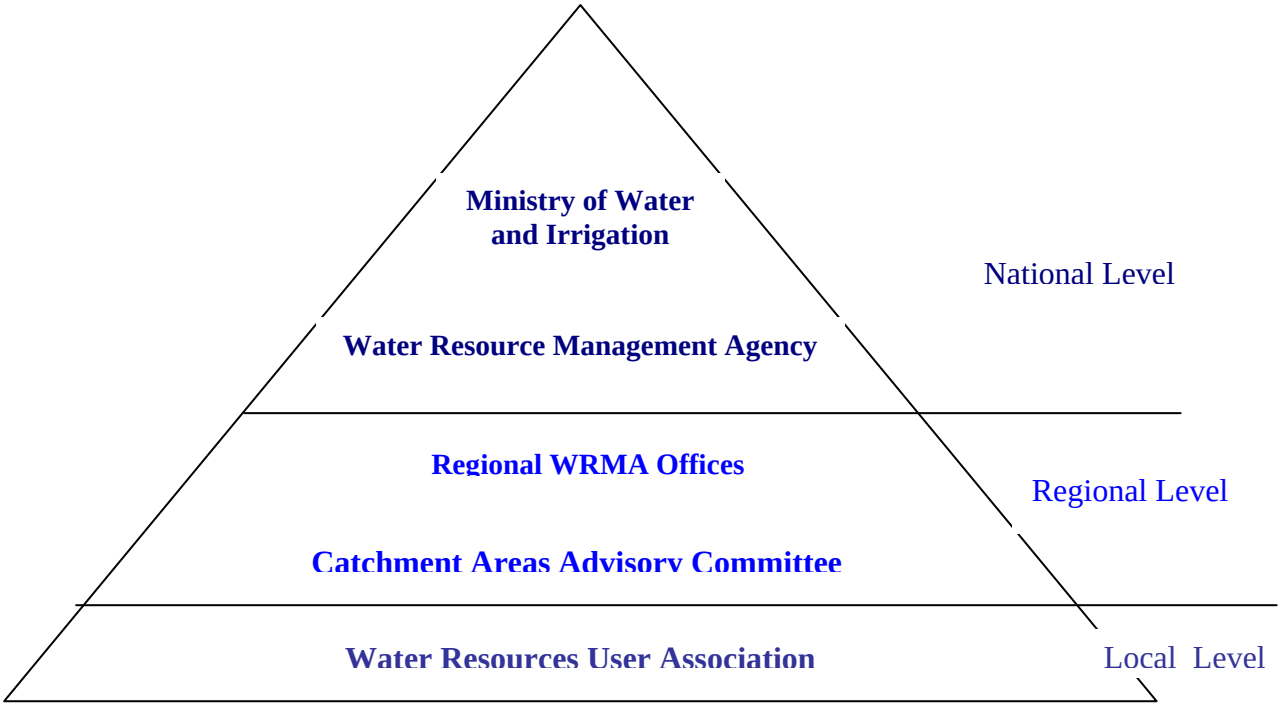

Figure 2. Institutional set up of the Water Resource Management Sector in Kenya

With regards to the water resources management activities, the Act set up an institutional structure aimed at managing water resources (Fig. 2). Under this Act the Ministry of Water and Irrigation is responsible for the policy formulation and the Water Resources Management Authority (WRMA) is created as the responsible body to manage the water resources at the National level. One important aspect of the mandate given to WRMA is the use of the subsidiarity principle for organization. The subsidiarity principle states that matters ought to be handled by the least centralized competent authority. Therefore the management, use, development, conservation and control of the water resources are being done through the development of catchment management strategies (CMS) and the establishment of Catchment Areas Advisory Committees Boards (CAAC) at the regional level and Water Resources Users Association (WRUA) at the local level.

The CAACs are established at the catchment level to advise the WRMA on conservation, use and allocation of water resources in their respective areas (WREM, 2007). The Mara River Basin is located within the Lake Victoria South Catchment Area (LVSCA), which is now creating a catchment management strategy in line with the National Resources Management Strategy which was operationalised in 2007 (KNBS, 2008).

2.2.1 Mara River Basin Water Resources User Association

The Water Resources Users Associations (WRUAs) are formed at a local level to support water management and allocation activities. In the Mara, the MRBWRUA was register as a legal entity in 2003. Its objectives are: i) to promote the protection and conservation of the Mara water catchment area; ii) to ensure efficient water use; iii) to monitor water use within the catchment; iv) to facilitate conflict resolution and co-operation management for water resources in the catchment area; and v) to advise the government on water resources conservation issues, adjustment and cancellation of water permits, and other matters related to water management in the Mara (personal communication Kennedy Onyacho, 2009).

The MRBWRUA assembles 700 individual members and 15 institutions among of which are schools, hospital, CBO´s etc. These members are represented through 17 board members who meet every 3 months. The board members are representatives of 10 sub-catchment committees (Fig. 3), which are then group in 3 catchments: the Amala River (8 members), Nyangores River (6 members), and the greater Mara (3 members). The Amala committee representatives are mainly small scale farmers living in the area and Mulot town representatives. The Nyangores committee have representatives from the large scale farmers and the game ranchers. Finally, the Mara committee have representatives of the lodges and the protected areas (represented by the county councils).

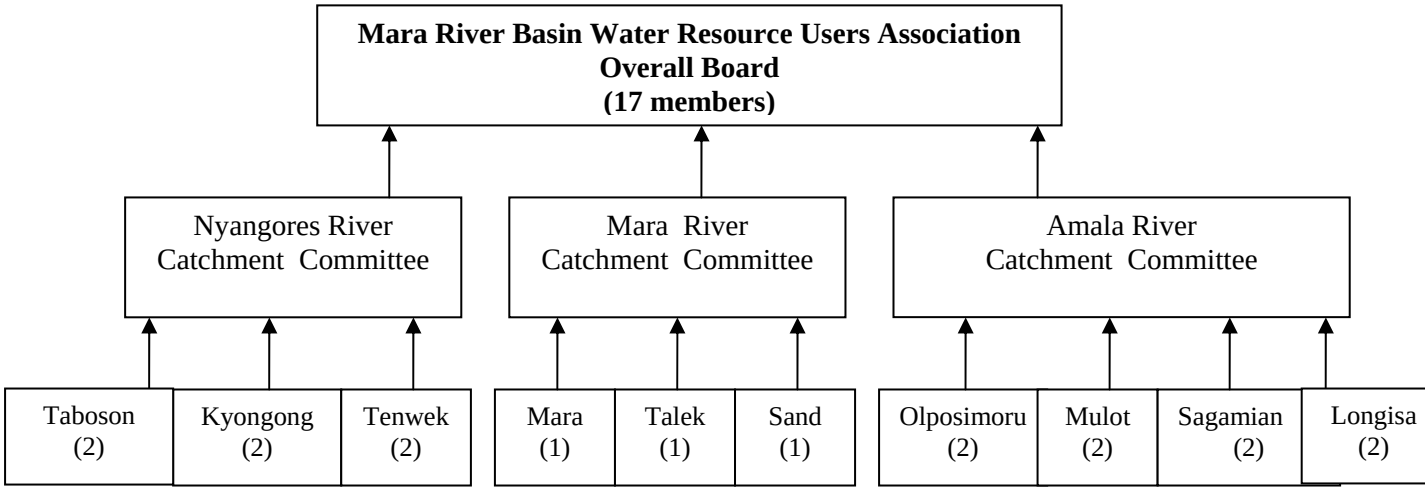

Figure 3. Board Structure of the Mara River Water Resources User Association in Kenya
Note: Number of members in parenthesis

During the quarterly meetings, each sub-catchment committees present the activities, advances on their initiatives, challenges and new initiatives. The board then evaluate the projects cases and decides which ones to fund and were to seek funding. The MRBWUA have a network of key partners such as: WWF, NEMA, Ministry of Agriculture, Kenya Forest Services, show provide technical support and contact for funding of their activities.

3 LITERATURE REVIEW

3.1 Ecosystem Services

Ecosystems services are the direct and indirect benefits provided to humans by well-functioning ecosystem [1](MEA, 2005; De Groot et al, 2002). The concept's implication that benefits derived from healthy ecosystems might be of direct value to humans. Plus the realization that the provision of benefits is a function of the ecosystem's health has made ES an attractive and popular tool to promote conservation (Brown et al., 2006; Khan, 2005).

Ecosystem services have been categorized in a variety of ways by: functional grouping (MEA, 2005; De Groot et al., 2002); organization grouping such as services that are associated with certain species; and descriptive grouping such as renewable resources, biotic services and biogeochemical services (MEA, 2005).

For the purpose of this research I've chosen the classification of ES by the functions from which they emanate because it is more useful in understanding and justifying the establishment of a conservation PES scheme in the Mara. Given that the PES implies providing incentives to upstream subsistence farmers (service providers) to change their agricultural practices in order to preserve the ecosystem functions and, therefore, benefits to downstream users (service buyers).

Ecosystem functions are defined as "the capacity of natural processes and components to provide goods and services that satisfy human needs directly or indirectly". Under the functional classification, ES are classified according to the function upon which they are generated, these are: i) provisioning services which are generated through the production functions of ecosystems, regulating services generated through regulation function (dg), supporting services generated through the habitat functions (dg), and cultural services derived from the information functions (dg) (MEA, 2005; De Groot et al.,2002).

[1] include food, water, recreation, regulation of vectors among other

Similarly, the functional classification is applied when referring to a Payment for Watershed Services' (PWS) such as the one promoted in the MRB. Under the PWS scheme the benefits obtained from an ecosystem within a watershed are traded at a regional level (Smith et al. 2006). Table 1 presents and defines the main water related-services provided by a typical watershed like the Mara.

Table 1. Water related-services provided by a typical watershed

Provisioning services	**Regulating services**
Services focused on directly supplying food and non-food products from water flows	Services related to regulating flows or reducing hazards related to water flows
• Freshwater supply • Crop and fruit production • Livestock production • Fish production • Timber and building materials supply • Medicines • Hydro-electric power	• Regulation of hydrological flows (buffer runoff, soil water infiltration, groundwater recharge, maintenance of base flows) • Natural hazard mitigation (e.g. flood prevention, peak flow reduction) • Soil protection and control of erosion and sedimentation • Control of surface and groundwater quality
Supporting Services	**Cultural and Amenity services**
Services provided to support habitats and ecosystem functioning	Services related to recreation and human Inspiration
• Wildlife habitat • nutrient cycling	• Aquatic recreation • Recreation and tourism • Cultural heritage and identity • Artistic and spiritual inspiration

Adapted from Smith et al.(2006), De groot et al. (2002)

3.2 Payment for Ecosystem Services

Payment for Ecosystem services is a relatively new and popular incentive based mechanism aimed at supporting positive environmental externalities by transferring resources (financial and/or in kind) from ES beneficiaries to those who allow the ES to be generated (providers) (Wunder, 2005; Mayrand & Paquin, 2004).

PES schemes can be defined through five basic criteria (Wunder 2005): they are a i) a voluntary transaction where; ii) a well-defined ES (or a land-use likely to secure that service) iii) being 'bought' by a (minimum one) ES buyer; iv) from a

(minimum one) ES provider; v) if and only if the ES provider secures ES provision (conditionality). Other authors like (Smith et al.,) considered the voluntary criteria to be applicable only to the supply side in order for it to include schemes in which government use taxes to pay for watershed services.

In practice PES programs are found to differ widely according to their local characteristics and the definition of key components, which include: identification of stakeholders, valuation and identification of watershed services, negotiation and agreement on how to manage the scheme (Fig. 4). The outcomes and the arrangements of these components will influence the scheme's efficiency and effectiveness (Mayrand & Paquin, 2004).

Bohlem (2009), Engel et al. (2008), Smith et al., (2006), Pagiola (2002), agree that the first steps in order to adequately define a PES scheme is to define the scientific relation between the land management practices upstream and its effect downstream. Answer to questions like: "how does management relate to sustainable use of services?; How can the condition of watershed services be monitored?;" should provide information on the quantity, quality, timing and duration of services´ respond to changes in the type of land cover, land use and management regimes and therefore give an insight on what should the scheme be invested in, where in the watershed should the investment be made and the scale at which the scheme would be design.

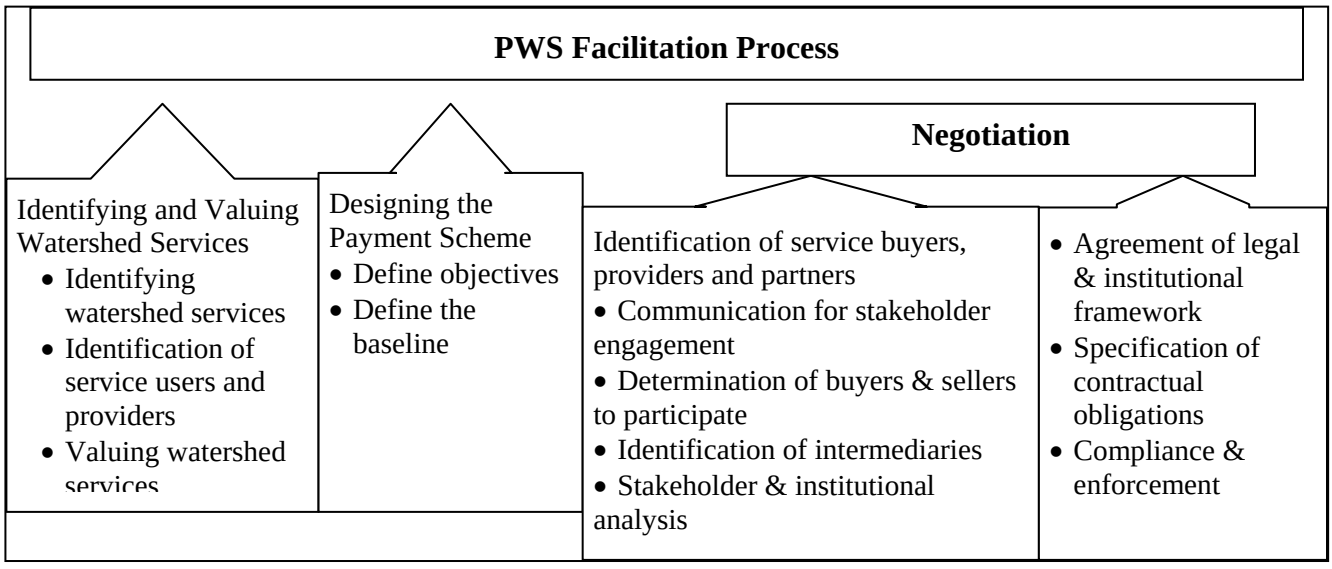

Figure 4. Components for the creation of a PWS scheme.
Adapted from Smith et al. 2006

The identification of watershed service and the ecosystem conditions that allow its provision is the basis for linking the needs and welfare of downstream users of water resources to upstream manager's actions. On the other hand, the valuation of the downstream watershed services represents the incentive for downstream users to influence decision making and management upstream (Smith et al. 2006).

