

# Payments for Ecosystem Services – A Feasible Mechanism for Natural Resource Management in East Africa?

## Taking Stock and Preparing to Advance



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**“The outcome of any serious research can only be to make two questions grow where only one grew before.”** (T. Veblen)



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## Summary

International and national actors increasingly resort to market-based mechanisms for natural resource management (NRM). One increasingly popular mechanism are Payments for Ecosystem Services (PES). PES create a market attaching an economic value to ES in order to achieve more considered consumption of services and resources. Payments are envisioned to serve as incentives for the adaptation of alternative land-use technologies that are environmentally beneficial while taking livelihoods and development of rural people into account. In East Africa interest and in situ pilot projects are increasing. The feasibility and necessary developments for effective application of PES are yet little explored. The objective of this research therefore is to study the feasibility of PES schemes as effective NRM mechanism in East Africa. The central research question therefore is: *To what extent are PES feasible mechanisms for natural resource management in the East African context?* Answering the research question is approached on three levels: the level of the East African regional, the national and project level.

The research shows that a strong point of the mechanism in the region lies in enhancing sustainable land-use technologies, add new sources of funding for NRM, strengthen local institutions and diversifying livelihoods. A number of NRM initiatives are in place in the countries with features of PES which are currently not considered under the term and which potentially can be supplemented by PES. Within the East African region there is on the one hand high interest in PES, yet on the other hand little coordinated development on the governmental level and between on-going efforts and pilot initiatives. Currently existing PES are often coupled with non-environmental goals as development objectives (e.g. poverty reduction, livelihood diversification). Efforts on the national level to mainstream and embed PES in the national legislation are emerging. Drafts for a regulatory and operationalising framework are under development in Uganda and Tanzania and in an earlier stage in Rwanda. National legislation in the area of NRM in the region have proven to be in line or even supportive to PES. NGOs and external actors are currently playing a central role in placing PES on the political agenda. Still, many actors have little knowledge of PES and the potential of the mechanism. Carbon projects seem most widely known as it at this moment seems easiest to find potential buyers for the multidimensional ES carbon as it is targeting primarily potential global buyers in developed countries. Despite complex land tenure structures, no explicit PES legislation and limited active governmental involvement in PES projects, several schemes have been and are being developed in the region. Yet most projects face considerable constraints concerning their financial sustainability due to a lack of potential and committed buyers. Capacity constraints prevail on the national governmental level as well as on the local and individual ES steward level. Long-term financial sourcing and supportive legislation to decrease uncertainty on the side of ES providers and consumers are significant constraining factors in the region.

The feasibility of PES as mechanism for natural resource management will depend on carefully designed PES and overcoming the challenges identified in this research. A favourable institutional environment is certainly a key condition to enable a sound integration in national sustainable land management (SLM) and NRM initiatives. Developing a common definition of PES in the region seems particularly important in this early phase of PES development. It is likely to abridge operationalisation and capacity building. With poverty alleviation being central to most current PES activities this may also imply to consider hybrid forms of PES. National efforts to mainstream PES into policies and to develop regulatory frameworks have to be accelerated. NGOs and other non-governmental actors will play an essential role here. Furthermore, regional networks for PES knowledge and expertise have to be strengthened and mandates of national authorities created to clarify responsibilities for PES. As PES touch on other non-environmental policy areas as health, poverty reduction, market development and climate change adaptation and mitigation, mainstreaming the mechanism into these areas is indispensable.

**Keywords:** Payments for Ecosystem Services, East Africa, Natural Resource Management, Key factors for effective PES

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In order to undertake a research project it takes more still than access to information and a good research framework. It takes friends around that motivate you, ask you questions and show you some issues you did not see before, and make you laugh in countless coffee and lunch breaks enabling you to keep up the spirit in the process of writing the thesis. And most of all, it takes a family that supports your decisions, bears with you through ups and downs and is there in times of disorientation - and did so all along to make it even possible to reach the final phase of studying. I was lucky to have all of these ingredients!

