



Baseline Survey for Rushebeya-Kanyabaha wetland landscape and Wambabya riverline forests system

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Executive summary

This report is based on the baseline survey that was conducted by Nature Harness Initiatives (NAHI) in Wambabya riverine forests system (Hoima District) to collect information for facilitating the development of workable rewards for environmental service agreements. The survey is as part of the ICRAF's led Pro-poor Rewards for Environmental Services in Africa (PRESA) project.

The objectives of the survey were to;

- I. Identify ecosystem service prospects and potential sellers, intermediaries and buyers
- II. Document existing land use practices and assess their impact on ecosystem services.
- III. Assess the policy and institutional terrain in the landscape
- IV. Identify threats, risks and opportunities for the rural poor to enter into PES activities

These were achieved by employing different data collection methods-use of participatory approaches in community consultative meetings, targeted interviews, forest inventories and mapping.

Results indicate that Wambabya riverine forests system provides clear saleable environmental services-carbon sequestration, watershed and biodiversity services which present high prospects for development of reward for environmental services schemes. Results further indicate that the quality of environmental services is deteriorating and already the downstream beneficiaries are getting concerned. In addition, there is a big threat to the existing biodiversity due to intense degradation of their habitat (forests). Potential environmental service sellers (forest and land owners), service providers/intermediaries and buyers were as well identified.

There are relevant policy and environmental legislations as well as a well-structured institutional framework that can potentially facilitate the development and design of a PES scheme for Wambabya riverine forests system, although there are no policies and institutions specifically developed for PES schemes in Uganda per se. They provide a conducive environment for PES to effectively operate.

The survey recommends for strong awareness creation for farmers to realize that they can benefit from forests other than cutting them for timber and agricultural purposes. Farmers' land use practices need to be improved in order to maintain healthy environmental services. Practices like agroforestry and leaving

appropriate distance from the rivers and streams should be promoted on a large scale in order to enhance the quality of environmental services.

For a PES scheme to be successfully implemented in Wambabya forests system, the incentives should be over and above the alternative income sources that farmers will forego, since many of the farmers still hold the opinion of cutting the forests for agriculture and timber as a better way of utilizing them.

Lastly, the study suggests some of the next steps for implementing a PES scheme in Wambabya forests system which include;

- Valuation of the indentified ecosystem services in Wambabya riverine forests system
- Mobilising the ecosystem service sellers and service providers
- Awareness creation among the ecosystem service sellers, service providers and buyers
- More engagements and negotiations with the identified buyers

1.0 Introduction

1.1 Background

This report presents the outcomes of the baseline survey in Wambabya riverine forests system (Hoima District). The study is part of the ICRAF's led Pro-poor rewards for environmental services in Africa (PRESA) and aims at collecting information to facilitate the development of workable service reward agreements.

1.2 Description of Wambabya riverine forests system (Hoima District)

1.2.1 Vegetation

The Wambabya riverine forests system lies in the corridor between the Budongo-Bugoma wildlife corridor in Hoima district. It consists of various riverline forests under different management regimes, namely; private forests, community forests and central forest reserves. Wambabya central reserve is the biggest (3,429ha) followed by Itoohya private forest in Munte, which is approximately 516 ha. The system consists of about 78 forests, totaling to an area of approximately 2982.5 ha of private and community forests. Wambabya is a natural tropical high forest system that is facing challenges of degradation and requires immediate conservation effort.

1.2.2 Biodiversity

Wambabya is one of the principal areas outside protected reserves where large forest pockets exist on private lands containing significant populations of chimpanzees. Other existing biodiversity of conservation importance include monkeys, baboons and bird species. The forests are also the main sources of water for surrounding communities and the private companies downstream.

1.2.3 Population structure

Wambabya riverine forests system covers 20 parishes located in 6 sub counties, with the total population of 143,015 people, covering 41.6% of the entire Hoima district population (343,618 people, representing 95.4 persons per km²)

Table 1: Population by parish in Wambabya riverine forests system

Sub counties	No. of parishes	No. of HH	Males	Females	Totals	Average HH size
Kyabigambire	4	6,312	15,266	14,862	30,128	4.8
Busiisi	3	2,919	6,753	7,036	13,789	4.7
Hoima TC	3	7,177	12,944	14,990	27,934	3.7
Bugambe	4	5,685	13,299	12,355	25,654	4.5
Kizirafumbi	3	4,391	10,687	10,679	21,366	4.8
Buseruka	3	5,012	12,288	11,856	24,144	4.8
Total	20	31,496	71,237	71,778	143,015	4.6

Source: Uganda Population and Housing Census (2002)

Over 90% of the total population in Hoima live in rural areas, of which 74% depend on subsistence agriculture for their livelihood. Farming is generally accomplished by hand with hoes and *pangas* (machetes) and using fire. Over 95% of rural households use locally gathered firewood for cooking (UBOS, 2007).

1.2.4 Major economic activities

The main economic activity for people in the area is crop farming. Others are livestock farming (goats, cattle and poultry), tree cutting for timber, charcoal burning and small scale businesses.