Once the services and how they are generated are identified, this will determine the scale at which the scheme should work and the stakeholders (service users and the providers of the watershed) that might be involved. Service buyers must then be identified through the valuation analysis of who will have sufficient financial interest in a particular watershed services to be motivated to pay for its conservation. On the other hand, service providers must value how much the change in practice will will change their income in order to determine if they will be willing to participate in the scheme and the amount of the incentive, which must exceed the benefit from the alternative use (Engel et al. 2008).

Wunder (2005) highlighted the importance of defining the schemes objective, whether they area conservation or poverty alleviation, in order to targeted the areas within the basin and practices that will be promoted through the scheme. This information would lead to the identification of the specific type of PES scheme. In addition, the determination of the baseline is essential for ES buyers to plan and later assess PES additionality. Additionality is defined as the difference in the provision of ecosystem service with respect to the baseline that can be attributed to the scheme. The careful inclusion of the baseline and the later measurement of the schemes additionally would improve trust among the potential buyers who would then see they are paying for the delivery of a service.

Additionally, stakeholder participation is fundamental in the scheme. All actors must learn and understand the watershed situation and the value that the ecosystem services have to their economies. In order to assist stakeholders in this process, "reliable information and know-how needs to be made available. Therefore, it is critical that the results of, for example, assessments of watershed services and their

values are communicated in formats that stakeholders can comprehend" (Smith et al., 2006).

Furthermore as awareness is created, the construction of a common vision that includes PWS and other incentives based mechanism as a mean for conservation is facilitated. Additionally, scholars also identified opportunities that could help progress towards making an agreement. These are: i) changes in policies, which would allowed the stakeholders to discuss its implications and preferred the incentive mechanism instead of the command and control measures; ii) new information might become available related to watershed services of direct relevance to some or all parties; iii) Tensions, conflict or a crisis might occur that bring parties together and enable them to find new ways to further their discussions (Smith et al., 2006).

Finally, the establishing a payment scheme requires buyers and sellers to negotiate. This negotiation aims at reaching agreements that specify the design and the rules for the operation of the PWS. Therefore, stakeholder's analysis is vital to understand the actor's interests, assets, capacities and power of the players (Smith et al., 2006).

3.3 Payment for Watershed Service in the Mara River Basin

A Payment for Watershed Services has been suggested in the Mara River Basin in order to contribute to the basin's conservation and palliate the effect of the growing economic activities in the area (Fig. 5). The PWS aims at the promotion of land management practices among upstream land and water managers (service providers). The activities promoted will seek to eliminate excessive water extraction, improve rainfall infiltration, decrease erosion and agricultural run-off, and restore forested areas among upstream users. These changes in land use have been associated with improving key watershed services such as i) quantity of water yield, ii) evenness of flow, and iii) quality of the water (Porras et al., 2008).

Under this PWS, downstream beneficiaries of the improvement of the river's flow and its water quality would be asked to provide a monetary incentive to the

upstream service provider. The amount of the contribution given by the service buyers, and the payment conditions are agreed upon through a negotiation stage between the service buyers and providers. This negotiation is based on the stakeholders' economic valuation for both the watershed services and the opportunity cost of the changes in land uses.

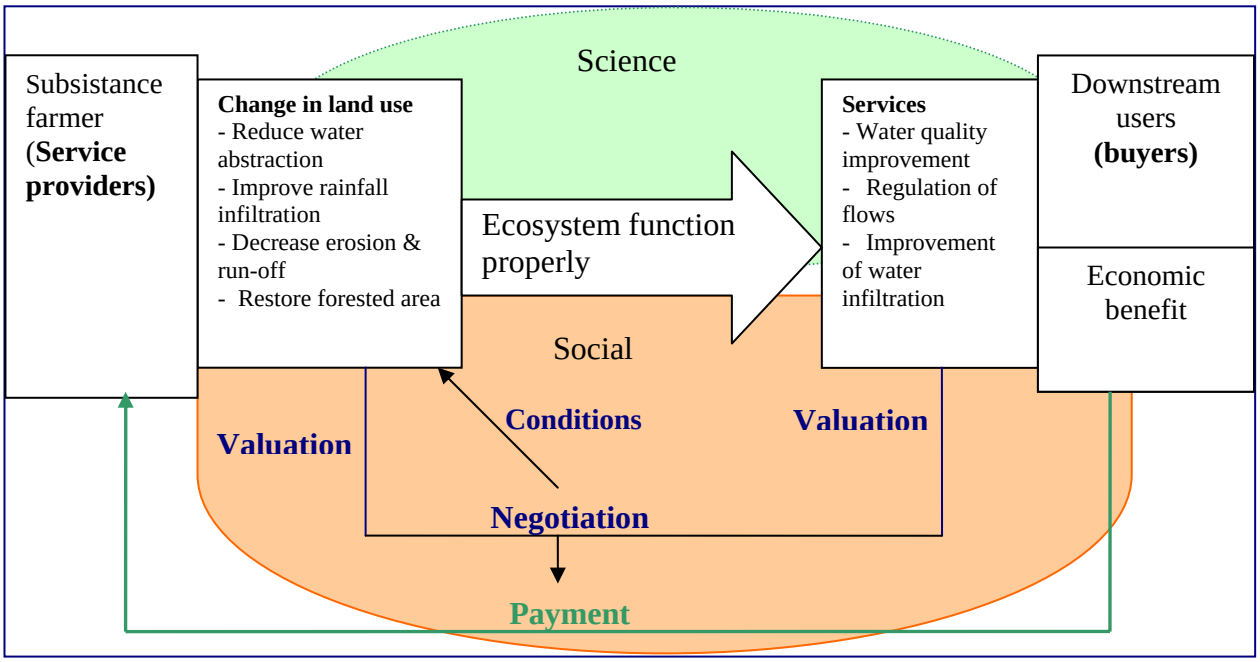

Figure 5. Conceptual framework of Payment for Watershed Service scheme in the Mara River Basin. ***Adapted from Pagiola (2002)***

3.3.1 Service traded

Typically PES schemes have traded mainly four kinds of ecosystem services, namely: watershed services, carbon sequestration, biodiversity protection, landscape beauty (Porras et al., 2008, Wunder, 2008). In the Mara River Basin, the suggested PES scheme focuses on trading watershed services. It is also important to consider that because of the interaction between the four functional categories of ES are common (one function may produce diverse services and one service is a product of two or three different ecosystem functions). Besides defining the type of service trade, clarity on whether it is a unique service or a bundled service scheme will be necessary in order to determine the stakeholders that could be interested in participating (Porras et al., 2008; Smith et al., 2006; MEA, 2005; Hawkins, 2003).

In the Mara River Basin the service traded under the proposed scheme between upstream land manager and downstream users is a change in land use practices upstream. This will result in an improvement of water quality, and will assist in meeting the Reserve flow requirements currently under development by the water ministries of Kenya and Tanzania; and will therefore promote the conservation of biodiversity in the area. The Global Water for Sustainability (GLOWS) program has led several studies that will contribute to the definition of the pertinent indicators to monitor the delivery of the service traded under the PWS scheme. Among the major studies are: establishment of environmental flows, water quality assessment, water availability and demand analysis and the construction of a hydrological model for the basin. The objectives of these studies and its relation with the PWS scheme in the Mara are summarized in Table 2. Additionally, hydrological model have been design for the MR, one of them (Mara SWAT) has the ability of predicting the effect of watershed management activities on water and sediments.

3.3.2 Service Providers

Smith et al. (2006) defines the service providers for a PWS as those land and water managers (whether private or government organizations) whose individual or collective decisions impact the quantity and quality of water available for downstream users. In the MRB subsistence farmers with farms of about 2 to 5 ha and where the main crops are maize, wheat, beans, and vegetables have been identified as the PWS scheme main providers (Krhoda, 2001). Additionally, under the PWS in the Mara, other water managers such as tourist facilities and irrigation farmers will contribute by seeking an optimization of water use in their activities and therefore reducing the extraction of water from the river.

Regarding service providers in any PES scheme, scholars agree that determination of property rights is a key principle in order to avoid offering a service for which you do not own the mechanism to assure its delivery. In other words, one can not offer to change agricultural practices on land that is not their property (Engel, 2008; Pagiola, 2007). In practice however, M Grieg-Gran et al. (2006) found that in local

PES scheme clear definition of property rights is not a prerequisite for success of the scheme.

PES schemes provide the opportunity to relate conservation to poverty alleviation strategies in developing countries. According to Wunder et al. (2008) this could be achieved in schemes were services providers are people with low income. In these cases through PES their income can be improved directly through the incentive and indirectly by improving practices that will ultimately increase income or reduce cost. On the other hand studies also describe the potential risk of PES of exacerbating poverty conditions, becoming a bad incentive for providers if not properly designed (Pagiola et al., 2007). The providers' dimension of the MRB PWS scheme lies outside the scope of this research; consequently a brief summary is presented in Table 2, as they are mention during the discussion section.

Table 2 Studies on the Mara River Basin and their relation to the establishment of a Payment for Ecosystem Services scheme

Name of the study (year of publication)	Relation with the PWS in the Mara
Assessing the Reserve for the Mara river: Kenya and Tanzania (2008)*	• The recommendation on the reserve flow proposed in this research may be used to set up targets for the PWS. • The study identified and assessed the status of critical indicators that can be used to monitor river's health. These indicators could be use to monitor the delivery of the service under the PWS scheme. • The initial assessment on the water quantity, quality, and the morphological and biological status of the MR can be used as baseline information for the establishment of the PWS. • This study identifies the ways communities use the MR
Koji Hashimoto MSc thesis Draft, august 2007	Level of interest in adopting best management practices as part of a basin-scale PES scheme. Understand the level of payment the consumers would be able to make for the improvement in water services
Geospatial Mapping and Analysis of Water Availability-Demand-Use within the Mara River Basin 2007	The quantification of the water use within 6 sectors in the MRB could become part of the baseline information for the implementation of the PWS. Wunder (2005) highlighted the fact that proper baseline is critical for PWS buyers to monitor that they are actually paying for a service that wasn't given before. This study further identify who are those stakeholder

	benefiting from the water quantity in the river.
Water Quality Baseline Assessment Report: Mara River Basin, Kenya-Tanzania	This study results might be useful to construct the baseline for the PWS, especially at the monitoring stage.
Mara River Basin Stakeholders' Workshop, 29th to 31st October 2003	Identified and describes main competing interest groups in the Mara, which are ALL involved in the implementation of the PWS as service providers (small scale farmers), and buyers

** Draft document was reviewed*

3.3.3 Institutional and Financial Mechanism

The establishing of a PES scheme requires different actors to agree upon a suitable institutional and financial mechanism that will handle the payment and monitor the compliance to the agreement by both service providers and buyers (Smith et. al. 2006). These mechanism's characteristics depends on the economic, social and political context, and are mostly shaped by a negotiation stage between stakeholders (Engel et al, 2008; Smith et. al. 2006).

The process of creating the adequate mechanism for each PES scheme starts by getting the adequate stakeholders (buyers, providers and intermediaries) on the table of negotiation. During this stage institutional analysis are needed in order to determine which institutions should be involve in the scheme, what role should this institutions be playing and whether there is a needed for a new institution to fill any gaps. At this point, achieving a balance between the stakeholder's position and powers is vital in order to facilitate achieving deals on which both parties feel satisfied (Engel et al, 2008; Smith et. al. 2006).

Smith et al. (2006); M Grieg-Gran et al. (2006) highlighted common lessons that have led to the establishment of PES schemes:

1.- The negotiation of clear enforceable rules in which all parties are well aware of the regulations, procedures and consequences of breaching them. The achievement of rules that are both known and according to stakeholders expectation will provide security to buyer's that the specified management

activities will be carried out to the required standard. On the other hand, providers will be confident that payments will be fair and will be made for long enough for them to benefit from their investment.

2.- Agreement on a transaction mechanism. The payment mechanism range from direct contract between buyers and providers, intermediary-based transactions to more sophisticated trading mechanisms: such as credits, licences and use rights. Furthermore, the authors agree that in developing countries, such as Kenya, simple mechanisms such as contracts area most commonly used. However they also found that intermediaries have played an important role in bringing buyers and sellers together, and facilitating the negotiation stage.

3.- Define and establish mechanisms for assessing compliance. The first step would be to define clear rules that are understood by the entire stakeholder. The remaining aspect will be how to monitor this compliance within the PES scheme and the financial support to undertake this monitoring. Under a PES the authors recommend a clear designation of responsibilities for proving compliance, and agreed sanctions in cases of non-compliance.

In the Mara River Basin context, the negotiation stages between the stakeholders are yet to come. However, this research presents some of the potential buyer's preferences with regards to the institutional set-up and characteristic that should manage the scheme. These responses will be helpful when designing the next negotiation stages.

3.3.4 Service Buyers

Service buyers for a PWS are the stakeholders (individual or group) who have sufficient financial interest in a watershed service to be motivated to pay for its maintenance (Smith et al., 2006). Buyers within a PES scheme can be classified in different ways:

1. According to the scale which links the ES and the actor, buyers could be at the local level (usually involved landscape services), regional level

(watershed services) or global level (carbon sequestration and biodiversity services) Jin et al (2007).

2. Because of their use of the service, buyers can be direct (directly affected by the upstream land management) or indirect buyers (interested in financing conservation of the service on other's behalf). The latter may include government agencies (local and/or National) and international conservation agencies (Smith et al., 2006).
3. Buyers could also be classified as private sector (hydroelectric companies, breweries, tourist facilities etc), governmental sector (National or local government), donors and parastatal agencies who manage fees from service beneficiaries (Porras et al., 2008).

The majority of on-going PES schemes use a combination of different buyers to obtain funding for the establishment and service payment of the scheme. According to Porras et al. (2008), funding for establishment of the schemes relies primarily on public and donors´ money. On the other hand, private funding in PWS schemes is relatively slow and has often said to be link to public relations rather than the motivation for an environmental benefit. This has raised the question of how sustainable can these programs be, given the nature of the funds that support them (Engels et al., 2008). In this sense, the information on the private sector involvement on PES schemes would facilitate the creation of an adequate business proposal for these stakeholders, leading to a more adequate and significant involvement of this sector. Furthermore, the increasing involvement of private companies as buyers in PES schemes, instead of depending on donor and governments funding, may answer part of the sustainability question set around these conservation programs (Porras et al. 2008; Engel et al. 2008).

One way to achieved long term funding for PES schemes is adequately identifying its buyers. For this a key issue is properly assessing the actor's ability and willingness to enter the scheme (Tresierra, 2008), (Gutman et al., 2003). The relation between a persons´ ability and willingness to pay in the context of water services is described by Wedgwood & Sansom (2003) as they explained that service users "must be able to support their desire for an improved service by the ability to pay the contribution towards this service".

Neglecting the assessment of the service user's ability to pay envisages the risk of marginalizing and exacerbating poverty by demanding a payment from people for a previously free service. This research assumes that all the actors identified in the Mara River Basin´s have the ability to pay for the conservation of the watershed services.