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## Abbreviations

ASARECA	Association for Strengthening Agricultural Research in Eastern and Central Africa
CAAC	Clean Air Action Corporation
CARE	Cooperative for Assistance and Relief Everywhere, Inc.
CCB	Community and Biodiversity Project Design Standard
CCBA	Climate, Community and Biodiversity Alliance
CCF	Community Carbon Fund
CDKN	Climate and Development Knowledge Network
CDM	Clean Development Mechanism
CSR	Corporate Social Responsibility
DNA	Designated National Authority
EAC	East African Community
ECCM	Edinburgh Centre for Carbon Management
EDPRS	Economic Development and Poverty Reduction Strategy
EFR	Environmental Fiscal Reform
EPWS	Equitable Payments for Watershed Services
ERA	Ecosystem Restoration Associates
ERPA	Emissions Reduction Purchase Agreement
ES	Ecosystem Services
E & SA KG	East and Southern Africa Katoomba Group
FAO	Food and Agriculture Organization of the United Nations
FONERWA	National Environmental Fund, Rwanda
GoR	Government of Rwanda
ICRAF	World Agroforestry Centre
IFAD	International Fund for Agricultural Development
IMCE	Integrated Management of Critical Ecosystems
Kagera TAMP	Kagera Transboundary Agro-Ecosystem Management Project
MBI	Marked-Based Incentive
MEA	Millennium Ecosystem Assessment
MINAGRI	Ministry of Agriculture and Animal Resources
MINELA	Ministry of Environment and Lands
MINIFOR	Ministry of Mining and Forestry
MININFRA	Ministry of Infrastructures
NAFA	National Forestry Authority Rwanda
NAPA	National Adaptations Programmes of Action on Climate Change
NEMA	National Environmental Management Authority, Uganda
NESA	Network for Environmental Services in Africa
NFA	National Forest Authority Uganda
NGO	Non-governmental Organization
NRM	Natural Resource Management
OLL	Organic Land Law, Rwanda
PAB	Protected Area Biodiversity Conservation Project, Rwanda
PEI	Poverty Environment Initiative, Rwanda
PES	Payments for Ecosystem Services
PRESA	Pro-Poor Rewards for Environmental Services in Africa
RDB	Rwanda Development Board
REDD	Reducing Emissions from Deforestation and Degradation
REMA	Rwanda Environmental Management Authority
SafMA	Southern African Millennium Ecosystem Assessment
SLM	Sustainable Land Management
TIST	Small Group and Tree Planting Project
TGB	Trees for Global Benefit
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
VCS	Voluntary Carbon Standard
VERs	Verified Emission Credits
WCS	Wildlife Conservation Society
WRUA	Water Resource User Associations, Kenya
WWF	World Wildlife Fund



## 1. Introduction

East Africa is a region marked by rich biodiversity and natural resources (NR), yet it also faces growing environmental issues and increasing pressure on NRs and ecosystems (UNEP, 2008). Ecosystems produce services that are differentiated into regulating, provisioning, cultural and supporting services (Pagiolo, 2005; Wunder et al., 2008; MEA, 2005). Ecosystems and ES play a significant role on multiple levels: on the local, national, regional (e.g. water management, and biodiversity conservation) and global level (e.g. carbon sequestration and biodiversity protection). ES are directly connected and supportive to the human well-being (Duraiappah, 2002). Yet in many developing countries economic, institutional and policy failures prevail increasing the pressure on ecosystem service (ES) and result in imperfect service delivery (Ferraro, 2009). The region features several transboundary ecosystems as e.g. the East Arc Mountain Range, the Mt. Elgon and Albertine Rift, Mgahinga Volcanic Mountains, Sango Bay, the Nile Basin and the Kagera watershed. Through the development and fortification of the East African Community (EAC) transboundary cooperation between the member states on NRM and ecosystem conservation is promoted. Also on the national level the value and importance of ES is considered more often.