Box 1. Tree cutting for timber as a drivers to forest degradation

Tree cutting for timber forms one of the lucrative economic activities in the Wambabya forests system and the entire Hoima district. One of the key informants of this survey, Mr. Fabius Bategeka, explained that an average tree can generate about 8 pieces of timber and in his village, each piece goes for about 5,500 ug.shs, generating a total of 44,000 Ug.shs. However, this activity has not necessarily benefited local communities/local forest owners as it does for businessmen and women. A forest owner is only paid an average of 15,000 ug.shs for a tree he has kept for over 20 years, because he wants money for his children's school fees and other household needs. The other arrangement, according to one of the timber dealers, is that timber dealers buy a whole forest patch for about 200,000 ug.shs from which they get about 2 Lorries of timber. This timber dealer noted that they have now resorted to buying single trees in some areas as intact forest patches have reduced. The practice is therefore a major driver to deforestation in the area as it has seen many of the forests on private land cleared because forest owners have limited quick sources of income.

1.2.5 Major crops grown and associated markets for their products

Tobacco and rice are major cash crops grown in Wambabya forests system and double as number one driver for forests degradation. Rice is also grown for home consumption. Other crops include cotton, tea, maize, ground nuts, sugarcane, potatoes, beans and cocoa in some areas.

Table 2: Major crops and their markets

Crop	Main markets	Marketing challenges
Tobacco	British American Tobacco (Uganda)	None observed
Tea	James Finlays Tea Company	Some out-grower gardens seemed not well attended to.
Rice	Home based/Farm gate prices	<ul style="list-style-type: none">• Marketing and selling coordinated by middlemen,• low prices to farmers,• Individual farmer marketing (low bargaining power)
Maize	Home based/Farm gate prices	
Ground nuts	Home based/Farm gate prices	
Cassava	Home based/Farm gate prices	

Tobacco and tea are grown solely for cash. Rice growing has slightly shifted from subsistence to commercial farming, but is also fed on. Other crops are grown on a subsistence scale.

1.3 Objectives of the survey

The overall objective of the survey was to collect baseline information to facilitate the development of workable environmental service reward agreements in Wambabya riverine forests system.

The Specific objectives are:

- V. Identify ecosystem service prospects and potential sellers, intermediaries and buyers
- VI. Document existing land use practices and assess their impact on ecosystem services.
- VII. Assess the policy and institutional terrain in the landscape
- VIII. Identify threats, risks and opportunities for the rural poor to enter into PES activities

2.0 Methods

Various data collection methods were used to conduct this baseline survey. These include:

Community consultative meetings

Participatory approaches were used to gather data from community consultative meetings conducted in Wambabya forests system using a pre-determined checklist. Meetings were held in 9 parishes selected from 3 sub counties to map the existing natural resources in each village, establishing forest owners and their associated sizes, economic activities, and institutional arrangements with in the parishes, among others. In attendance were mainly the local leadership, including the sub county chiefs, parish chiefs, local council leadership from LCIII to LCI and the local community-forest owners and other natural resources stewards.

Forest owner interviews

Interviews were conducted among forest owners using semi-structured questionnaires to capture their socio-economic settings, status of the forests and their opinions on forests and other natural resource conservation.

Forests inventories

Forest inventories were conducted in selected forests. In each forest,

- ✓ Line transects were cut along an established baseline at an interval of 500m
- ✓ Along each transect, plots of 25mx20m were established at alternate sides along the transect
- ✓ Within each plot of 25mx20m, identification was done for all the tree species encountered
- ✓ Specimens of unidentified species were collected and taken to taxonomists for identification.
- ✓ Diameter at breast Height (DBH) for species ≥ 10 cm (Trees) were measured using diameter tapes/callipers and recorded in availed forms (see **appendix.....**)
- ✓ Data on poles and saplings was collected from smaller rectangular plots of 10m by 10m established in each plot of 20m by 20m at one corner. Species and total counts were done
- ✓ For seedlings, smaller rectangular plots of 5m by 5m were established in each plot of 10m by 10m at one corner of every plot to collect data. Identification and total counts were being done.
- ✓ Fauna and their signs of fauna, and human activities sighted were also recorded.

Mapping

- ✓ GPS (Geographical positioning system) points for the boundary of each forest were taken and recorded.
- ✓ GPS points for degraded and well managed spots of the forests were clearly recorded

2.1 Sample selection

Selection of the survey sites was done following earlier categorization of Wambabya riverline forests system by Buseruka hydro Power project during their inventory of River Wambabya sub catchment and its associated tributaries and the WWF Lake Albert East Catchment initiative project as upper, middle and lower catchments. Out of the seven sub counties where the Wambabya riverine forests system lies, four sub counties, two from the upper catchment and two from the middle catchment were purposively selected due to presence of many private forests.

Table 3: Sample selection by village in Wambabya riverine forests system

Catchment area	Sub county	Parishes	Villages
Upper catchment	Kyabigambire	4	
	Kitoba	Kiryangobe	4
		Budaka	2
		Birungu	3
Middle catchment	Kiziranfumbi	Munteme	5
		Bulimya	6
	Bugambe	Luguse	11
		Katanga	7
		Nyarugabo	7
		Bugambe	9
Total		13	54

Overall, the survey involved four sub counties, 13 parishes and 54 villages.

3.0 Results

This section presents the outcomes of the survey in Wambabya riverine forests system. The section starts with profiling the landscape.

3.1. Ecosystem service prospects and potential sellers and buyers

3.1.1. Potential ecosystem services in Wambabya forests system

Wambabya forests system presents opportunities for developing rewards environmental services schemes as saleable environmental services were identified. The environmental services identified are:

- ***Carbon sequestration***

Wambabya riverine forests system has experienced continued deforestation and forest degradation mainly due to agricultural activities and the need for timber. Local communities have shown concern over the drastic rate at which these resources are reducing, but insist that *"they must continue expanding their agricultural base in order to meet their household financial and food security needs"*. The survey however established that they are willing to conserve their forests if there are available incentives to motivate them. The forests provide an opportunity for REDD, and also afforestation and re-afforestation in the margins of the natural forests, and therefore a potential for carbon trade.