On the other hand, willingness to enter the conservation scheme lies in the center of this research. Several scholar have found that willingness to pay is link to factor like: i) buyer's awareness of the benefits generated from the ecosystem service or the lost bring by not having the service, therefore generating a "felt need" toward the service; and ii) the acknowledgment of the services´ scarcity in order to provide an incentive for paying for its conservation (Brown et al., 2006); iii) financial cost benefit analysis; iv) intangible benefits; v) acceptance of the scheme objectives; vi) the target group's trust for the mechanism that manages the schemes and the trust of the other actors.

In the Mara river Basin, the identified potential buyer´s within the basin were: large scale farmers, the management of the two protected areas (Narok County Council, Trans-Mara county council and Tanzania National Park), residential users, industries which depend on the ES (tourist accommodation facilities, mining companies). Outside the basin, one could also identify potential buyers for the MRB watershed service. This is due to the trans-boundary character of the river and the fact that its part of the larger Nile River Basin. An example would be Nile Basin Initiative and the Lake Victoria Basin Commission under the EAC who are interested in the quality and quantity of the MRB input into Lake Victoria. This stakeholders´ participation in the PWS in the Mara lies outside the scope of this study.

3.3.4.1 County councils

The Masai Mara category of National Reserve entails that it held in trust for the people and managed by the local county council. The 1,510 Km^2 MMNR known today, was declared a protected area in 1961 and was brought under the management of the **N**arok **C**ounty **C**ouncil (NCC). Later on 1995 the

administration of the reserve was divided between the Narok County Council and the newly formed Trans- Mara county council (Khroda, 2001, Mara Conservancy webpage).

The 1000 Km^2 eastern portion of the reserve is managed directly by the NCC. Khroda (2001) estimated the NCC income from the management of the reserve in approximately 40 million KSh. The revenues are then invested in the specific conservation activities as managing the Mau Forest, tourism development in the area and maintanance of infreastructure. On the other hand, the 510 km^2 area of the MMNR within the trans-mara district, known as the Mara triangle was given for its management to a a non-profit managements company called the Mara Conservancy . The activities of the mara conservancy include revenue collection and distribution, security, tourism development and management, infrastructure maintenance and development of the Mara triangle.

3.3.4.2 Commercial Scale Irrigation farmer

Krhoda (2001) presents two distinct types of agriculture in the Mara River Basin, namely a smallholder mixed farming and large-scale commercial farming. Hoffman (2007) estimated the large-scale farming sector's water demand at around 12 Million m^3/a, setting it as the largest of six sectors (tourism accommodation facilities, mining, population, livestock and wildlife) studied within her research. The study further states that "The four largest commercial farms (Olerai Limited Mara Farm, Lemontoi, Shimo Limited and Ndakaini Farm Limited) cover an area of approximately 690 hectares of land and basically used irrigation systems to produce wheat, maize and french beans".

3.3.4.3 Tourist accommodation facilities

Tourism is one of the pillars for economic growth in Kenya. In 2007, the economic survey reported a 16.4% revenue increase in this sector due to the diversification and improvement of Kenya's range of products. However, reports for 2008 showed a decrease in revenue because of the post-election violence lived in Kenya at the beginning of that year. Since then, tourism industry has tried to recover but

has found it to be difficult due to the economic crisis which hampers tourist ability to travel (KNSB, 2008; Heath, 2009).

In the Mara River Basin tourist accommodation facilities have increased rapidly in the last decade. In 2003 there were an estimated 24 facilities in and around the MMNR. In 2007 Hoffman (2007) reported 65 tourist facilities, despite the National Environmental Management Authority´s moratorium to prevent the building and expansion of tourist facilities within the reserve. NEMA´s action have managed to halt the growth of these facilities within the reserve but not on the surrounding area. Currently the Kenyan Wildlife Service (KWS), who supports in the management of the protected areas, has a list of 72 camps and lodges in the Maasai Mara (Annex I).

Table 3 summarizes the information on the potential buyers and providers for the MRB scheme.

Table 3. Potential service buyers for the Mara River Basin PWS scheme.

Actors' Description	Theoretical considerations
Potential buyers	
Group Name: Commercial Scale Irrigated Farms Largest water demand in the basin: approximately 12 Million m^3 /year (Hoffman, 2007). **Possible role in the PWS:** • Provide Economic Incentives to upstream land manager (subsistence farmers). • Potential to reduce water consumption through use of more efficient irrigation systems and/or diversification of crops. **Why they would like to participate:** • Assure water availability for agriculture • Avoid potential conflict with neighbours over water (communities and accommodation facilities) • Avoid negative image	Define their ability to pay Define their willingness to participate in the scheme: i) buyers awareness on the situation ii) scarcity feeling iii) cost-benefit analysis iv) intangible benefits v) acceptance of the scheme vi) trust for the mechanism that manages the schemes.

Group Name: Protected Areas Managers (Narok County Council & Trans-Mara County Council manage the Maasai Mara National Reserve and the Mara Triangle, and Tanzania National Park manages the Serengeti National Park) **Possible role in the PWS:** • Provide Economic Incentives to upstream land manager (subsistence farmers). • Issue stricter regulation for clearance of new accommodation facilities permits in the protected areas. **Why they would like to participate:** • This group has the mandate to manage and conserve the protected areas. • They manage the park gate fees and the fees paid by the tourism accommodation facilities in the protected areas, thus have the ability to pay. • Conservation of the Mara-Serengeti Ecosystem because of its local and national economic importance and its global significance.	
Group Name: Permanent Accommodation facilities 72 facilities according to the Kenyan Wildlife Survey inventory. **Possible role in the PWS:** • Provide Economic Incentives to upstream land manager (subsistence farmers). • Reduce their water abstraction from the river (if applies) through a more efficient water use. • Reduce pollution by setting proper wastes water treatment plants **Why they would like to participate:** • Their income depends on the conservation of the Mara Serengeti ecosystem because that is the major tourist attraction in the area. • They want to avoid water conflicts in the basin that could deter tourist from coming to the area. The participation in such scheme may bring them a positive images and a marketing opportunity.	

3.4 Problem Statement and research questions

As describe above, the Mara River watershed is being threatened by a growing population and its related demands on its resources. Given the great economic importance and global conservation significance of the area, efforts need to aim at mitigating the effect on the ecosystem, promoting more effective agricultural and water management practices and at the same time providing means to equitably share benefits among the basin's stakeholders. A PES scheme is being proposed as a useful way of achieving some of these aims. The process of designing a PES scheme includes a definition of services, definition of actors (buyers, providers and intermediaries) and a negotiation among selected actors. To properly facilitate this negotiation process, information on the actors' position and interest is required in order to know how and when to involve them in the negotiation process. In the Mara, the proposed PWS will be financed by local stakeholder, thus there is a need to describe these actors and understand the factors that would motivate them to participate in the PWS scheme.

This research goal was to identify who should pay for the watershed services in the MRB and the conditions under which they will be willing to participate. The results will hopefully contribute to the preparation of an attractive business plan for these actors in the next negotiation stage. In order to achieve the goal, research questions were identified and organized under three objectives:

Objective 1- To identify potential buyers in the Mara River Basin Payment for Watershed Services scheme

- Who are potential buyers for the ecosystem services provided by the Mara River Basin when considering the services trade?
- How many potential buyers are located within the Mara River Basin? Where are they located?
- What are the current water sources and consumption of the potential buyer's?

Objective 2 - To assess potential buyers' willingness to participate in a PES scheme where the service provided is the assurance of the availability of an already existing resource (water quality and regulation of river flows)

- What potential buyers are willing to participate in a PES scheme for the Mara River Basin where the service is improvement of water quality and regulation of river flows?
- What conditions do the potential buyers require in order to consider participating in a PES scheme for the Mara?
- What are the reasons for non-participation in the PES Program?
- How does their economic activity influence their willingness to participate in a PES scheme?

Objective 3 - To identify an institutional arrangement for the PWS scheme in the Mara

- How can the regional buyers be organized in a PWS scheme for water services?
- What is the potential buyers' preferred institution to manage the PWS scheme in the Mara?
- Which good practices and lessons learned can be applied in the design of the MRB PWS program? How can they be applied in the context of the Mara?

4 METHODOLOGY

The activities undertaken to answer the research questions presented in the previous sections are: i) desk review; ii) data collection; iii) data analysis and writing (Fig. 6).

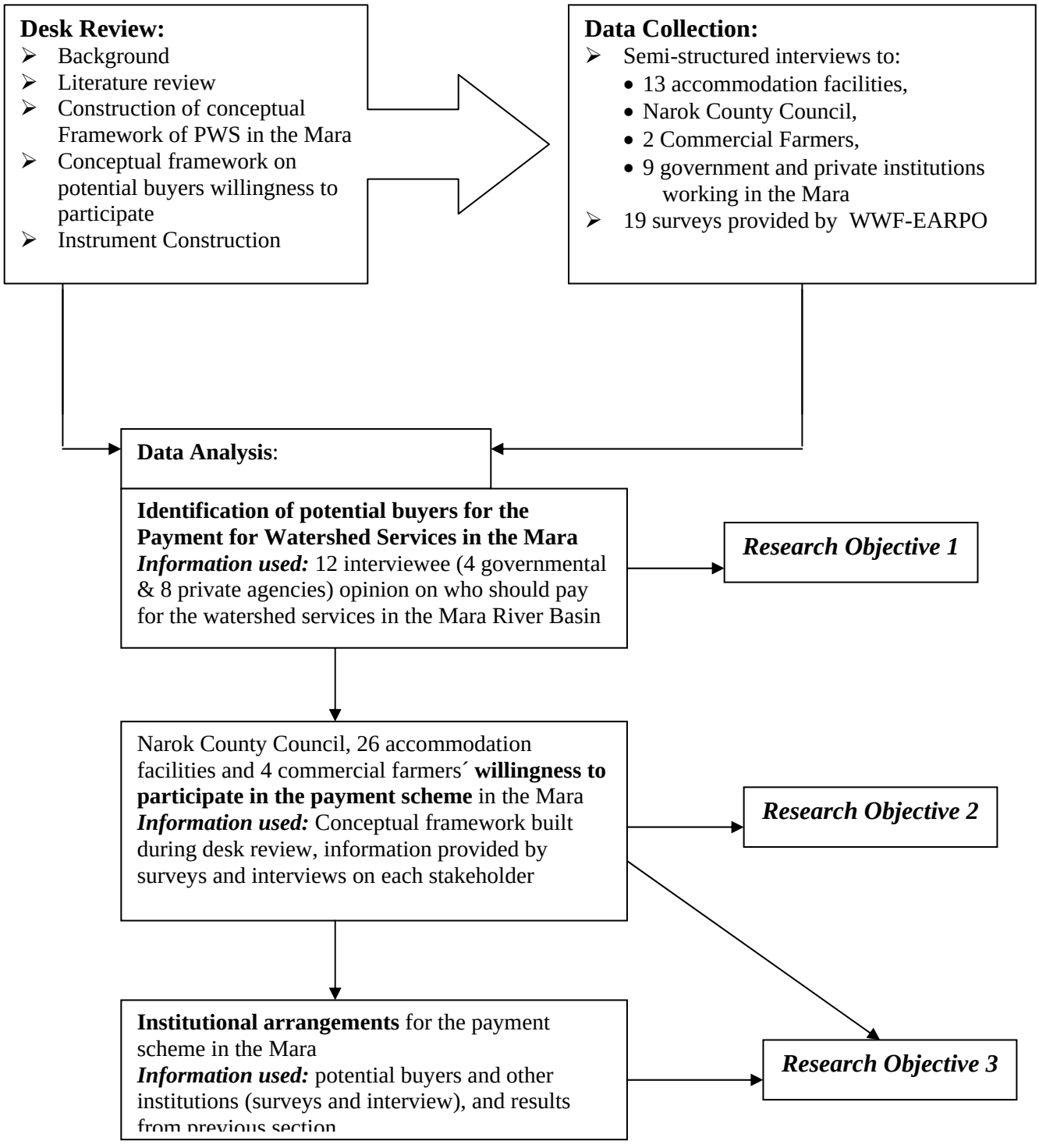

Figure 6. Flowchart of research Methodology

4.1 Desk Review and Conceptual Framework

This desk review was conducted in Delft, from mid October to December 2008. During this time a literature and internet search of books, articles, and organizations working in the MRB was done in order to gather as much information on the selected potential buyer's for the MRB PWS scheme. It is worth highlighting that during this desk review it was assumed that all the identified stakeholders (tourist accommodation facilities, Narok County Council, and Commercial Scale farmers) had some ability to pay and therefore this research focused on the factors that will motivate them into participate in the PWS scheme.

The information gathered helped in constructing the research's background and the conceptual framework on the factors that influence the MRB potential buyers´ decisions to enter a PWS scheme. Building the conceptual framework started with trying to define the ecosystem service traded, summarizing the information available on each potential buyer and hypothetically stating what will be the buyers´ incentives to enter a PES scheme that with trade those services. The framework latter became the basis for the modification of the available questionnaires to be applied at the tourist facilities head offices. Furthermore the information from the framework provided the blueprint for the structure of the interviews with the Narok County Council, and the other organizations working in the Mara.

This research built on the surveys of tourist lodges and commercial farmers conducted by the WWF-EARPO through its Narok office between June and October 2008. Therefore, besides using the data generated from the surveys, a decision was made to keep the structure of the questionnaires in order to facilitate comparison among actors.

Finally, in preparation for the fieldwork, a contact list was created for actors in the Mara River Basin (Annex II). A media search was used to prepare summaries of tourism related organizations and institutions working in the Mara River Basin. The organizations chosen might be influential in the implementation of the PWS,

since the majority of potential buyers in this research are involved in tourism activities. Lastly, the individuals and organizations on the contact list were reached via e-mails in order to introduce both the researcher and the PWS for the Mara River Basin. In this way, meetings were set for January 2009 when the researcher was in Kenya.

4.2 Field work

Fieldwork was conducted for 3 weeks in January 2009 in order to gather the data for the research. Half of this time was spent in Nairobi conducting semi-structured interviews with the following accommodation facilities' Head offices: Serena, Kilima Camp, Sekenani Camp, Musiara (Governor's camp), and Karen Blixen camp. Also contacts were made with other lodges' head offices such as Olonana, Ngerende, and Royal Mara. These contacts were later followed up by e-mail and telephone communications. Additionally, interviews were set up with organizations working in the Mara Basin, namely: Ministry of Tourism (MoT), Tourism Trust Fund (TTF), Kenya Association of Tour Operators (KATO), National Environmental Management Agency (NEMA), and Eco-tourism Kenya. The other half of the time was spent in the Mara Basin interviewing hotel lodges and other stakeholders such as Narok County Council members, WWF-Narok office sttaf, Water User Association representatives, and local hotel lodge managers and owners (Karen Blixen), Mara conservancy staff, and commercial farmers.

At this time the WWF-EARPO Narok office had completed surveys for 17 tourist accommodation facilities and 5 commercial farms surveys. The data from these surveys were fundamental in shaping the interviews and site visits to the lodges in the Mara, the subsequent visits to the head offices in Nairobi and the interviews with the commercial farmer's. Annex 1 contains a list for the actors in the Mara and the methods used to gather information from them.