Counties in the region, have similar socio-economic conditions (Baijukya, 2008; Buerli, 2006). The livelihoods of the large share of the population are based on the agricultural sector and are thus directly depending on ES. The declining level of ES therefore has severe impacts on different levels and scales. Poverty rates especially in rural areas are high and overstocking, overgrazing and encroaching subsistence farming into sensitive areas have led to a number of land-use problems and resulting land degradation in the area (Baijukya, 2008). In the future these pressures are likely to increase combined with an increasing population density. The barriers and increasing land-pressure faced in the region at the current moment are similar to issues that will be or are already faced in other regions with comparable circumstances<sup>1</sup>. In the past primarily regulatory land and resource management schemes have yet not yielded significant improvement of the environmental pressures and issues of the region (ibid.). The environment and natural resource management (NRM) remains little integrated into other policy areas and re-investment into the environment is limited (Ferraro, 2009). Recently however, efforts to mainstream the environment and NRM into the policy frameworks are spreading (UNEP, 2008). Awareness and interest in the possibility of integrating market-based mechanisms as additional sources for funding and incentives for NRM through e.g. the inclusion of the private sector are growing (Wunder et al. 2008). Incentive-based approaches can support an integrated ecosystem approach to achieve improved natural resource management in the region (Baijukya, 2008; Buerli, 2006). Yet, market-based mechanisms are still slow in gaining ground in the region (E & SA KG, 2008). One such concept, payments for ecosystem services (PES), represents an increasingly disseminating mechanism. Their potential and effects are yet little explored.

### 1.1. Payments for Ecosystem Services

The context of NRM is very dynamic with attention arising for alternatives to pure regulative approach. Market-based mechanisms have been applied growingly in the last decades for environmental and natural resource management. Emerging in the context of developed



Figure 1: Map of the East African Community

Source: Nystrom, H. J., 2010

<sup>1</sup> The term East Africa is confined here to the East African Community (EAC) and the five member states Uganda, Tanzania, Kenya, Rwanda and Burundi whereby the focus is on the first four countries (see for more details below).

countries the underlying notion is based on attaching a physical value to natural resources to encounter negative externalities, unsustainable resource consumption and environmental issues. In more recent time these mechanisms are also receiving increasing attention in the context of developing countries. Payments for ecosystem services represent a very prominent mechanism in this context. Through PES an economic value of ecosystem services is created. At the current state externalities of ES consumption are very often not taken into consideration when individual actors make their consumption decision. This can also have negative consequences for other ES users depending on their delivery. Furthermore, ES providers and consumers can be geographically separated so that neither a link, awareness on the causal relationships and consequences of ES consumption nor institutional structures and markets exist (Pagiola, 2005). PES aim to create a space (market) for ES consumer and stewards to meet and to establish a rewarding system for ES provision based on the willingness to pay for received ES by consumers. By creating a market for ES, their provision, consumption and conservation is included into individual NRM decisions (Swallow et al., 2008). Creating a link between ES producers and consumers is also crucial to enable sustainable decision making on resource use. The most widely applied definition of PES is:

“(i) A **voluntary** transaction where (ii) a **well-defined environmental service** (ES) or a land-use likely to secure that service (iii) is being ‘bought’ by a (minimum one) service buyer (iv) from a (minimum one) service provider (v) if and only if the service provider secures service provision (**conditionality**)” (Wunder et al., 2008: 835).

The underlying positive incentives made to ES providers, e.g. land-users within an ecosystem, can contribute to bringing about changes in the management of natural resources i.e. support the adaptation of alternative and more sustainable land-use technologies. Incentives are aligned with land-use activities and technologies sustaining ES. Focusing on improved ES provision is ultimately expected to generate a variety of local, national and global benefits. Examples include restoration of degraded lands; improved agricultural productivity; climate change adaptation/mitigation; carbon sequestration; and agro-biodiversity conservation (FAO, 2010a; for more details on ES see box 1 below).

Originating from the forest conservation area PES have found their way into a growing field of application for NRM. High interest of international donors, organizations and NGOs to promote PES capacity building and pilot projects prevails (Wunder, 2010). Most PES schemes in developing countries can be found in South America and Asia, yet also in Africa PES are increasing. In the East African region the mechanism and its potential is only slowly gaining ground in the awareness of regional and national actors. Yet more recently, especially due to a very active role of international networks and organisations, a growing number of PES pilot projects, networks and cooperation are being formed in the region. A number of *ad hoc* pilot schemes have been developed, yet the large share of PES projects developed in the region does not succeed in proceeding beyond the conceptual phase (Masiga, 2010). This also has a negative impact on the potential up-scaling of existing projects (E& SA KG, 2008). The created experiences, knowledge, capacities and lessons learned are often not shared with other stakeholders. Existing studies on the feasibility are mostly very context dependent and case specific. The institutional environment and the feasibility of PES as effective NRM remains little explored. It is therefore important to gain a better insight into and understanding of the status quo and the environment that PES are embedded in within the region.