- ***Watershed management***

Wambabya forests system form the source and main catchment for River Wambabya, the main river joined by other tributaries from the entire catchment, draining into L. Albert. Down stream users mainly for hydro electric production, livestock, James Finlays Bugambe Tea estate and the oil drilling companies are the big users, in addition to the surrounding local communities. They showed concern (especially the power production company) about the deteriorating volume and quality of the water from the river and have realized that management of the upstream is the only way they can be assured of continued river flow for their operational requirements.

- ***Biodiversity conservation***

Wambabya forests are homes to threatened biodiversity mainly the Chimpanzees and other biodiversity of high conservation importance-monkeys, baboons and many bird species. Also these forests provide corridor between two important protected areas of Budongo and Bogoma forest reserves which have important chimpanzee populations. Surveys conducted in 2003 indicated that each of the two reserves

have about 600 chimpanzee populations, equaling to approximately 25% of the national total (Plumptre, et al, 2003). Wambabya forests system provides a movement corridor between the two forest reserves and also a habitat for these important apes and yet the forests degradation is at high rate. There is therefore need for an incentive mechanism to attract the stewards of these resources and the biodiversity therein to conserving them.

3.1.2 Potential environmental service sellers.

Carbon sequestration

The potential ecosystem sellers in Wambabya forests system are the forest owners. As earlier noted, the forests system is comprised of many privately owned forest patches and the owners (Table 4) are the stewards of the natural resources and biodiversity therein.

Table 4: Potential environmental service sellers in Wambabya forests system

Parish	Identified villages with forests	Identified forest owners	Forest size (Acres)	Forest size (Ha)
Bugambe	9	184	650.5	263.4
Luguse	11	64	75	30.4
Katanga	7	90	181.5	73.5
Nyarugabo	4	19	178	72.1
Bulimya	6	70	288.3	116.7
Munteme	5	29	1393.5	564.2
Kiryangobe	4	64	158.6	64.2
Kiragura	2	17	33	13.4
Birungu	3	41	136.21	55.1
Budaka	2	18	33	13.4
Kyabigambire	8	87	608.5	246.4
Total	61	683	3736.11	1512.6

Overall, 683 forest owners were identified in 61 villages with a total of 1512.6 ha of forest size, giving an average of 2.21 ha of forest size per forest owner.

Biodiversity services

Forest owners remain the potential sellers for the biodiversity services. The mentioned biodiversity is habited within the forests which are privately owned.

Watershed services

Sellers of the watershed services include landowners of the wetland and forested areas, which are the main water catchment areas. Note that most forests in the Wambabya system are riparian and their degradation has squarely affected the quality and quantity of the rivers which flow through. Along these riparian forests are pockets of wetlands, most of which have which have also been degraded. Main drivers to this effect is waragi brewing using sugar molasses, a practice that is common in all the sub counties visited-Kitoba, Kiziranfumbi, Bugambe and Kyabigambire. Cultivating up to the river banks is another major driver to river degradation (Fig. 3).



Fig. 1: A tobacco nursery at the bank of R. Wambabya, waragi brewing at one of the tributaries.

In order to protect the water resources, there is need to work with such particular activities that degrade the quality and quantity of water–waragi brewers & those who cultivate up to river banks. From the outlook, there is a possibility of bundling the three ecosystem services since they are interlinked and that management of one ecosystem service may enhance the quality of the other services.

3.1.3 Potential environmental service buyers in Wambabya riverline forests system

One clear buyer for watershed management services for the Wambabya riverine forests system is Hydromax Uganda Limited, a private power production company that is currently constructing a 9 megawatt hydropower plant downstream of river Wambabya towards Lake Albert. The company recognizes that their business depends on water and therefore a healthy watershed. They are committed to contributing to management of the watershed having recruited a fulltime environment officer that is charged among others

with watershed management. At the time of this survey, the environment officer was compiling a situation analysis report that would enable the company better understand the 'health' of the watershed. Several visits have been made to the site where they plan to tap water for HEP production from. It was observed, and later confirmed by the environment officer during an interview that the river flow has reduced in volume and immediate action towards the management of the watershed is paramount.

The other potential buyers are the downstream oil companies situated on the shores of Lake Albert. A number of oil companies have established their bases on the shores of Lake Albert in Hoima district following the discovery of oil deposits in the Albertine rift part of Uganda. Drilling and processing the oil products is in process. These companies largely depend on Wambabya catchment for the water they use for domestic and oil production work. They have exemplary corporate social responsibility as they have so far up-graded the road network in the larger part of Hoima, put up schools and health centres, among others. They portray a big potential for rewarding the environmental service stewards to protect the water they use and this would therefore add them a credit as far as environmental conservation is concerned.

3.2 Existing land use practices and assess their impact on ecosystem services

3.2.1 Land use practices within the landscapes.

An assessment of existing land use practices was conducted in Wambabya forests system and established those that degrade as well as those that enhance the quality of ecosystem services in the degraded and well managed spots respectively. Targeted interviews were also carried out in these areas and explored the circumstances that lead to both scenarios in the landscape.