During the fieldwork and due to information obtained in talks with the WWF-EARPO Narok office staff, the decision was made to focus on the tourist accommodation facilities located in the western part of the basin from the confluence of the Amala and Nyangores tributaries, near the town of Mulot,

downstream to the Serena Lodge located within the Mara triangle. This decision was made for two main reasons:

i) According to the stakeholder's map of the basin made by WWF-EARPO, subsistence farmers (service providers) and large scale farmers are bordering this area. This situation is not found anywhere else in the basin, thus focusing on this section would provide first-hand information on the relation between potential buyers (commercial farmers, tourist accommodation facilities) and the already identified service providers. Besides, if the decision of setting up a pilot PWS was to be taken, this area would be very suitable because upstream land changes by small scale farmers would most likely show results in this area in a shorter period of time. It must be said that although from the location of the stakeholder's perspective, this area seems suitable. The decision of whether trying to establish a PWS in the area and with these actors, depends on defining how the land uses in the area are affecting the provision of the watershed services.

ii) They are approximately 20 lodges and camps in this area, of which 5 were already visited by the WWF-EARPO Narok office, thus by visiting this area the researcher has a better chance of getting data from a significant amount of lodges in order to establish their willingness to pay.

Because of the diversity of stakeholders and the available information on some of these groups, the data was gathered using different methods. The main methods used were surveys, semi-structured interviews done both personally and over the phone, and site visits. Therefore, the data gathered included: notes from interviews, surveys, booklets and policy regulations collected from organizations and agencies, reports, photographs and onsite GPS points taken with a mobile GPS model 76CSX Garmin.

4.2.1 Questionnaire and interview structure

The questionnaire structure used with the tourist facilities Head Offices in the Mara was a shortened version of the one created by the GLOWS program for the same facilities (Annex III). Both the questionnaires and the interviews to all the stakeholders were structured in the following way: i) assessing the actors´ awareness of the situation in the Mara river with regard to water quantity and

quality and its possible effects; ii) presentation the PWS scheme and questions about who should be paying for each service; iii) facilities' attitudes towards conservation, which also include a description of the facilities' charges and a direct question about their willingness to pay for a PWS, and information on the preferred institutional set-up for the scheme; iii) further general information of the facilities, further comments, general turnover and its affiliation to other associations.

4.3 Data Analysis

The data obtained through the surveys and questionnaires were arranged in an Excel worksheet. The information obtained from the surveys was summarized in a Word document. Once the data were organized, the analysis was done in the following way: i) identifying potential buyers for the MRB different ecosystem services; ii) determining the factors that would motivate the stakeholders to enter the PWS; and iii) assessing the preferred institutional arrangement for the PWS in the MRB.

4.3.1 Potential Buyers identified by the MRB stakeholders

This analysis was done using the information provided by 12 interviewees representing 4 governmental agencies at local (NCC) and national levels (MoT, NEMA, WRMA); and 8 private enterprises. The interviewees were asked "***who they thought should be paying the upstream farmers (providers) for each of the ecosystem services mentioned?"*** Namely:

- water available throughout the year
- reduced water contamination
- regulation of water flows

The responses were names of organizations and agencies, which were latter organized into five groups: tourism business, water service boards, local groups (which include pastoralists, farmers), local government (county councils), national government agencies and international institutions.

Because both the interview and the electronic format were used to collect these data, drawbacks were identified at the time of organizing the information. These were: i) the lack of clarity in the definition of the ecosystem service caused confusion among the "improving run-off" and "regulation of flows" services. During the interviews this was explained to the informant but during the electronic survey some of the answer reflected the lack of comprehension from the informant; ii) Furthermore, because the "Reduce water pollution" service was used instead of "improve water quality", respondents were hesitant to name potential buyer's. They instead highlighted the application of the polluter's pays principle in Kenya, under which the individual/institution responsible for generating the pollution should pay for it.

4.3.2 Stakeholder participation in the Payment for Watershed Service in the MRB

In this section the study focused on assessing the factors that would motivate the participation of three potential buyers in the PWS. The selected stakeholders were: large-scale farmers; tourist accommodation facilities and the Narok County Council in the Kenyan side of the Basin. The analysis of these data was based on the conceptual framework made on the first phase of the research (Fig. 7).

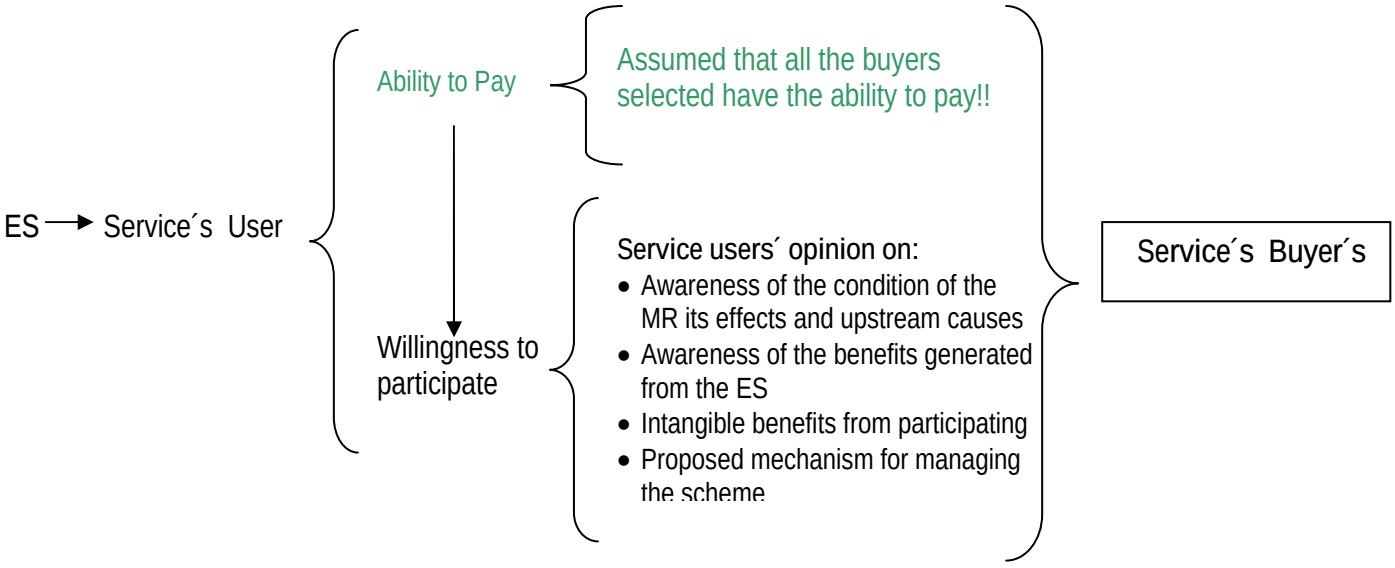

Figure 7. Conceptual framework of Factors that influence participation of Service Users in a Payment for Ecosystem Services program

As explained before, the identification of potential buyers was made under the assumption that they have the ability to pay the upstream service providers, in other words that these actors have the financial means to provide the agreed upon contribution towards the provision of the service.

This section of the analysis focused on the ecosystem service users´ attitudes towards a conservation scheme and then specifically a Payment for Watershed Services. First, through the study of the: i) Knowledge on the condition of the Mara River and its relation to their economic activities; ii) Identification of the upstream activities that may be causing the ecosystem degradation. Questions were asked under the assumption that stakeholders with a greater awareness of the degradation problems and possible anthropogenic causes will be more prone to participate in a conservation scheme.

Secondly, actors´ willingness to participate in the PWS scheme was evaluated and the reasons why they would or would not participate were listed. These questions aimed at identifying strategies for the following negotiation stages in the Mara River Basin. Furthermore, an analysis of the actual conservation activities and how they could become part of a PWS scheme is made for the MB.

The accommodation facilities analysis was based on 26 surveys and interviews (which include 8 facilities´ head offices). This represents the opinion of 26 out of 72 lodges/camps registered along the Mara according to the KWS inventory (Annex I). The information was then organized according to the facilities´ position with respect of the Mara River and its main tributaries in the middle catchments, the Talek and the Sand River. This arrangement facilitates the identification of common perception about the degradation causes in each area. Following this thinking, the lodges were separated in three groups:

- 14 facilities along the “Upper Mara”, from the junction of the Nyangores an Amala River near the town of Mulot
- 8 facilities along the Talek River
- 4 facilities along the Sand River

The analysis of Narok County Council was based on interviews of authorities its authorities. On the other hand the analysis done on the commercial farmers was based on 4 surveys provided by the WWF-EARPO Narok office and 2 interviews made during the fieldwork.

4.3.3 Institutional arrangements for the PWS in the Mara

To assess service users´ suggested institutional arrangements, the informants (15 accommodation facilities who said they were willing to participate the scheme), NCC, and 2 commercial scale farmers were asked if they thought the mentioned institutions (WUA, National government Agency, District Council or a totally new fund) were suitable for transferring the payment within the scheme. The data generated from the surveys and interviews suggest what would be the most acceptable arrangement according to the potential buyers. In the analysis this information was then compared to the opinions provided by other actors working inside the basin such as the Ministry of Tourism official, Tourist Trust Fund, Eco-tourism Kenya, MRBWRUA, Mara conservancy, WWF- EARPO Narok Office, KATO, NEMA, WRMA

Finally, based on the results from the previous sections and literature on other payment for watershed services cases, the research concluded with recommendations and suggestions for the negotiation stage of the PWS in the Mara River Basin.

4.4 Limitations of the study

This section describes the major limitation of the study in order for the reader to consider them as he/she reads further into the result, discussion and conclusion sections.

The diversity of stakeholders and the methods used to collect the data in this report lead to a different total number of samples for each section of the analysis. This may lead to confusion when reading the report. To avoid this, Fig.6 contains detail on the sample size used for every section of the analysis. Additionally, the diversity of ways the data were collected (electronic message, telephone interview and personal interview) constitute the major limitation to organize and analyze the

data. In some cases this leads to a reduction in the number of opinions used for analysis.

A limitation for the analysis on the information provided by the accommodation facilities along the Talek and Sand River was the lack of time to visit a sample of the lodges during the fieldwork. Therefore the analysis on these facilities was based on the surveys provided by the WWF-EARPO Narok office and not on data gathered through different methods. This would have allowed the researcher to have a better understanding of the situation and therefore do a more in-depth analysis.

The researcher sought to gather information on the potential buyers' attitudes toward PWS. In order to do this, the assumption that the selected potential buyers- accommodation facilities, commercial farmers and Narok County council- have the ability to pay and therefore focuses on the factors that will motivate them to participate in the PWS scheme.

5 RESULTS

5.1 Identification of Potential Buyers for the PWS scheme

Informants agree that any user who is benefiting directly from the services provided by the Mara should be involved as payers in the scheme. As explained by WRMA representative "services in the Mara should be met by all stakeholders who are making a livelihood or a business income through exploitation of natural resources in the Mara. The rationale for this is, it's only the user of the water resources who appreciates its use, and should therefore be made to pay for it."

The respondents identified a mixture of actors as potential buyers for the watershed services in the Mara River Basin (Table 4). For improving the run-off services the main potential buyers were the county councils, tourism facilities, local groups such as farmers and pastoralist and the National government.

Table 4. Stakeholders opinion on who should pay for the ecosystem services in the Mara (n=12)

The stakeholder interviewed is presented on the left and their opinion on who should paid for each service is represented in the columns through an X

Ecosystem Service	Improving infiltration yield						Reduce Pollution						Flow regulation					
Actor	T	WSB	LG	RG	NG	I	T	WSB	LG	RG	NG	I	T	WSB	LG	RG	NG	I
MoT	X		X	X			X		X				X		X			
NEMA	X		X		X		X						X	X				
MRWA	X	X	X	X	X	X			X				X	X	X	X		
NCC	X	X		X			X			X	X				X			
TTF	X	X	X	X	X						X				X		X	
Eco-tourism Kenya	X			X			X			X								
KATO				X	X													
WWF- Narok	X	X	X	X	X	X		X		X								
Goverenor´s			X	X	X			X			X			X	X	X	X	
Kilima			X	X	X						X			X		X		
Sekenani				X				X		X	X				X			
tarquin wood	X		X	X	X					X	X		X		X	X		
Total	8	4	8	11	8	2	4	3	2	5	6	0	4	4	7	4	2	0

T= Tourism facilities; WSB= Water Service Boards; LG= local groups; RG= regional government; NT= National Government; I= International Institution.

The flow regulation service was related with the agricultural activities in the area. Therefore the local groups, which include the farmers, were identified as potential

buyers. Additionally, in terms of the National Government, the Ministry of Agriculture and regional development agencies were identified as potential buyers. On the other hand, for the reduce pollution service actors like the regional and national government were identified as potential buyers.

5.2 Stakeholder participation in the Payment for Watershed Service

5.2.1 Tourist Accommodation Facilities

Through the surveys and the interviews data was gathered from 26 lodges in the Mara of the 72 listed in the KWS inventory (Annex I). The location 9 of the 14 lodges visited during the fieldwork is showed in Fig. 8. As specified in the previous chapter, a special emphasis was put in visiting most of the lodges in the western part of the Basin from the union of the Amala and Nyangores River to form the Upper Mara until the Serena Lodge in the Mara Conservancy part of the Reserve.

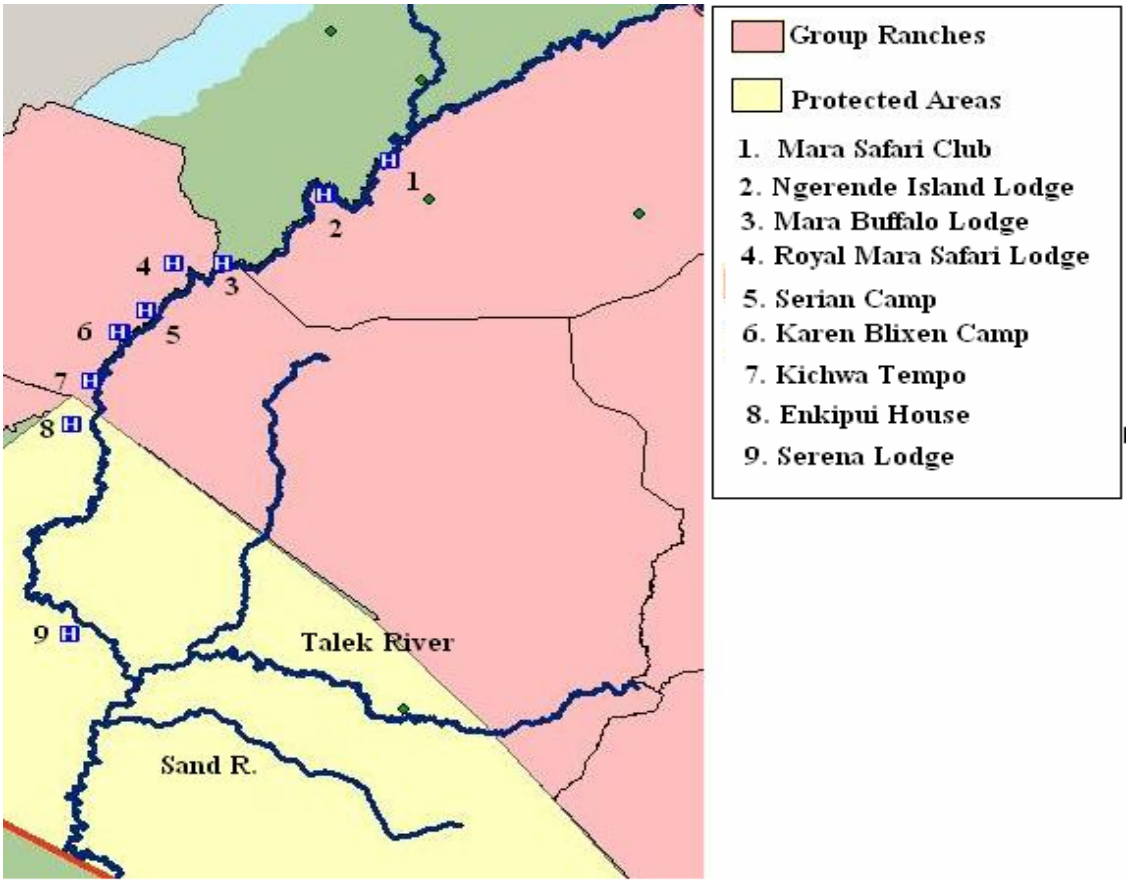

Figure 8. Location of visited accommodation facilities in the Mara River Basin

5.2.1.1 Water Sources

The main sources of water for the accommodation facilities in the Mara are represented in Fig. 9

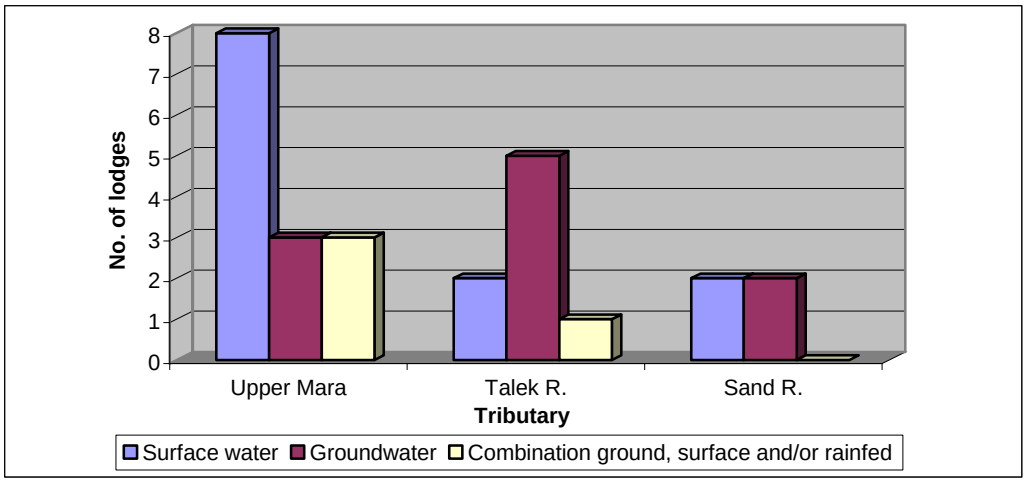

Figure 9. Primary water sources for operation of surveyed accommodation facilities in the Mara.

Facilities along the Upper Mara (14), commented on their sources of water availability and quality:

1. Lodges which draw water directly from the river (8 lodges) were consistent in expressing their concern regarding the diminishing water quality in the river related to the fact they have to spend more money on treatment than before. Three of the lodges (Serena, Olonana, Mara Bufalo) report finding increasing amounts of chemical content and suspended solids in the water they attributed to agricultural practices upstream.

2. Lodges using groundwater for their operations reported no changes in their water source over the past years. The lodge's reason for this opinion is diverse: The Royal Mara Safari Lodge has less than two years of operation, and Little Governors have both a bore hole and a well to extract water. Additionally, Kichwa Tembo surveyed showed groundwater as their main source for their operation, but Hoffman (2007) reported this lodge extracts water from the Sabaringo Spring. Even though this lodges have not reported a change in the water availability and quality from their sources, their staff did mentioned a greater variability on Mara river levels.

3. Facilities with a combined source of water such as Serian camp (surface water, ground water and rain collection), Kilima camp (surface water and rain collection) and Ngerende (groundwater and surface water for plant watering), did not report a decline in water quantity or quality for their operation.

With regards to the facilities along the Talek River (8); 2 (Riverside camp and Mara Simba lodge) stated they extract water only from the Talek river. The others had either mixed or groundwater sources. Further information on these facilities´ sources of water is needed since the Talek River is a temporal river and therefore they must have an alternative source of water for their operation during the dry season.

On the other hand, all the facilities along the Sand River claimed to extract water from groundwater sources. However, two of them identified springs as their water sources and therefore were placed in the surface water category,

Additionally, the daily amount of water consumed by the lodges varies according to i) the lodge size (amount of tourists and employees) at a given time, and ii) the time of the year, during high season (July-October & January- March), hotels have more tourists and therefore hire extra staff, resulting in increasing water usage.

5.2.1.2 Attitudes towards a Payment for Watershed Services

Several questions were aimed at determining the respondents´ knowledge of the situation of the Mara and its relation with tourism in the area (Table 5).

Table 5. Lodges staff members response on their knowledge of the Mara´s degradation, its links to wildlife and tourism and their belief about upstream communities´ relation to this degradation n=26

Statements	Yes	No	Not sure
Observed a general decline in water availability in your area over the years	19	6	1
Noticed any linkage between the water availability in the river and the returning of wildlife to your area	11	7	8
Believe that the communities upstream might be affecting quantity and quality of the water flow in the river	19	5	2

19 of the respondents established that there has been a decline in water availability on the Mara River and the same number think this variability can be partly attributed to upstream communities' activities. On the other hand, only 11 of the respondents acknowledge the link between water availability and the returning of wildlife to the area.

Organizing the answers by location, the data showed: 12 facilities (out of the 14) in the upper Mara recognize a decline in the water availability on the Mara River. Karen Blixen Camp's manager didn't notice any change in the rivers level and the Kilima camp manager was not sure about a decline in the river. Kilima's camp managers appreciation does not come as a surprise, since its property is situated on the Syria Escarpment, some 5 km away from the river. On the other hand, in the Sand River 3 facilities reported a visible diminishing in the water availability in the river. It was interesting to find that in the Talek tributary half of the surveyed lodges did not report a general decline of water in the area.

The 19 facilities (11 in the upper Mara, 4 in the Talek and 4 in the Sand), who found upstream communities activities to be affecting their water quantity and quality were asked to identify specific activities. Table 6 presents the main reasons given by the accommodation facilities with relation its location within the basin.

Table 6. Accommodation facilities staff members opinions on the activities upstream that affect water availability in the Mara River and its tributaries n=19

Activities	Facilities location in the Mara		
	Upper Mara	Talek	Sand
Deforestation of the Mau Forest	10	2	1
Water Extraction for irrigation farming	7	0	1
Pollution from upstream tourist facilities wastewater	2	1	3
Pollution from nearby towns and settlements (washing clothes)	4	0	0
Pesticides from agriculture	1	1	0
Siltation due to farming	1	1	0

Note: Lodges present more than one activity upstream, so total may exceed total number of lodges.

According to 13 accommodation facilities in the Mara, the deforestation of the Mau forest was identified as the common cause for diminishing water quality and quantity in the Mara River. When the responses are organized by their location in the basin, in the Upper Mara section of the basin other activities like the extraction of water by large scale irrigation farmers and pollution due to nearby towns like Mulot are also considered important by the staff of tourist facilities in the area. Facilities along the Talek identified pollution from upstream tourist facilities and pollution and siltation generated through agriculture as their main concerns. On the other hand in the Sand River, the facilities highlighted the fact that there are too many tourist facilities (lodges, camps etc.) in the area and their operations bring pollution into the river.

The opinions of the facilities´ located along the Talek and Sand Rivers on the activities upstream that cause degradation of the Mara are congruent with the information provided by the accommodation facilities inventory. The latest inventory on the accommodation facilities in the MRB establishes a growth in the number of tourist facilities between the Sand and the Talek Rivers (personal communication Gitonga, Mwaura, Njora). Staff member from facilities in the upper Mara also highlighted the high degree of encroachment of tourist facilities along the Talek and Sand tributaries.

Tourist facilities´ observations on the decline in the Mara River´s water availability, their great degree of dependence of their revenue on the ecosystem servcies and the recognition that upstream activities affect this water service may seem to be sufficient motivation for them to enter into a PWS scheme. However, the 26 lodges were asked directly if they would be willing to participate in a PWS scheme for the Mara. 15 of the respondents answered positively, 7 answered they were not sure and 4 answered they were not interested in participating.

Those who answered positively were asked later their estimated maximum contribution for the PWS scheme in the Mara, but only 5 gave an estimated figure of their contribution, which ranged between 5,000- 500,000 KSh annually. Although most of the interviewed tourist facilities showed interest for the PWS for

the Mara, they identify key issues that would need to be addressed before considering their participation in the scheme; these are ranked by how often each was mentioned:

1. More information is needed about the amount of their contribution and the cost of the initiative in order to decide if their participation is possible.
2. The reliability of the mechanism use to administer the funds is considered fundamental in order to decide to enter in the PWS.
3. The mechanism use to determine the amount of money each lodge would have to pay.
4. All facilities (and commercial water users) should be participating as service buyers.
5. Farmers upstream should be committed to the idea of PWS and willing to undergo the behavioral change.

On the other hand the main reasons for those lodges that were not interested (4) or were not sure (7) in participating are presented in order of frequently mentioned:

1. Government should be paying for it
2. Facilities are already investing in conservation activities around their facilities and with the nearby-communities.
3. The cost may be too high and there is "enough water therefore it is not needed"
4. The tourist industries in Kenya have had major set-backs in the last two years and there is priority for surviving and recovering rather than investing in new schemes.
5. They do not think the paying upstream land and water managers for their services would actually work

These results reflect several opinions and highlight common concern of tourist accommodation facilities around the PWS in the MRB. In order to create an attractive "business case" for the accommodation facilities in the MRB to enter a PWS scheme, these factor are analyzed in the following sections.

A second case lodges and other accommodation facilities made to explain their lack of interest in participating in a PWS is the fact that they are already investing in

conservation and other social activities. 23 facilities contacted during this research are already involved in conservation and or community support activities, and projects (Table 7).

Table 7. Community Outreach and conservation activities funded by the tourist accommodation facilities in the Mara River Basin n=23

Activities	Number of lodges
Reforestation around the lodges and neighboring communities	11
Campaign for efficient water use among the facility´s clientele & staff	5
Water reuse activities	7
Biogas production among the neighboring Maasai	2
Social projects (schools, eye-clinic, dental clinic)	3
Solid waste campaign	8
Support for a conservancy	2

Most of the facilities in the Mara are involved in reforestation projects which focused on their neighboring areas. The lodges' role in this scheme varies between provision of the seedlings, planting threes along with nearby communities or hiring of local communities to lead the reforestation and other conservation activities. In Serian Camp and Ngerende Camp they are hiring families who live in the nearby areas to lead their conservation work in the area.

Accommodation facilities also invest in training for staff in order to reduce water consumption, monitor water use to prevent leakages and other water lost. Also 7 of these lodges encourage water reuse for car washing and gardening. Additionally, lodges are promoting awareness campaigns among its clients and neighboring communities to advocate proper use of water resources.

Finally, the Mara Safari Club hotel and the Kicheche Bush Camp are the tourism partners of nearby conservation areas denominated conservancies. Additionally a group of approximately 10 accommodation facilities along the Upper Mara area are joining and planning the creation of the Maasai Mara North Conservancy. Also

Olerai Farms Ltd. has planed to transform a 200 hectare farm along the Upper Mara and create a conservancy area.

5.2.2 Narok County Council

As mentioned in the previous sections the Narok County Council is responsible for the management of the largest portion of the MMNR (approximately 1,000 km^2). Currently, the NCC and Trans-Mara County Council are working together in the development of a management plan for the MMNR. This plan is set to guide the management activities in the area for a ten-year period, and is designed for both the area managers and other stakeholders. The plan describes the Zonation and Visitors Use Scheme and four major management programs, namely the ecological, tourism, community outreach and protected area conservation program. Currently both the NCC and Trans-Mara County Council, represented through the Mara Conservancy, are looking for a way to implement the management plan.

The NCC representatives´ opinions are that the major tourist attractions to the area are wildlife diversity, scenic beauty, the annual migration phenomena, and the hotels which provide good service and demonstrate the cultural endowments of the area in cooperation with representative tribes like the Maasai. They also agreed that water quantity and quality influence the tourist industry in the area by allowing the operation of tourist facilities and other institutions. Even though they acknowledge the importance of having water in the river, the informants stated that water quality was the most critical condition to keep, since alternative sources of water for tourist facilities operation do exist such as groundwater.

NCC respondents reported a decline and great degree of variability in terms of water availability in the Mara River during the last 5 years. They also identified as some of the activities that could be causing this variability and decline of water availability: disposal of sewage by the lodges and towns, chemical pollution from farming since some fish killings have been reported, abstraction of large water quantities for irrigation, and the deforestation of Mau Forest.

After the introduction of the PWS scheme and the benefits of its participation, the interviewees were asked who should be paying for the services. Among other, they identified themselves as potential buyers since they are the regional government responsible for the MMNR. They stated their willingness to pay at approximately 2 million KSh /year from the budget approved for the conservation of the Mau Forest which is 37,660,981 KSh for fiscal year 2008-2009.

Additionally, the informants stressed the importance of facilitating a trans-boundary effort and bringing the LVBC into the PWS scheme to gain international recognition and support.

5.2.3 Commercial Scale Irrigation Farms

As described in previous sections, at the time of this study there are approximately 8 farms in the Mara River Basin that use irrigation technology for their crops. The findings of this report are based on 4 surveys and 2 interviews, which represent 4 commercial farms in the MRB.

The farms cover a total area of 9,824.25 acres located around the Amala and Mara Rivers. Table 8 presents a summary of the water use information provided by the farms through their surveys.

Table 8. Water source and total crop area of commercial farms in the Mara River Basin

Farm Name	Water Source	Total Crop Area (acres)	Water extraction
Lochab Farm; Simba Farm	Rainwater	8,151	N/A
Olerai Farm Limited	Mara/Amala River	1,173	1.5 Million M3/year
Ndakaini Farm	Groundwater and Amala R (dry season)	500	N/A

Lochab, and Simba Farms are located within a range of 15-20 Km from the river and they have rainwater as their main source of water. This water is stored and later used throughout the season. Therefore this farm´s dependency on river water for their economic activities and therefore its interest to participate in a

conservation scheme could be lower in comparison with Olerai and Ndakaini Farms.