3.2.2 Land use practices that enhance quality of ecosystem services + pictures for each.

Some farmers were observed carrying out practices that enhance the quality of ecosystem services but on a very low scale. Such practices include:

Agroforestry

This practice mainly integrates fruit trees especially mangoes, jack fruits within gardens and compounds. Other tree species are also scattered in plantations as seen in Fig. 5.



Fig. 2: Agroforestry species with a banana plantation

Leaving some metres of land from the forest/river,

Though not common with many farmers, this practice was observed among a few rice farmers in Kiyora village. Approximately 15 metres were left between the garden and the forest/river, and this practice left the resources intact and healthy. However, rice growing, together with tobacco in many places within Wambabya forests system have been regarded as major crops degrading the quality of ecosystem services.

3.2.3 Practices that degrade the ecosystem in the Wambabya riverine forests system

Burning of vegetation

This practice has been going on for a long time. It is mainly carried out while opening up virgin areas for cultivation. Being forested in most of the area, people first burn the area to reduce the vegetation cover and cultivate easily. This has left the land bare and vulnerable to erosion, and the soils are poured in the rivers causing siltation

Cultivation up to the river banks

The land owners especially in the riparian areas have the tendency to cultivate up to the river bank, leaving no distance to protect the rivers and streams in there against siltation and contamination from the main

land. In addition, the rate of the water flow has been reduced due to reduction in the catchment area. There is need to implement the existing policies of leaving some metres (5-50m) for the river banks when carrying out cultivation.

Timber Harvesting

Harvesting rates of forests for timber is very high in the Wambabya riverine forest system and the associated impacts on the habitats for biodiversity is also high (Fig. 6). The major question asked by land owners, however, has been;

"how can we benefit from keeping the forest standing; yet, we need income for paying school fees, hospital bills and buying food items for our homes", "will these forests feed our children"?

Many similar questions were being asked by forest owners who envisage their forests as their source of livelihood only through cutting them for timber and agriculture. A PES scheme can instill confidence in the land and forest owners to practice conservation for continuity of forests.



Fig. 3. Evidence of tree logging for timber; timber being carried by children in Bugambe parish.

Over grazing

In the Wambabya forests system, there are cattle keepers with many herds of cattle that have overgrazed the areas. Overgrazing has resulted in soil and water erosion that strip the top soil making it unproductive. The unproductivity of the soils has forced people to cut more virgin forests in search for fertile soils. Also,

the cattle trample on the soils compacting them and making it impermeable to water penetration rendering it unproductive.

Excessive use of inorganic fertilizers and pesticides

Some of the extensively grown commercial crops such as tobacco require use of inorganic fertilizers to realize good yield and be able to break even in the business. Farmers also apply inorganic pesticides to fight against pests that reduce yield. Some studies carried out have revealed that the chemicals are discharging within the rivers and streams which imply that they end up in the lake system affecting the aquatic life as well. Our interaction with farmers, most of whom happen to be forest owners, showed that they are not about to reduce on growing such crops/use less of such inputs unless they are given better alternatives which can earn for them higher incomes. This means that benefits from PES schemes must cover up more than the alternatives foregone (opportunity costs).



Fig.4: Tobacco crop adjacent Wambabya forest

Fig. 4 presents a tobacco garden along Wambabya forest in Kiyora village. For farmers to get such gardens, they must apply fertilizers and pesticides which have adverse effects on the water quality downstream.

Vehicle washing along rivers

This is an activity one will never miss on different spots along roads from Hoima town to Kiziranfumbi, to Bugambe, to Kitoba sub counties. All sorts of vehicles-Buses, tractors, lorries and other types of cars are seen in rivers along the roads for washing (Figure 7). The practice is unhealthy for water users downstream as lots of oils, mud and other impurities are poured into water.



Fig.5. Tractors and motor cycles near a wetland along R. Wambabya

Sand mining

Sand mining is not a very common practice in the wambabya riverine forests system, however, where it is taking place (in the Bujawe CFR), it is very intense and destructive but expanding. This is a commercial activity that is an opportunity cost to keeping the forest standing.

3.2.4 Mapping

For purposes of determining landscape boundaries, GPS coordinates were taken around individual forests which will be used for mapping. In order to benefit from the existing GIS structures at ICRAF as earlier communicated, the coordinates will be sent to ICRAF for generating the site map.

3.5 Review of relevant environmental legislation and institutional arrangements for PES.

A review of policies and the institutional framework is important for this survey to establish whether pro-poor rewards for environmental service schemes are legally and institutionally catered for.

The global environmental legislation debate evolved with the emergence of the environmentalist movement in the 1960s and spread through the decades that followed with growing concerns over the deteriorating ecosystems. The famous 1972 Stockholm Conference on the Human Environment created a United Nations office specifically for the environment (UNEP) was based on this. This was followed by the 1986 Brundtland report which defined sustainability as *meeting the needs of the present generations without compromising the needs of future ones*, and brought a breakthrough in global environmental philosophy. Following were the two main conventions- Convention for Biological Diversity (CBD), and the United Nations Framework Convention on Climate Change (UNFCCC), which provided the platform for global legislations on biodiversity and broadly environmental conservation.

The Government of Uganda (GoU), noticing the problems with the ecosystems in the country, ratified both the CBD and UNFCCC in 1993, thereby joining the rest of the world in providing an international legal framework for biodiversity conservation and climate change adaptation strategies. Having ratified the two conventions, GoU then begun undertaking initiatives to localize these global legislations as they provide an international legal framework for biodiversity and global environmental conservation. Thus, the last decade saw the development of various reforms in environmental legislation and protection in Uganda.