Moving to the farmers´ opinion of the situation of the Mara, all the informants agree to have seen a noticeable decline in water availability in the Mara River over the last years in the area, and a more sudden change in the water levels, in their own words "the river rises and fall quicker". Furthermore, they have identified as the main cause for the diminishing of the service (rank options according to frequency):

1. Deforestation
2. Droughts
3. Increase human population upstream and their diversion and water extraction actions
4. Siltation due to upstream farmer cultivating steep slopes and too near the river

All farmers identified at least one of the above mentioned upstream activities which may cause a decline of water availability in the area. When they were asked directly if they would be willing to contribute to an upstream conservation fund, two of them (Olerai Ltd., and Ndaikaini) responded positively. Olerai Ltd. stated its maximum willingness to pay at 750,000 Ksh/year. As pointed out above, Simba farm was not sure of its participation in the scheme and Lochab stated its interest in participating if they could abstract water from the Mara River.

5.3 Institutional Arrangement

As mentioned in the previous section, the stakeholders recognize the importance of having a proper mechanism to manage the PWS scheme in the Mara. During the interviews and the surveys, the informants were asked who they thought should manage the PWS scheme. For the tourist accommodation facilities, Table 9 summarizes the opinion of the 15 facilities that agreed to participate in the PWS scheme.

Table 9. Informants Opinion on institution to manage the payment scheme n= 15

	Good Idea	Not Sure	Bad Idea	not answered
Water Resource User Aassociation	6	3	4	2
National Government	1	2	9	3
District Council	0	2	9	4
New Trust Funds	8	1	2	4

8 tourist facilities preferred a new fund to manage the PWS in the Mara and 6 think the Mara River Basin Water Resource User Association (MRBWRUA) could play that role adequately. On the other hand 9 of 15 tourist facilities think that managing the PWS through the National Government or the District Council is a bad idea. It is important to highlight that during the interviews 3 of the lodges head offices were not aware of the existence of the Water Resources User association in the Mara, so even though this may sound like reasonable idea for the managers in the lodges, it may be unsuitable at the head office's level.

The representatives of the two commercial farms who were interest in participating in the PWS scheme had different preference regarding its management. On one hand, the representative of Olerai farms Ltd. stated that the MRBWUA is the best institution to manage the PWS but they also recognize it strengthen need before it could be considered. The opinion of the Ndakaini farm was towards the creation of a new Trust Fund to manage the scheme.

The Narok County Council's officials had a mixed opinion about the mechanism to manage the PWS in the Mara. They stated as their first option a totally new trust fund which will have to closely work with the WRMA and the WUA. The second option was to have the MRBWRUA become the institution responsible for the scheme because they are the local water management authority. Under this structure the MRBWRUA would have to be strengthened by the WRMA or other government authority.

Additionally, other actors were also asked to give their opinion about their preferred institutional arrangement for the PWS in the Mara, there opinion can be classified in 3 main categories:

1.- Recognize MRBWRUA is the institution to manage the scheme

2.- Recognize WRMA is the institution to manage the PWS scheme

3.-The creation of a totally new fund in the Mara was not recommended by the representatives from Eco Tourism Kenya, the Tourist Trust Fund and Water Resource Management Authority since there is already a high level of atomization and duplicity in the Mara which may lead to inefficiencies in the initiatives. So

creating a new fund will be less effective and will be considered as more of a burden than a help for the PES scheme.

6 DISCUSSION

6.1 Identification of Potential Buyers for the PWS scheme

The proposed PWS scheme in the Mara River Basin will seek its funding from local stakeholders such as the tourist accommodation facilities, commercial farmers, water users and mining companies. So far, the county council is the only governmental agency in the Kenyan part of the basin considered as a potential buyer due to its mandate to manage and protect the MMNR and its management of the reserve's gate fees. These research results support the opinion that water users in the Mara, especially commercial users, should be asked to pay for its conservation. Stakeholders consulted identified 4 main groups as potential buyers for the Mara River Basin payment scheme:

1.- County councils

2.- Local groups such as pastoralist and commercial farmers

3.- National government agencies

4.- Tourism related facilities

It must be highlighted that the specific agencies mentioned as potential buyers for the watershed services in the Mara varied according to the service. This result stressed the need to determine specific services to be traded under the PWS scheme in order to properly define the potential buyers for the program.

Regarding national government participation as potential buyers, the results showed that respondents wanted government agencies to be involved as buyers in the PWS scheme. This view on the involvement of the government sector as potential buyer's in the PWS is based on two reasons: i) national government agencies already have the mandate to manage water and environmental resources in the Mara River Basin; ii) water and management fees already paid to the government have not been reinvested in the basin's conservation.

Although responses from staff of private sector agencies such as the TTF consistently mentioned national government agencies that could be included as buyers for the ecosystem services in the Mara. These agencies would be most

suitable as facilitators of the process through the construction of enabling policy frameworks and the support to such conservation schemes. This opinion is based on two main reasons:

i) According to Smith et al. (2006) a change in policy may act as a catalyst for a watershed payment scheme as they could encourage stakeholders to gather and seek cheaper and feasible solutions for reducing degradation. Within the Kenya context, this position was supported by KATO and Eco-tourism Kenya representatives who stated the need for National government involvement in setting a policy framework that would motivate private sector water users to enter a PWS scheme as buyers. As describe by them, otherwise "it would be very difficult to get the private sector to pay, without any good incentive for them to participate." As it is now in the MRB, there is not a real incentive besides demonstrating social responsibility or there is not a disincentive for not participating. Additionally, representatives from the Ministry of Tourism also view themselves as providing the legal framework to motivate the tourism industry to participate in conservation schemes such as the PWS.

ii) Pagiola and Platais (2007) considered schemes that use national government funds as less effective because they lack the "first-hand information on the service value" and the payment is more subjected to political will than a direct monitoring of the provision of the service. In the Kenyan context, the political situation is normalizing after a great disruption from the 2007 presidential election process. Additionally, important national decisions, such as the Mau Forest conservation, are influenced by tribal differences within the country. In light of this, depending on political will to partly fund a PWS scheme may jeopardize the scheme's efficiency and sustainability.

6.2 Stakeholder participation in Payment for Watershed Services

Concerning the other groups identified as potential buyers for the PWS in the Mara River Basin. Four out of the 26 tourist facilities interviewed in the Mara were not interested in participating in the PWS scheme; the remaining 22 were interested (15) or not sure (7). This shows an entry point for the MRB PWS, although further information on the service traded, costs and mechanism is needed in order to properly motivate these facilities' participation into the scheme.

Also, commercial farmer's willingness to participate is linked to their need to have water for irrigation; so a scheme which aims at regulating flows in the river would be more attractive to these actors. This section focuses on analysing the factors that would motivate participation among the identified potential buyers for the PWS service.

6.2.1 Knowledge of the condition of the Mara River

Linking upstream land and water use to downstream benefits is essential to motivate stakeholders to participate in a PWS scheme (Smith et al. 2006). The previous chapter showed that 24 out of the 31 potential buyers in the Mara know about the declining water availability in the river and they linked this decrease to upstream activities like deforestation of the Mau Forest, extraction and pollution of water by agricultural, domestic and tourist facilities. 13 stakeholders (11 accommodation facilities, and 2 commercial farmers) were aware of the potential consequences of losing the ecosystem service to their economic activities. These results indicate a degree of awareness among the Mara stakeholders on the link between upstream activities and the Mara River water quantity and quality. On the other hand, the link between the river's water quality and quantity and its role in supporting the Mara- Serengeti ecosystem was not that clearly stated.

These results can be explained according to type of services each stakeholder depends on. De Groot et al. (2002) explained that regulating and supporting services were more difficult to quantify because they are conditional for the maintenance of the provisioning and the cultural amenities services, besides giving benefits directly to humans. In this sense, stakeholders like the accommodation facilities and commercial farmers who extract water from the river for their operations are better able to monitor and value these services and are thus more interested in participating in a conservation scheme. This is supported by the willingness of facilities along the Upper Mara to participate in conservation scheme, like the conservancies, that are set in the area. This growing awareness would also explain the popularity of the conservancies concept within the Mara.

On the contrary stakeholders like the NCC, the rainfed commercial farmers and accommodation facilities with groundwater sources where less clear in identifying

the link between the river health and the impact to their economic activities and are therefore less interested in participating in the conservation scheme. For example, the NCC officials identified water quantity and quality of the river as important for the tourist facilities to provide its services but not for sustaining the ecosystem upon which the tourism activities depend.

In this sense, providing information and promoting understanding of the linkages between economic activities and the provision of different ecosystem services is needed to create awareness among the users. Additionally, Wunder et al. (2008) and Smith et al. (2006) recognized that setting up communication channels among stakeholders to provide and interpret information is desirable for the establishment of PWS since they promote trust and it may result on recognition of actor's shared interest.

So far the analysis has concentrated in the actor's awareness on the conditions of the Mara River, its valuation in terms of their economic activities and how this relates to their willingness to participate. Another aspect brought up by potential buyers before considering participation on PES schemes is the need for more information about the scheme itself and how it would work.

6.2.2 Requirements for the participation of a PWS scheme in the Mara

Understandably, before embarking into a new conservation scheme where they figure as potential buyers, the stakeholders in the Mara need further information on the economic and intangible costs and benefits the scheme will bring to them, the means used to determine their contribution, and the guarantees regarding the service providers' participation. These issues and how they would help in the construction of a PES scheme for the Mara River Basin are discussed in this section:

The accommodation facilities emphasised that knowing the cost of the initiative and the specific benefits will be a first step. Thus, defining the service and how the proposed management will be linked to the improvement of water quality and

regulation of the river flows will help accommodation facilities to estimate their maximum willingness to pay.

Interviewees also highlighted that intangible benefits such as public recognition, prevention of social conflicts and avoidance of sanctions could also be used as incentives for participation. Porras et al. (2008) state that private stakeholders are typically more motivated for the promotional reason than for conservation in the 58 cases included on their report. In the Mara, representatives of private sectors such as KATO and the MoT stated that a combination of an eco-certification mechanism and adequate policy could be used to motivate hoteliers to participate in the scheme. Although there is an eco-certification process in Kenya named "Eco Rated Lodges" (which labels facilities as gold, silver or bronze); this certification is currently used for marketing purposes only. However, an eco-certification scheme that is complementary to a policy which encourages facilities who promote conservation might be more effective in involving the private sector into conservation schemes such as the PWS.

Another intangible benefit for the buyers in the Mara might be the prevention of social conflicts. The social and political complexities in the Mara River Basin are many. On one side, there is a general conception among local communities in the basin that tourism industries´ revenues promote and support their investors only. Also, there is resentment from tourist facilities to large scale farmers for the extraction of water from the river. Finally, local communities are struggling with each other over land tenure issues, which are exacerbated by the tribal turmoil between the Kipsigis and Masai in the middle catchments area, and between the Kikuyu, Kipsigis, and Ogiek who live in the Mau Forest. The possibility to harmonize and alleviate some of these relations through an equitable distribution of resources could also be an intangible benefit that could motivate stakeholder's participation in the area.

Besides the need to know about the costs and benefit of the scheme, potential buyers identified the need to know about the mechanism use to determine the contribution each partner would pay. It was a general opinion among stakeholders

that all facilities which benefit from the ES from the Mara should be participating as service buyers. However, the mechanism through which each contribution would be calculated changed according to the facilities. For example: interviewed accommodation facilities with low bed capacity (36) mentioned the importance of devising a payment system that would reflect the amount of economic benefit obtained from the ecosystem service, as opposed to paying a fix rate. Other stakeholders suggested that charges should be calculated based on the amount of water extracted from the river. The solution could lie in between the two proposed options, to devise a contribution based on water abstraction and/or a rate calculated from a fix base charge adjusted by bed-night fees.

Furthermore, stakeholders in the Mara (both accommodation facilities Head offices and other governmental agencies) agree that participation of the private sector could more easily achieve if they were allowed to provide their contribution as in-kind payments such as providing seedlings for upstream reforestation. Another alternative to this in-kind contribution would be working with the facilities on-going conservation initiatives. For example, the expansion of the eye-clinic and biogas project to the upstream farmers as a complement to the payment given to the PWS initiative.

Both the calculation of the contribution and the kind of contribution that potential buyers would give to the scheme shall be determined in subsequent negotiation stages. However, having a proposal that includes the stakeholders concerns and suggestion will facilitate determining their maximum willingness to pay prior to entering that negotiation stage.

Finally, there are two other conditions highlighted by potential buyers in order to enter PWS schemes in the Mara:

i) Potential buyers highlighted the need to include all accommodation facilities in order to avoid free-rider behavior among them. A free rider would benefit from the provision of services without contributing in the PWS system and is known to be a cause for support withdrawal within PES schemes (Mayrand and Paquin, 2004).

ii) Potential buyers also expressed the need for service providers to be on-board, as a pre-requisite for their participation. On this point, service buyers stressed that the providers must be willing to change they behaviour and comply with the agreements made. This position is congruent with Grieg-Gran et al. (2006) lessons on how to design PWS scheme, which stated that "buyers confidence that the specified management activities will be carried out to the required standard by service providers" is requisite to involve buyers in PES scheme.

It is important to understand that the first step in fulfilling these requirements is the adequate identification services and the stakeholders that will be part of the scheme. Namely, providers that can deliver the service and are willing to do it for the proposed incentive, and buyers who are sufficiently interested in the service that they would be willing to pay for its conservation. Once the service buyers and providers are defined and they were given the information in order to valuate the ecosystems service and to do the proper cost benefit analysis. These actors would enter a negotiation stage, at this point intermediaries with the capacity to level the field for both buyers and sellers are fundamental in order to reach flexible, win-win situation for the parties involved (Smith et al. 2006). Although the PWS scheme is on its primary phases of defining the services and the potential buyers and sellers willingness to participate, the suggestions given and the acknowledgement of the process ahead will be make it easier of future stages.

6.3 Institutional arrangements

The reliability of the mechanism used to administer the funds was ranked second in priority in order to decide to enter in the PWS by the interviewed potential buyers. According to Smith et al. (2006), designing an institutional framework for a PWS scheme entails an institution with the "capacity and credibility to manage the scheme effectively, reliable contract law, capacity for transaction governance and credible enforcement." Stakeholders in the Mara were very strong in emphasizing the importance of having an effective administrative institutional arrangement to manage the PWS as a condition for their participation.

Potential buyers considered it best to create a new trust fund in order to manage the PWS in the Mara River Basin. The advantages of creating a new trust fund include transparency and accountability to the fund management. On the other hand, disadvantages of creating a new fund to manage the PWS will be its lack of mandate and the resources to monitor compliance of the agreement and the duplicity of not using the available institutions will reduce the efficiency of the PWS.

The MRBWRUA as the institution managing the initiative was also considered by several actors. These actors identified the MRBWUA as suitable because i) it is already part of the institutional framework for managing water resources, it therefore has the mandate to manage water resources; ii) they have the experience, motivation and interest for it to work; iii) they are affected directly by the conditions of the river and therefore have a direct interest; iv) they already have a structure and are effective in communicating throughout the whole basin; v) they have "ex-official members" providing technical support, which would be necessary in order to monitor the service delivery; vi) the stakeholders involved in the PWS are already part of this platform; and vii) the MRBWRUA is part of a trans-boundary forum that will enable stakeholders from both Kenya an Tanzania to participate in the scheme.

However, the same stakeholders who identified the MRBWRUA as the most suitable institution to operate the PWS also agree that this institution should be further strengthened in order to be suitable to manage the scheme. Some of the areas to be strengthened in the MRBWRUA are: its administration capacity for the scheme and the technical capacity to monitor the service delivery.

An interesting third possibility that emanated from the results was creating agreements between existing institutions to complement each other and manage the PWS together. This was suggested as the creation of a new trust fund that will work together with the MRBWRUA, under WRMA supervision. A second option suggested is to have the MRBWRUA supported by WRMA and other national government agencies. A final possibility is having the MRBWRUA working together with a private entity in managing the scheme. As mentioned by one of the

interviewees, the main advantage of hiring a private entity to manage the PWS is that funds are transparently and effectively used.

The idea of a management scheme by the local council and national government was not considered good idea by 70% of the informants (9 accommodation facilities, 4 farmers, and the NCC). Nevertheless, WRMA representatives showed interest in becoming the institution to manage the PWS scheme. They have the institutional capacity and the mandate that could support them in becoming the institution to manage the PWS in the Mara. Furthermore, they already have the expertise to supervise and work with the project, promote capacity building, collect the money from permits for water allocation and monitor compliance for the water regulations.

An existing challenge for WRMA is the availability of resources to achieve compliance of current regulations. They are handling this issue by working closely with the MRBWRUA in order for it to become the local level monitoring agency. Other actors also identified as a limitation that because of WRMA´s national level jurisdiction, there is a risk that by becoming the scheme manager, third parties interest could also become important in managing the PWS scheme. Additionally, the trust of the potential buyers may be lost.

There are various possibilities to the institutional arrangement that would manage the PWS in the Mara river Basin. Results indicate that potential buyers are inclined to institutions that can demonstrate transparency and efficiency in the fund management. On the other hand, there are institutions which already have the structure to manage this scheme but lack the technical and administrative capacity to give confidence to the potential buyers.

6.4 Reasons for not participating in the PWS scheme

The results also captured the main reasons for non-participation in the payment scheme in the Mara. These are analyzed within this section and include: i) current budgetary constraints due to tourist industries set backs; ii) the cost may be too high and there is “enough water therefore it is not needed”; iii) facilities are already

investing in conservation activities around their facilities and with the nearby communities.

The Kenyan tourist industry reported earning of approximately 9 billion more Kenya Shillings (USD 135 million) more in 2007 than in 2006. According to the Economic Survey (2008), this was attributed to the diversification and improvement of Kenyan touristy products. However, in 2008 following the post election violence, the tourism industry suffered a decline in profits. The Mara Conservancy reported a drop of 27% in the three year average of 62,683 bed nights within the Mara Triangle. The report further states that there was a 50% decline on the occupancy rate between January and April, 2008 (Heath, 2009). For 2009, the situation is not so dire but accommodation facilities in the MMNR have stated their recovery will be slow, especially with the current international economic crisis which is expected to decrease international tourism throughout 2009 (WTO, 2009). Due to this situation accommodation managers said that their ability to participate in such a conservation scheme would depend on the recovery of their budgets.

The actors in the Mara also expressed "fatigue" over people and institutions repeatedly approaching them with conservation and eco-friendly practices. There is a perceived lack of planning and communication among existing activities, which lead to a dilution of initiatives, and doubling of efforts on conservation. To avoid falling into this cycle, the PWS could identify on-going conservation initiatives within the Mara, such as the conservancies, to learn from and create synergies.

The conservancies are areas in which local communities agree to lease their land to tourism partners in return for a rent on a per hectare basis to give the land owner a viable income. Some of the positive effect of the establishment of these areas are: i) they are buffer zones that enhance the conservation and growth of the wildlife population in the area by decreasing human-wildlife conflicts; ii) they promote conservation-based growth for the local Maasai, since the tourism partners generate employment opportunities and promote development projects, beside the payment stipulated in the contract; iii) they are safeguards against dry season scarcity

because the area within the conservancies is designated for local grazing use in case of drought.

On the other hand some of the challenges faced by these conservation areas are: i) lack of compliance with the terms in the contract, especially with regards to livestock intrusion in the core areas of the conservancy; and ii) lack of full financial sustainability as, although a growing proportion of the expenditures is covered by the contribution from the tourism partners and tourists, some of these conservation areas still need the support of donors to cover essential expenditures. Both challenges could be potential challenges in the establishment of the PWS scheme in the MRB.

The proposed PWS scheme in the Mara has one major difference from the conservancy's initiatives. Under the conservancy scheme payment lacks the conditionality criteria that characterized PES schemes. In other words, payment is done on a monthly basis independent of weather the conditions on the contract are met. Representatives of Working Wildlife Ltd. reported in an interview that this condition might change in the new version of the contract since this conditionality could improve compliance for the contract's conditions.

Even though the conditionality criterion is missing in the conservancies, important lessons from these initiatives challenges could be used for the PWS scheme. Additionally, because of the location of these conservancies (they are neighboring the areas with subsistence farming), they could become strategic inn the implementation of the PWS scheme in the upper catchments.

The conservancy initiative is becoming the example for conservation within the Mara River Basin. Expectations around the payment amount request from tourism partners, the payment amount given to providers, the mechanism use to manage the initiative and its effectiveness will be important to analyze and compare with the prepare implementation for the PWS. On the mechanism that manages the conservancies, it should be added that informant in the area are satisfied with its effectiveness and they are willing to make efforts to bring this managements into new conservancies areas (Personal communication, Tarquin Wood).

On the other hand, the conservancy scheme as it is working now in the Mara is only possible because of the unambiguous property rights in the area. This allows the payment to be directed to the person who can really make the decision about leaving part of their land for conservation. In the case of the PWS, where potential buyers are subsistence farmers upstream, these property rights are not always clear and this may cause challenges in order to expand the conservancy initiative to the PWS area.

7 CONCLUSION AND RECOMMENDATION

7.1 Conclusion

1) In the Mara River basin, stakeholders agree that service users who benefit directly or indirectly from the services provided by the Mara should become buyers in the Payment for Watershed Service scheme. Consulted stakeholders identified 4 main groups as potential buyers for the Mara River Basin payment scheme: i) County councils, ii) Local groups such as pastoralist and commercial farmers; iii) National government agencies; and iv) Tourism related facilities.

2) The identification and description of the specific agencies that would pay for the maintenance of a certain ecosystem services scheme depends on the proper definition of the service traded under the scheme.

3) Governmental agencies at different levels would play diverse roles in the payment for watershed service scheme in the Mara. On the one hand, agencies at the regional level such as the Narok County Council acknowledge their role as buyers for the PWS. The Water Resources Users Association is considered an option for the scheme management; and national level agencies were considered scheme promoters through the promotion of policies that will motivate actors to gather and seek feasible solutions for the degradation problem within the basin.

4) Potential buyers in the Mara are aware of the relation between the deforestation in the basin's headwaters, extraction and pollution of water by

agricultural, domestic and tourist facilities and its negative effects on the quantity and quality of water in the Mara River. This is partly due to the awareness building campaigns done by NGOs, and diverse government officials on the Mara River's importance, especially with regards to maintaining the Mau Forest

5) Twenty two tourist facilities in the Mara were interested (15) or not sure (7) whether to participate in the PWS scheme. This shows an entry point for the MRB PWS, although further information on the service traded, costs and mechanism is needed in order to properly motivate these facilities participation in the scheme.

6) County councils acceptance of their role as potential buyers is considered an important step in the implementation of the payment scheme. These actors involvement as buyers could motivate private potential buyers to support the scheme as they would see a financial involvement of the responsible governmental agency.

7) Potential buyers´ awareness of the Mara River condition and its link to their economic activities is influenced by their dependency on ecosystem service that is easier to quantify and value. Stakeholders like the accommodation facilities and commercial farmer who depend on services like water provision for their operations are better able to monitor and value these services and are thus more interested in participating in a conservation scheme.

8) Potential buyers considered the transparency and effectiveness of the mechanism use to manage the funds as a prerequisite for their participation in the scheme. The preferred mechanism was the creation of a trust fund to handle the fund management for the PWS scheme. The MRBWRUA was also considered a second option for the management of the funds, but stakeholders also identified its strengthening need before it could be considered. On the other hand, central government participation was not recommended.

7.2 Recommendations

1) Ecosystem services traded under the Mara River Basin PWS scheme must be clearly defined in order to properly identify the scheme potential buyer's.

2) Providing information and promoting understanding of the linkages between economic activities and the provision of different ecosystem services is needed to create awareness among the users, and therefore motivate participation among the potential buyers. New information about the services traded, the costs and mechanism for the PES scheme would motivate their participation, since they would be able to properly understand the links between their economic activities and the provision of the ecosystem services.

3) There is a fear among the accommodation facilities in the Mara that they would be asked to pay a disproportionate amount to support this scheme. Efforts should be aimed at bringing into the negotiation all potential buyers to avoid actors that benefit without contributing to the scheme in the Mara.

4) There are on-going conservation activities in the Mara such as the conservancies, important lessons from their operation and negotiation process would be enriching for the implementation of the Payment for Watershed Services in the Mara River Basin.

7.3 Further Research

Among the findings of this research is the need for further research on the buyers dimension prior to the negotiation stages of the payment for ecosystem services scheme in the Mara, a list of these further research topics follows:

1. Studies aimed to define the ecosystem service traded and its cost in the Mara river basin PWS scheme are necessary in order to have enough information to identify potential buyers.
2. This research focused on stakeholders in the Kenya side of the Mara River Basin. Further research is needed to assess the participation of potential

service buyers on the Tanzanian side of the basin such as Tanzania National Park.

3. An institutional analysis of the Mara River Basin Water Resources User Association should be done. This research could focus on the determining the strengthening needs of the institution as the manager of the PWS. It could also asses the possibility of it initially working with an existing private organization in the Mara and WRMA.
4. An analysis of the socio-economic characteristics and interests of potential buyers is needed to help ensure that payment schemes are appropriate to their ability and willingness to pay.
5. The Trans-Mara and Narok County Councils are working on a management plan for the protected areas in the Mara. The management plan focuses on the protected areas, but through a zoning scheme also includes part of the surrounding group ranches area. An assessment is needed in order to see how the Payment for watershed services in the Mara could work together with the management plan.

REFERENCES

Alusa-Bosire, E. 2008. Green Directory 2009. Eco-tourism Kenya. 2008. Nairobi

Bohlen, P., Lynch, S., Shabman, L., Clark, M., Shukla, S., and Swain, H. 2009. Paying for environmental services from agricultural lands: an example from the northern Everglades. Front Ecol Environ 2009; 7(1): 46–55, doi:10.1890/080107

Brown, T., Bergstrom, J., Loomis, J. 2006. Ecosystem Goods and Services: Definition, Valuation and Provision. Discussion Paper.

Corbera, E., González, C., and Brown, K. 2008. Institutional dimensions of Payment for ecosystem services: An analysis of Mexico's carbon forestry programme,
Ecological economic, doi:10.1016/j.ecolecon.2008.06.008

De Groot, et al. 2002. A typology for the classification, description and valuation of ecosystem function, goods and services. Ecological Economics. 0921-8009/02

Engel, S., Pagiola, S., and Wunder, S.2008. Designing payment for environmental services in theory and practice: An overview of the issues, Ecological Economics, Volume 65, Issue 4, 1 May 2008, Pages 663-674.

Gereta, E.J., Wolanski, E., Chiombola, A.T. 2003.Assessment of the Environmental, Social and Economic Impacts on the Serengeti Ecosystem of the Developments in the Mara River Catchment in Kenya. Kenya

Global Water for Sustainability Program. 2007. Water Quality Baseline Assessment Report:Mara River Basin, Kenya-Tanzania. The Mara River Basin Management Initiative.

Global Water for Sustainability Program. 2008. A living River for the people and Nature: first draft assessing the reserve for the Mara River, Kenya and Tanzania. Unpublished document.

Global Water for Sustainability Program. 2008. Mara River Basin Project Tanzania and Kenya
website:http://glows.fiu.edu/glows/Projects/MaraRiverBasinKenyaTanzania/tabid/77/Default.aspx

Grieg-Gran, M., Noel, S., and Porras, I. 2006. Lessons learned from payments for environmental services. Green Water Credits Report 2, ISRIC Report 2006/5, ISRIC, Wageningen

Gutman, P. 2003. From Goodwill to Payment for Environmental Services. Macroeconomic for sustainable development program office.WWF.

Hashimoto, K. 2008. Study on Willingness to Participate in a Payment for Ecosystem Services Scheme in the Mara River Basin. Florida. Draft Document

Heath, B. 2009. Mara Monthly: March 2009. Chief´s Executive Report. Web document accessed at URL: http://www.maratriangle.org/monthly-reports/

Hoffman, C. 2007. Geospatial Mapping and Analysis of Water Availability-Demand-Use within the Mara River Basin. Florida.

Kenya National Bureau of Statistics. 2008. Economic Survey 2007. Ministry of Planning and Development.

Khan, J.R., 2005. The Economic Approach to Environmental and Natural Resources. Thomsom Southwestern. Ohio.

Krhoda, G. O. 2001. The Hydrology of Mara River. Consultancy Report for the WWF – Eastern Africa Regional Programme Office (EARPO). The Mara River Basin Management Initiative.

Mara Conservancy. 2009. Background: Before the Mara Conservancy. Accessed April, 2009 at URL: http://www.maratriangle.org/mara-conservancy/

Mati, B.M., Simon, M., Patrick, H., Mtalo, F., and Hussein, G. 2005. Land Use Changes in the Transboundary Mara Basin: A Threat to Pristine Wildlife Sanctuaries in East Africa. Paper for presentation at the 8th International River Symposium, Brisbane, Australia.

Mayrand, K., Paquin, M., 2004. Payments for Environmental Services: A Survey and Assessment of Current Schemes. Unisféra International Centre. Montreal

Millennium Ecosystem Assessment. 2005. Ecosystems and Human Well-Being: Wetlands and Water Synthesis. Washington, DC.

O'Keeffe, J. 2007. Module Sustainable Development: Mara River Exercise. Introductory Presentation. UNESCO-IHE Institute for Water Education, Delft, and the Netherlands

Ol are Orok conservancy. 2009. Overview and project proposal. Accessed April, 2009 at URL http://www.oocmara.com/

Ottichilo, W. K., Leeuw, J., Skidmore A., Prins, H. T., Said, M. 2000. Population Trends of Large Non-Migratory Wild Herbivores and Livestock in the Masai Mara Ecosystem, Kenya, between 1977 and 1997. African Journal of Ecology, 38, 202-216.