The initial effort towards the reform of environmental legislation in Uganda was the development of the National Environmental Management Policy in 1994; the 1994 Wetlands Policy; an Environmental Statute and the Wildlife Statute in 1995 and the establishment of a National Environmental Management Authority in 1995. All these were later well incorporated in the revised Constitution of the Republic of Uganda (1995), which guarantees the citizens a clean environment and entrusts the ownership, use and management of

Uganda's natural resources-wetlands, forests, land, water and air to its citizens. The constitution places the responsibility for this with the government at both the national and local levels. The Local Government Act (1997) and the Decentralization Act (1993) place the responsibility for the management of natural resources with local authorities. Other policy instruments that later followed on include the 1996 Wildlife Policy; the 2000 Fisheries Policy; the 2000 National Energy Policy; and the 2001 Forestry Policy, among others. These policy instruments are meant to ensure that development activities should maintain or enhance environmental quality and the natural resource base, thereby allowing Ugandans to meet their needs at present and in the future.

National environmental management policies promote the use of economic instruments, public participation and environmental information dissemination and education. The National Environmental Management Policy (1994) is a landmark output of the National Environmental Action plan process and it identifies the aforementioned strains on the environment as well as the impacts of these strains. The policy calls for establishing an institutional and legal framework for protecting the environment; the transformation of current management systems into more sustainable ones; the evolution of a new conservation culture; the updating of laws, and the establishment of a monitoring and evaluation system. The overall goal of the policy is:

"Sustainable social and economic development which maintains or enhances environmental quality and resource productivity on a long-term basis that meets the needs of the present generation without compromising the ability of future generations to meet their needs¹".

It calls for the establishment of the National Environment Management Authority (NEMA) as the principle agency for coordinating, monitoring and supervising all activities in the field of environment. Significantly, the policy also includes a recommendation for land tenure arrangements. The policy aims to promote improved land stewardship by rural and urban land users by better defining and strengthening land and resource tenure rights. This is actually imperative for sound management and specifically for PES schemes.

The 1999 Uganda Wildlife Policy, following the 1995 enactment of the Wildlife Statute shines some light on the various systems of environmental protection that are already in place in Uganda. It should be noted that

¹ National Environment Management Policy, 1994

tourism is the main source of income for the country at large and the regional comparative advantage over Kenya and Tanzania is the large chimpanzee and gorilla population in the country. It is therefore important for Uganda to protect its mammal populations. The policy goal of the wildlife policy is: *"To conserve in perpetuity the rich biological diversity and natural habitats of Uganda in a manner that accommodates the development needs of the nation and the well-being of its people and the global community²".* The importance of protecting biodiversity for the tourism sector is well implied here.

The systems in place to protect Uganda's biodiversity include National Parks, Wildlife Reserves, Sanctuaries, Controlled Hunting Areas, and National Forests. The policy phrases the reasons for management as twofold: for sustainable natural resource extraction and for tourism. The guiding principles for this conservation are: to identify and protect critical habitats and ecosystems; to monitor and protect important wildlife populations; to reintroduce trans-locate wildlife; to manage rare species for their value for tourism; and the need for ex-situ species conservation to assist in-situ conservation measures. It is important to note that the policy also deals with wildlife conservation outside protected areas. The policy therefore is ideal for Wambabya riverine forests system since the forests provide a habitat for threatened-the Chimpanzees, and also a corridor for their movements between Bugoma and Budongo protected areas which accommodates over 25% of the national chimpanzee population. Biodiversity conservation in this case can be effectively and profitably managed by landowners and users under an incentive mechanism.

The 2001 Uganda Forestry Policy has several important implications for the management of forest ecosystems. The main concern that led to its formation was that no adequate policy for the management of forests existed previously, but at the same time the state of the forests was deteriorating rapidly. The policy goal is: *"An integrated forest sector that achieves sustainable increases in the economic, social and environmental benefits from forests and trees by all the people of Uganda, especially the poor and vulnerable³".*

² Uganda Wildlife Policy, 1999

³ Uganda Forestry Policy, 2001

In terms of the three pillars of sustainable development (society, economy, and environment), however, forestry is an important aspect. Moreover, the forestry sector includes many stakeholders, such as the producers, the processors, the general public, NGOs, and the government. In 2001 in Uganda, 24% of all land consisted of forests, where 19% were woodlands and 5% tropical forests, but at the same time all forests are declining. Possible local explanations for this process of global significance are: forest clearance for agriculture and need to clear habitats (forests) that harbour problem animals; over-harvesting of forests; encroachment of government resources; and de-gazetting of reserves for other purposes. The reasons for these malpractices vary from former policy deficiencies, market failures, poor regulation, population growth, and rural poverty.

The 1994 wetlands policy provides a comprehensive legal framework for the management of wetlands. It was developed and adopted by the government as the national policy for the conservation and management of wetland resources. Under the policy, the government has committed itself to promoting the conservation of Uganda's wetlands in order to sustain their ecological and social-economic functions for the present and future well-being of the people.

From the above highlights, it can be observed that the policies provide a comprehensive framework relative to land use/land cover change in Uganda. The policies are all encompassing. The issue of sustainable development is emphasized and this ensures good management and utilization procedures.

Considering the legal and regulatory framework in Uganda, the National Environment Statute, (1995) provides for a comprehensive framework for environment management, and that NEMA issues guidelines and prescribes measures for the management of all forests and wetlands and that all forests and wetlands shall be managed with the principle of sustainable development

The National Forestry and Tree Planting Act, 2003 is a landmark departure from the former which advocated for a 'command and control approach' to the regulation of forests management and exploitation. It provides for the establishment of private forest plantations and declares that all forest produce on such a private plantation forest belongs to the owner of the plantation and that the owner is free to use the forest

produce in any manner he may determine. It provides that any person may enter into a contractual or other agreement with the owner of an interest in a private forest for the right to harvest, purchase, or sale of all or any part of the forest produce in the private forest. This actually recognizes the plight given to the private sector (individuals as well) like to freely own, manage, sell or harvest a forest, though the local government authorities may have to ensure that these are done in a professional and sustainable manner. The opportunity to own and utilize private forests gives individuals the incentives and powers to enjoy all the associated tree commodities. Also, the fact that individuals have rights to exchange through sell or purchase of such forests, it gives such forests to have an economic value like any other commodity, which can appreciate over time, given the growing need for land cover and trees in particular. This is an opportunity for PES since the right of tenure- one of the major conditions for it to effectively operate is legally catered for.

3.6 Institutional arrangement for Wambabya forests system.

An institutional mapping was carried out for the development of PES in Wambabya forests system. Results show that Uganda has well established institutional structures that can promote the development of PES schemes. Besides, there are other various institutions both government and non government currently supporting agricultural and natural resources management activities in the study area, and are potential service providers.

Institution	Functions or activities involved in
The Ministry of Water and Environment	<ul style="list-style-type: none"> • Overall government body directly overseeing the environmental activities in the country. • Its mandate is to promote and ensure the rational sustainable utilization and development of, and the effective management and safeguard of land and water resources and the environment for social and economic welfare and development as well as regional and international peace, including the utilization of weather and climate information for sustainable development.
The Meteorology Department, Ministry of	<ul style="list-style-type: none"> • Government unit overseeing climate issues in the country with a mission to maintain a well weather and climate monitoring system that provides necessary information and advisories in a cost-effective manner in support of government

<p>Water, Lands and Environment</p>	<p>policies for sustainable socio-economic development.</p> <ul style="list-style-type: none"> • Uganda's focal point for the UNFCCC • Plans are under way to transform it into a National Climate Change Secretariat. <p>The key functions of the department include the following:-</p> <ol style="list-style-type: none"> i) Formulate and review of policies and programmes for the implementation of the UNFCCC and the Kyoto Protocol ii) Negotiation of purchase agreements for CDM projects iii) To raise the level of awareness at the national level regarding the UNFCCC and Kyoto Protocol iv) Checking and verifying CDM baseline calculations and developing CDM operational guidelines for the approval of projects v) Co-ordinate the implementation of the UNFCCC and the Kyoto Protocol vi) Maintain a register of CDM projects and keep track of the Certified Emissions Reductions Units (CERs) and, vii) Identify capacity building needs and mobilize resources to address them.
<p>Ministry of Finance, Planning and Economic Development</p>	<ul style="list-style-type: none"> • Manage and control public finances in a prudent and sustainable manner and to oversee the planning of national strategic development initiatives in order to facilitate economic growth, efficiency, stability and the eradication of poverty. Key issues include: • Formulating environmentally sensitive macro-economic policies, Undertake environmental impact assessment of macro-economic policies and make adjustments where necessary, • Prescribe targeted economic instruments for social environmental management, integrate environmental consideration in the development planning process from lower councils to national level • Allocate sufficient financial resources for environmental management. • Has facilitated a number of studies through several projects like The Enabling Uganda project, which covered the Identification of information gaps in the GHG inventory and Vulnerability and Adaptation Studies, preparation of national adaptation plans.

<p>Uganda Investment Authority (UIA)</p>	<ul style="list-style-type: none"> • Responsible for creating favourable conditions for investment in the country. In other words, it is responsible for promoting investments in Uganda. • In its promotional activities, it guards against projects that pollute the environment through carrying out EIA on all new projects. • Has a CDM desk manned by three staff members to co-ordinate all CDM-related activities. • Has organised workshops to sensitise the public sector on CDM implementation, • Has introduced Team Uganda through worked out Client Charters, which guide investors identify possible projects to take on. As a result, many projects have been licensed based on this strategy.
<p>National Forestry Authority (NFA)</p>	<ul style="list-style-type: none"> • Responsible for management of central forest reserves and the provision of technical advice, training and guidance on forestry management to the private forest sector. • Promotes community participation in the management of CFRs, LFRs, private forests and forests found on community land. • Spearheading community involvement in the establishment and management of private forest plantations, <p>Coordinating with other organisations which are directly working with communities- has developed MoUs with most of them</p>
<p>Forest Inspection Division (FID)</p>	<ul style="list-style-type: none"> • Formulate national policies, standards, legislation and plans for management of forests, resource mobilization, inspection, monitoring performance of NFA, monitoring and coordinating activities of local government in forest management and the provision of technical advice. • Currently housing the Sow Log Production Scheme, a European grant to promote tree planting within and outside forest reserves and as Bio carbon fund by the World Bank, targeting about 2000ha for tree planting in Western Uganda.
<p>The role of Civil Society Organizations</p>	<ul style="list-style-type: none"> • Raising awareness in the community and to the private sector on sustainable forest management • Monitor the activities and engage various forest institutions as one of the avenues to ensure compliance and performance of their assigned roles

	<ul style="list-style-type: none"> • Spearhead forest reform initiatives and process.
The Private Sector Foundation Uganda (PSFU)	<ul style="list-style-type: none"> • Developing and carrying out effective policy and advocacy activities on behalf of the private sector. • Has organised several meetings and workshops to sensitise and enable the private sector understand CDM and how it can work to improve business and investment in Uganda for sustainable development
The private sector/individuals	<ul style="list-style-type: none"> • Either owners or engaged in the extraction of forest products. • Have the right to establish, own, harvest, sell or buy any forest commodities in the private forest.