Pagiola, S,. 2002. Design and Implementation of PES Mechanisms. World Bank. web document:http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIR

ONMENT/EXTEEI/0,,contentMDK:20487921~isCURL:Y~menuPK:1187844~pagePK:210058~piPK:210062~theSitePK:408050,00.html

Pagiola, s. Arcenas,. 2007. Can Payement for Environmental services Help reduce Poverty? An Exploration of eth issues and the Evidence to Date from Latin America. 2007. World Bank.

Pagiola, S., Platais, G,.2007. Payment for Environmental Service: From theory to Practice. World Bank. Washington.

Porras, I., Grieg-Gran, M., Neves, N. 2008. All that glitters: A review of payments for watershed services in developing countries. Natural Resource Issues No. 11. International Institute for Environment and Development. London, UK.

Sinclair A.R.E. 1998. Natural Regulation of ecosystems in protected areas as ecological baselines. Wildlife Society Bulletin, 399-409

Smith, M., de Groot,D., and Bergkamp, G. 2006. Pay: Establishing a Payment for watershed services. IUCN, Gland, Switzerland, 109pp.

Thirgood, S., Mosser, A., Tham, S., Hopcraft, G., M wangomo, E., Mlengeya, T. 2004. Can parks protect migratory ungulates? The case of the Serengeti wildebeest. Animal Conservation 7, 113–120 . United Kingdom. DOI:10.1017/S1367943004001404

Tresierra, J., (edited). 2008. Equitable Payment for Watershed Services: An innovation approach for reducing poverty and conserving nature. WWF-CARE-DANIDA-DGIS.

Wedgwood, A., & Sansom, K. 2003.Willingness-to-pay - A streamlined approach: Guidance notes for small town water services WEDC, Loughborough University, UK.

WREM. 2007. Mara River Basin Policy, Legal, and Institutional Cooperative Framework: Draft Final Report. Nile Basin Initiative, Nile Equatorial Lakes Subsidiary Action Program.

WREM. 2008. Mara River Bain Investment Strategy. Draft Final Report. Nile Basin Initiative, Nile Equatorial Lakes Subsidiary Action Program.

WRMA. 2008. Cathment Management Strategy. Lake Victoria South Catchment Area. Ministry of Irrigation. Kenya

Wunder, S. 2005. Payments for environmental services: Some nuts and bolts. CIFOR Occasional Paper No. 42. Center for International Forestry Research, Indonesia

Wunder, S., Engel, S., Pagiola, S. 2008. Taking stock: a comparative analysis of Payment for environmental service programs in develop and developing countries. Ecological Economics. doi:10.1016/j.ecolecon.2008.03.010

WWF – World Wide Fund for Nature. 2006. Payments for Environmental Services: An equitable approach for reducing poverty and conserving nature. Switzerland.

Annexes

Annex I : Camps and Lodges Situated on the Maasai Mara

Mara Conservancy- Transmara County Council		
No.	**Names**	**No. of Beds**
1	Little Governors	36
2	Mara Serena	150
3	Mara Siria	16
4	Maasai West Missionary Camp	18
5	Mpata Club	40
6	Olonana	24
	Sub-Total	**284**
Maasai Mara Game Reserve (Narok County Council)		
1	Explorer Camp	20
2	Government Private Camp	16
3	Il Moran Camp	20
4	Keekorok Lodge	202
5	Main Governors Camp	74
6	Rekero Camp	14
7	Naibor Camp	14
8	Olkiombo Camp	60
9	Sarova Mara Camp	150
	Sub-Total	**570**
Siana Masai Mara Conservancy		
1	Acacia Camp	100
2	Amicabre Camp	30
3	Bike Treks	20
4	Bush Tops	24
5	Kenia Safaris Camp	24
6	Kimana Camp	18
7	Leleshwa Camp	14
8	Mara Hippo Lodge	110
9	Mountain Rock	86
10	Mara Sopa	220
11	Ngama Hills Lodge	20
12	Naunerru Camp	10
13	Oseur Camp	Mobile
14	Planet Camp	36
15	Prime Time Camp	16
16	Safari Line	12
17	Safari seekers	17
18	Savuka Camp	40
19	Sekenani Camp	30

20	Siana Springs	76
21	Spurwing Camp	57
22	Flamingo Camp	30
	Sub-Total	**1040**
1	Ntipilikwani	68
2	Bush Buck	12
3	David Livingstone Lodge	164
4	JMAR Safaris	8
5	Elephant Pepper Camp	16
6	Ilkiliani Camp	34
7	African Safari	116
8	Mara River Camp	Temporarily closed
9	Nyumbu Camp	32
10	Ol Seki Mara Camp	12
11	Ol tome Camp	20
12	Saruni Camp	18
13	Kicheche Camp (Main camp)	24
14	Kicheche Exodus Camp	12
15	Talek Riverside Camp	20
16	Base camp	32
17	Aruba Camp	3
18	Mara Leisure Camp	70
19	Olare Mara Camp	20
20	Karen Blixen	49
21	Olmaku (Royal Camp)	8
22	Off Beat	12
23	Fig Tree	170
24	Game Trakers Private Camp	24
25	Mara Samba Lodge	202
	Sub-Total	**1146**
Olchoro Oirowua		
1	Mara Safari Club	100
2	Richard Camp	18
	Sub-Total	**118**
Olkinyei Conservancy		
1	Mara Porini Camp	12
	Sub-Total	**12**
Oloololo Group Ranch		
1	Bateleur Safaris	18
2	Kichwa Tembo	102
	Sub-Total	**120**
Majimoto Group Ranch		
1	Olarra Camp	12
	Sub-Total	**12**
Olaro Orok Conservancy		
1	Porini Lion Camp	**12**
2	Kicheche Camp	**12**
3	Rekero Camp	**12**

	Sub-Total	**36**
OLDERRKESI		
1	Mpiri Mpiri	**N/A**
2	1920 Cottars camp **Sub-Total**	**28**
	Grand Total	**3366**

Annex II: List of interviewed actors and methods use to gathered information

Actor	Name of Contacted persons	Contact Info (e-mail and phone)	Method use for gathering data
Actors Working in the Mara			
1.Ministry of Tourism	Stella Amadi Principal Tourism Officer	samadi@tourism.go.ke afandistella@yahoo.com	Personal Interview
	Mr. Frederick Karenga Tourism Officer	fkarenga@tourism.go.ke	Personal Interview
2. Water Resources Management Authority	Margaret Abira	mabira59@yahoo.com +254 572025493	Interview through Telephone
3. National Environmental Management Agency	Mr. Njora	dnjora@nema.go.ke dmunuhe@yahoo.com	Personal Interview
4. Mara River Basin Water Resource User Association	Mr. Kennedy Onyacho Manager	benachoke@yahoo.com Phone: +254 728336090	Personal Interview
5. Kenya Association of Tour Operators	Fred Kaigua Chief Executive	ceo@katokenya.org tel: 254 202713348	Personal Interview
6. Ecotourism Kenya	Phillipe Murithi Community Officer	phillip@ecotourismkenya.org Tel: +254 020-2724755	Personal Interview
7. Tourims trust fund	Francis Musumba Agoya Resource Mobilization officer	fagoya@ttfkenya.org tel: 254 020-2730333	Personal Interview
	Sammy Kibet Chief Executive	info@ttefkenya.org tel: 254-020-2730333	Personal Interview
8. Mara Conservancy	Brian Heath Chief executive	bheath@triad.co.ke	Personal Interview
9. WWF-EARPO	Doris Ombara Narok Office Coordinator	dombara@mara.wwfearpo.org	Personal Interview
Potential Buyers			
10. Narok County Council	James Sindiyo Warden Member of the WRUA	jsindiyo@yahoo.com P.O. box 60 Narok	Personal Interview
	Nyamalo Nkumum Sankale Senior Administrator	P.O box 19 tel: 254 0726 40 8519	Personal Interview
11. Large scale farmers	Hugo Wood Olerai Farm Ltd. and president of the WRBWRUA	hugo@olerai.co.ke tel: 254 0733701632	Personal Interview
	Tarquin Wood Olerai Farm Ltd. Commercial Farmer	tarquin@olerai.co.ke	Personal Interview

Accomodation facilities			
12. Governors Camp Governor's Ilmoran Little Governors	Ariana Grammaticas Sales and Marketing	Skype: arianagrammaticas Tel +254 20 273 4000	Personal Interview (Head Office)
	George Murray Manager Little governor´s camp	info@governorscamp.com tel: 254 020 2734000	Personal Interview
13. Serena Lodge	Bob Oguya Chief Naturalist	Boguya@serena.co.ke Tel: +254 814113	Personal Interview (Head Office) Interview with Manager
14. Kilima Camp	Dominique Berger Director	info@kilimacamp tel:254 020 2081747	Interview (Head Office)
	Evans Kalafa Camp manager	evans@spawnintours.com tel:+254 020 8010871	Personal Interview
15. Serian Camp	Alex Walker Owner	safari@serian.net	Contact by phone
	Milah Mutai	chepkolum@gmail.com	Personal Interview
16. Sekenani Camp	Nick Wood Onwner	nickwood@iconnet.co.ke	Interview (Head Office)
17. Karen Blixen	Martin Nielsen Director	msn@karenblixencamp.com skype: karen.blixen.camp.martin.nielsen	Interview (Head Office)
	Katrina Owner	katzjes@hotmail.com info@karenblixencamp.com	Personal interview
18. Olonana Tented Camp	Elijah Wainaina Head Office	ewainaina@sanctuaryretreats.com	Survey
	David Embaki	olonana@sactuaryretreats.com	Phone Interview (Head Office)
19. Ngerende Island Lodge	Catherine	admin@safariline-africa.com tel: 254 883271	Phone Interview (Head Office)
	Bernard Kiber General Manager	bkiber2002@yahoo.com	Interview
20. Royal Mara Safari Lodge	George Sphikas Owner	reservations@royalmara.com tel: 254 020 7123356	Phone Interview (Head Office)
	Jay Frayer General Manager	masaaimaracamp@yahoo.com	Phone Interview (Head Office)
21. Kicheche	Natalie	sales@kicheche.com tel: 254 020 890541	Phone and internet communication no interview took place
22. Fairmont Mara Safari Club	Munene Ngotho General Manager	munene.ngotho@fairmont.com tel:254 050 22172	Interview Survey
23. Mara Buffalo Camp	Otteko General manager	tel: 254 733600225	Interview and survey
24. Kichwa Tembo (Bateleur)	Theresa Pereira	kichwa@africaonline.co.ke tel: 254 50 22464/22465	Interview and survey

Sofía Méndez Castillo
UNESCO-IHE

David Livingstone Safari Resort			Survey
Barrick Corporation	Stephen Kisakye Regional Community Relation Manager	skisakye@barrick.com	Contact by e-mail Note. No information was obtained for the research results
	Ulrich Sibilski Regional Environmental Manager	usibilski@barrick.com Phone: +255 222600604 ext 3006 Mobile: +255 753861163	Contact by e-mail and phone

Annex III: Questionnaire used as guidance for interview

Survey questions for Payment for Ecosystem Services
In Mara River Basin (MRB) of Kenya and Tanzania

Consent

The researcher is a participant of the Environmental Science Program from UNESCO-IHE water research institute in the Netherlands. She is interested in identifying your organization's willingness to participate to the establishment of a Payment for Ecosystem Service (PES) in the Mara River Basin, as a mean to achieve conservation and sustainable tourist development in the basin. This research is part of a larger integrated water resource management initiative and it's crucial in generating policy- and management-relevant information which is expected to be used by government and stakeholders in your respective countries. The information you provide will be held confidential and no personal information will be disclosed. Your participation in the survey is voluntary, only if you are willing to participate, please answer the following questions. Thank you

1.- Title of the person who is filling this questionnaire

_____

2.- Would you please tell us about the various taxes and fees that you are currently required to pay to different agencies?

Name of the tax or fee	Agency	Annual payment (please specify currency)	Observation
	District Council		
	Group Ranch Organization		
Sales taxes	State or national agency		
Income taxes	National agency		
Commercial taxes	Local/National agency		
Water taxes	National Water Resource Agency		
Other			
Other			

3.- Tourism authorities in Kenya stated as the base for their industry the diverse natural resources in the area. In the Mara River Basin, scientist have shown an alarming reduction in the river's water flow and they have also stressed the importance of this water for the survival of the wildlife, ecosystems and human communities living further down the river. Your lodge could play an important role in enhancing the water flow in the river and thereby improving the overall environmental and human welfare in the Mara River Basin, which is very critical to maintaining abundant wildlife populations and in turn, attracting tourists to your

area and lodge. One way to improve water flow in the Mara River and its tributaries is to implement a comprehensive water and land conservation program in the upper catchment area of the Basin. This would involve motivating upstream pastorals, foresters and land managers to plant and nurture trees and shrubs on their respective landscape, without cutting them for reasonably long time. Land owners and managers in the upper catchment areas will also be encouraged to eliminate excessive water abstraction facilities. In order to implement such program, people upstream would require a reasonable monetary encouragement. Since your business is so much dependent on water availability, you may be asked to provide such monetary encouragement to upstream people. Given that a proper institutional mechanism would be set in place to administer the above monetary collection and payment, would you be interested in making a reasonable monetary contribution to a trust fund that would be used for upstream water conservation program? Note that this contribution is in addition to what you are already paying in annual water charges and various taxes.

Yes ____ No _____ Not sure ____

4.- If you are willing, what is the maximum amount you would be willing to pay yearly, in addition to what you are already paying in various fees. Please choose a range?

40,000- 100,000 Ksh _____

100,001- 160,000 Ksh _____

160,001- 200,000 Ksh _____

more than 200, 000 Ksh _____

5.- You are currently one of the water users. Another role you could play is to recycle water at your lodge so that you will minimize water use as well as reduce water pollution that might occur from the sewer water coming off of your lodge. Would you be willing to exercise this option?

No ____ Yes _____ Not sure ____

6.- If answers to any of the above options are "no", then please indicate the reason. *Please put a "check" mark for as many reasons as appropriate under those activities for which answer in question #3, 5 was a "no"*

Reasons you said you would not undertake the activity	Options	
	Paying monetary contribution to upstream landowners (question #3 above)	Implementing water recycle and treatment (question # 5 above)
Might cost me too much money		
I don't think this measure will actually work		

Government should fund these kinds of activities not a private businesses like us		
We have more immediate problems to worry about rather than this		
Other (please indicate)		

7.- What are your current conservation investment in the Mara?

Activities	Investment amount (please indicate the currency and whether its an annual or monthly invest)	Observations

8.- Would you like give any further comments or suggestions about paying for upstream water users, tourists operations, the role of water users' association, or other government agencies?

_____

_____

9.- If answer to question # 3 above is YES, who should be in charge of managing your money and monitoring the activities upstream? Please indicate using the following institutions is a good idea or not (please put a check mark)

Institution	**Good Idea**	**Not a good ideas**	**Not sure**	**Observations**
Mara River Water User Association				
National Government agency (water management department)				
District council				
A totally new fund				
Other				

10.- Are you a member of any business or trade organizations? If yes, please indicate the names of the organizations.

_____

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11.- Would you like a copy of the final research report

Yes _____ No _____

Thank you very much!!

Any questions, please refer them to: Sofía Méndez Castillo
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