3.6.1 District local governments

The Local Government Statute (1997) decentralizes services and activities, which include the management of district natural resources including forests. Hoima district local government therefore is charged with the responsibility of managing the district's forests, wetlands and water sources on behalf of its people. However, the District Senior Environment Officer decried the rate at which the district's resource base is being degraded. Forests are more affected and this directly impacts on the water quantity and quality since most of them are situated along rivers. She noted that conservation incentives of PES nature are therefore timely to save the district's resources.

3.6.2 Sub County Local governments

Sub counties are lower local government structures that work with the district in the management of the natural resources. It was established that the sub counties of Kiziranfumbi, Bugambe and Kitoba which were involved in this survey integrate environmental management aspects in all sub county development activities because environment is a crosscutting issue. In one of the consultative meetings in Bulimya parish in Kiziranfumbi Sub County, the Sub County chief said;

"we have realized that environmental management is one of the cross cutting issues that require urgent attention, and as such, every project in the sub county has a component of environment to ensure sustainable development".

He noted that business people come from Hoima town and beyond and forcefully cut local people's trees for timber without compensating them. He observed that there is need for organized groups among the community to resist illegal natural resource use like tree logging for timber.

In an interview with the Chief of Katanga parish, Bugambe sub county however, it was established that monitoring the utilization of private forests is relatively hard especially since farmers want to maximize their agricultural production. He further noted that some farmers establish gardens inside the forests to attain maximum yields and these are hard to find out due to poor facilitation and more so, the fact that forests are privately-owned.

3.6.3 The role of other governmental agencies and Non-governmental organizations

There are a number of other governmental agencies and non-governmental organizations that are providing support services in agriculture, social services and natural resource conservation within communities in the landscape (Table 5). These would act as service providers and facilitators to help in valuation of the identified ecosystem services, mobilization of the ecosystem service sellers as well as engaging and negotiation with the buyers and implementation monitoring and verification in the Wambabya riverine forests system.

Table 5: Support Organizations in Wambabya Riverine Forests System

A. Government Agencies		
Agency	Nature	Focus
National Environmental Management Authority (NEMA)	A national agency mandated to co-ordinate, monitor and supervise environmental management in the country	<ul style="list-style-type: none"> Monitoring and regulation of environmental practices and standards Designing PES schemes
National Forestry Authority (NFA)	Management of Central Forest Reserves on behalf of the government	<ul style="list-style-type: none"> Promotes community participation in the management of CFRs, LFRs,

		<p>private forests and forests found on community land.</p> <ul style="list-style-type: none"> • Protecting the central forest reserves against illegal activities • Spearheading community involvement in the establishment and management of private forest plantations
Hoima District Local Government	Forests conservation, National Agricultural Advisory Services (NAADS), Area-Based Agricultural Modernisation Programme (AAMP)	<ul style="list-style-type: none"> • Agricultural advisory services, livelihood improvement, Bee keeping, piggery, fruit farming
National Agricultural Advisory Services (NAADS)	A national agricultural advisory services provider.	<ul style="list-style-type: none"> • Providing improved breeds of goats
B. Non-Governmental organizations		
Organization	Nature of Organisation	Activities
WWF (Lake Albert East Catchment Project)	An international conservation organization	<ul style="list-style-type: none"> • Management of Wambabya river catchment area • Water quality and quantity management
Nature Harness Initiatives (NAHI)	Ugandan-based organization	<ul style="list-style-type: none"> • Facilitating the private sector to better manage their environmental footprint • Providing technical support including identifying sellers and valuing ecosystem services to NEMA, to design market-based mechanisms including PES schemes
Chimpanzee Sanctuary and Wildlife Conservation Trust (CSWCT)	A conservation organization	<ul style="list-style-type: none"> • Biodiversity conservation
World Vision	International development organization	<ul style="list-style-type: none"> • Building schools and health centres, agricultural services

Overall, Uganda has a well-structured legal and institutional framework for environmental management which provide a platform for the design and management of PES schemes. The institutions range from those that do implementation to coordination and monitoring/inspection of all environmental activities in the

country. It is worth noting that of recent, the government has realized that working with the civil society and the private sector can provide a lasting positive impact on her natural resources management and are therefore involved in such rather new conservation initiatives like PES to improve the livelihoods of the rural poor.

3.7 Potential Intermediaries/Facilitators

The survey identified several governmental agencies and non-governmental organizations in the Wambabya forests landscape providing support in agriculture, social services, research and general environmental conservation (*Table 5*). A close look at their activities shows that NAHI, in addition to other conservation activities, has been carrying out facilitator roles, mainly facilitating the private sector to better manage their environmental footprint and also providing technical support to NEMA, to design PES schemes. NAHI would therefore potentially facilitate the design and implementation of environmental reward scheme in this landscape. Other organizations promoting conservation activities in the area could play some roles in the process of designing and implementing the rewards schemes like training ecosystem service sellers in practices that enhance the quality of ecosystem services and specialized training in forest-based income generating enterprises in which local communities/potential ecosystem service sellers showed interest.

3.8 The proposed structure of a PES scheme in Wambabya riverine forests system

A synthesis of the survey results suggests the structure around which a PES scheme for Wambabya riverine forests would be designed. The proposed structure is presented in Table 6 below.

Table 6: Proposed structure of a PES scheme for Wambabya forests riverine system.

Ecosystem services	Watershed services	
	Carbon sequestration	
	Biodiversity conservation	
Ecosystem service sellers	Forest owners (Carbon sequestration, watershed and Biodiversity services)	
	Land owners (Carbon sequestration and watershed services)	
Service providers/ Facilitators	Nature Harness Initiatives (NAHI), Local support organizations like NAADS, CBOs and NGOs with specialized skills.	
Intermediaries	ECOTRUST, Chimpanzee Sanctuary and Wildlife Conservation Trust (CSWCT)	
Buyers	Watershed services	<ul style="list-style-type: none"> • Hydromax Power Company • Oil companies-Tullow Oil, Dominion • James Finlays Bugambe Tea estates
	Carbon sequestration	Voluntary carbon buyers
	Biodiversity conservation	Tourists

3.9. Threats, risks and opportunities for the rural poor to engage in PES activities.

3.9.1 Limiting factors to implementation of rewards for ecosystem services in Wambabya.

In Wambabya riverine forests system, farmers have a tendency that better yields can be attained only when they open up new areas for cultivation (mainly for rice and tobacco) and this is done mainly in forested areas. This may therefore pose some rigidity on the side of the sellers to shift from this practice in favour of conservation.

Some farmers expressed fears and concerns that the incentives may not cover up the benefits they currently get from the forests. One forest owner in Kaigo village, Munteme parish, Ms Mary Nyakahara, noted that the opportunity cost of preserving the forests for conservation purposes may not be worthwhile, considering her current earnings from crops cultivated in newly opened up fields.

Box 2. A forest owner's worries over preserving her forest for conservation

Despite her need for environmental conservation, Ms Mary Nyakahara, a forest owner in Kaigo village, Munteme parish, is torn between two scenarios-cutting her forest for agriculture and preserving it for conservation purposes and earn carbon credits. She noted that the minimum yield of rice from a newly opened up 1ha of grassland is 35 bags @ 100 kgs. With each kg currently costing 2500 ug.shs in the local market, Mary gets 8,750,000=ug.shs (approx. US\$4375) a season. Mary further added that yields per ha from a cleared forest have relatively much higher. She wondered whether a PES scheme would potentially attract her into conservation other than maximizing her earnings from agriculture.

3.9.2 Ideal conditions for pro-poor rewards for ecosystem services.

Assessments so far show that there are some ideal conditions that can help pro-poor rewards for ecosystem services in the Wambabya riverine forests system to take off. The first opportunity is that communities are enlightened on the need for conservation and the associated benefits, for instance, the need for clean water.

Secondly, potential buyers mainly Hydromax hydro power company is willing to support conservation activities. This is an opportunity to engage with them and also to act as a basis to attract other potential buyers to the scheme.

3.9.3. Assessment of existing reward mechanisms

An assessment of existing reward mechanisms that could provide a launch pad for pro-poor rewards for environmental services was undertaken in the Wambabya forests system. The assessment established that The Environmental Conservation Trust of Uganda (ECOTRUST) has scaled out her Trees for Global Benefits (Carbon) project that was originally piloted in Bushenyi district to Kidoma parish, one of the parishes in Wambabya riverine forests system and engages farmers in fruit trees growing.

4.0 Conclusions

Wambabya riverine forests system provides clear saleable environmental services and therefore, a potential for developing environmental rewards schemes. There are clear and marketable environmental services-carbon sequestration, watershed and biodiversity services but are under threat of degradation, with the major drivers being agriculture and tree cutting for timber. The services can be quantified and a value attached to them.

Forest and land owners were identified as potential sellers. Potential service providers/intermediaries and buyers were identified as well, basing on the current practices and activities involved in relative to the designing of PES schemes.

The environmental services in Wambabya riverine forests system are faced with challenges of land use practices which have greatly contributed to their degradation. This is due to expanding population pressure which calls for more agricultural production, and also the need for money through cutting of trees for timber.

Uganda has in place relevant policy and environmental legislations as well as a well-structured institutional framework that can potentially facilitate the development and design of a PES scheme for Wambabya riverine forests system. Though not specifically designed for PES schemes, the policy and institutions in place provide a favorable ground for their operation.

5.0 Recommendations

There is need for strong awareness creation among the farmers to realize that they can benefit from forests other than cutting them for timber and agricultural purposes. This is because, farmers have a tendency that opening up of new fields-mainly in the remaining forests is only way to increase yields and that incomes can mainly be got from selling timber by cutting their private forests.

Farmers' land use practices need to be improved in order to maintain healthy environmental services. Practices like agroforestry and leaving appropriate distance from the rivers and streams should be promoted on a large scale in order to enhance the quality of environmental services.

For a PES scheme to be successfully implemented in Wambabya forests system, the incentives should be over and above the alternative income sources that farmers will forego. Although some farmers recognized the value of healthy ecosystems, many still hold the opinion of cutting the forests for agriculture and timber as a better way of utilizing them.

6.0 Next steps

- Valuation of the indentified ecosystem services in Wambabya riverine forests system
- Mobilising the ecosystem service sellers and service providers
- Awareness creation among the ecosystem service sellers, service providers and buyers
- More engagements and negotiations with the identified buyers