## 1.2. The Objective of the Research

The point of departure here is that PES can be beneficial tools for providing incentives for sustainable resource management when the contextual conditions are supportive and appropriate. Based on past experiences with NRM and the environmental and social threats faced in the East African region, PES seem to be a viable mechanism to achieve sustainable or improved natural resource management (FAO, 2010a; Baijukya, 2008; Buerli, 2006). The feasibility of PES is connected to a framework of key factors with the institutional and policy environment as key elements (Corbera et al., 2009; Pagiolo, 2005; Wunder et al., 2008). PES

represent a feasible and effective mechanism when the institutional environment is supportive or at the minimum coherent with the characteristics of PES and key factors for effective PES designs are met. The key factors for a feasible application of PES are also elaborated on in Chapter 2. In this research PES are considered effective when they are able to ensure the declared objectives consisting of defined ecosystem services as well as the co-effect of supporting livelihoods (see also Gross-Camp et al., 2010). Institutions are defined here as:

“Humanly devised constraints that structure human interaction. They are made up of formal constraints (e.g. rules, laws, regulations), informal constraints (e.g., norms of behaviour, conventions, self-imposed codes of conduct), and their enforcement characteristics” (North, 1994: 360).

They are “prescriptions that humans use to organize all forms of repetitive and structured interactions” (Ostrom, 2005:3).

Considering the information above, the objective of this research is to study the status quo and feasibility of PES schemes as effective mechanism for natural resource management in Eastern Africa. This research wants to contribute to filling existing knowledge gaps by exploring the readiness of the regional environment to support effective PES as well as central issues connected to mechanism in the special context of Eastern Africa. By providing insights to policy makers and practitioners it aims to support the potential for dissemination of PES in the region. The analysis includes (i) regional developments, policies and structures concerning PES; (ii) in-depth study of the governmental structures, institutions and policies in the national context based on the case of Rwanda; and (iii) case studies of seven on-going PES schemes, their key design principles, important institutions and challenges. Thereby the research proceeds from the ideal environment for ES in literature, to the status quo in the region to identifying key challenges and gaps.

The research does not cover a full-fledged inventory of all PES-like schemes in the region nor does it focus on one single local context. This would go beyond the feasible frame of the project and it is not expected to contribute greatly to the research objective. It is also not feasible in the given context to elaborate on the debates surrounding PES, ranging from the complexity of the valuation of nature, commodification of ES and possible negative leakage effects. Yet some of these factors are briefly touched on in the research.

### 1.3. Research Issue

In order to approach the objective of the research the following structure depicted in Figure 2 below is drafted.

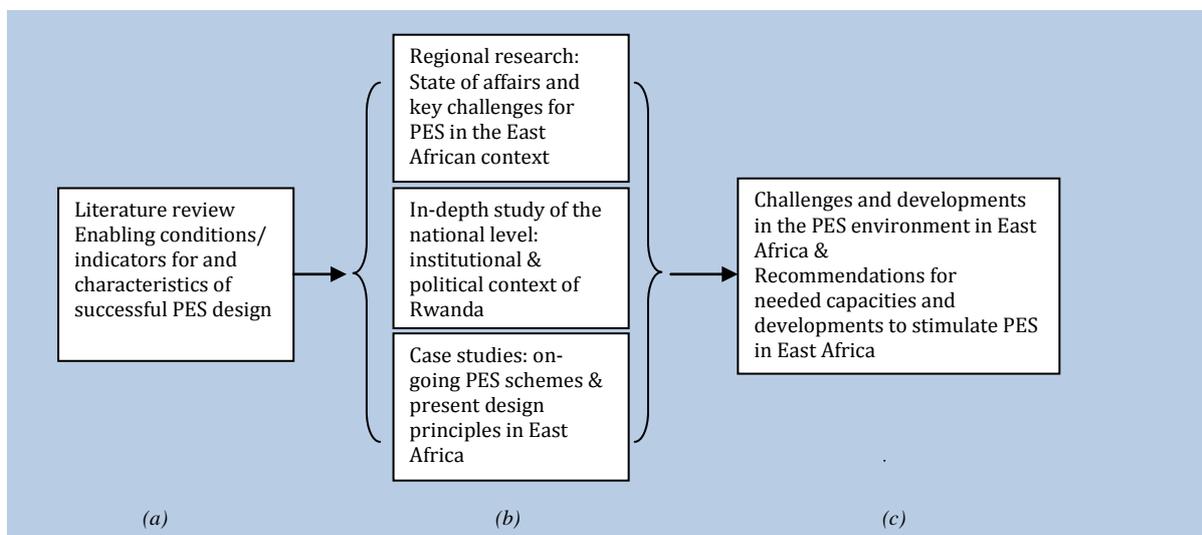


Figure 2: Research Framework

The central research question therefore is:

**RQ:** *To what extent are PES feasible mechanisms for natural resource management in the East African context?*

In order to answer the central research question a number of sub-questions are formulated that accumulate insights into the status quo and feasibility of PES in Eastern Africa.

(a) With the aim of assessing the feasibility of PES in East Africa, the first section (Chapter 2) provides a review of existing literature on payments for ecosystem services to identify key factors for enabling effective PES. These factors are synthesised into an analytical framework applied throughout the research. Thereby, the focus is on case studies in developing countries and the key factors to assess PES cases taken up by the authors. This answers the sub-question:

**RQ 1:** *What are key factors forming the basis for an effective application of PES mechanisms in relevant literature?*

(b) In the third chapter information on PES developments, the policy and institutional environment, major challenges and structural dynamics in East Africa are analysed. This enables to gain insight in the presence of the identified key factors on the regional level. Thereby the focus is on existing policies, institutions, institutional interaction, organizations and NRM programmes. In order to assess effective PES projects and initiatives in Eastern Africa, an inventory is conducted containing insights into applied design principles and key factors, important institutions and developments on the ground. This addressed the sub-question:

**RQ 2:** *What supportive policies and structures exist in East Africa with reference to PES?*

In order to further analyse the institutional and political dynamics as well as the presence of key factors on the national level, thereafter in Chapter 4, the case of Rwanda is explored in-depth. Thereby the institutional feasibility, structural dynamics and legal context as well as the current policies, and key stakeholders are considered. This contributes to the answer of the following sub-question:

**RQ 3:** *To what degree is the institutional and policy environment in Rwanda supportive to PES?*

In the final step the information on PES in the region is supplemented by the project level through seven in-depth case studies (Chapter 5). An analysis of the institutional structures on the project level enables to assess whether the rules applied are supportive to effective PES (Colbera et al., 2009). The cases are analysed on the presence of the identified key factors and design principles. This provides insights on which pre-conditions and structures seem most important in the regional context and which central challenges have to be approached. The pertinent sub-question is:

**RQ 4:** *What are the characteristics and applied design principles of existing PES schemes in the region and to what extent are key factors identified in literature present in these schemes?*

(c) The sub-questions result in knowledge on the feasibility of PES in the regional context and enable to make recommendations regarding required developments and capacities. Analysing these aspects provides insights on (i) the coherence of PES with the national regulatory and policy frameworks; (ii) the nature of property or user rights; (iii) key actors and institutions; (iv) institutional interaction; (v) applied key factors for PES in existing scheme; (vi) potential SLM programmes in which PES can be embedded; as well as (vii) required capacities that need to be fostered.

#### 1.4. Sources and Data Collection

Connected to the steps (a), (b) and (c) in the research framework the sources contribute to answer the central research question according to the following logic: For step (a) addressing the first sub-question a literature review is conducted. Therein literature is selected based on the citation index and snowball sampling of case studies in developing countries' context as well as key documents of organizations centrally involved in developing the mechanism. This is

supplemented by key authors mentioned by practitioners and experts interviewed in the research. Their input was also taken into account in developing the framework of key factors.

To approach step (b), sub-question 2 on supportive policies and structures in East Africa, participatory observations in a PES workshop in Rome, Italy, and in a regional PES workshop in Jinja, Uganda serve as source (see table 1 below). Additional sources are interviews and e-mail communications with key actors, consultation of policy documents and internet research. The inventory is based on the participation in the conferences, internet research, interviews and e-mail communication with project managers. Furthermore, existing national inventories from e.g. the Katoomba Group are consulted.

For sub-question 3 analysing the national context of Rwanda, interviews with government officials as well as other NRM stakeholders are feeding into the research. Furthermore, analysis of policy documents, participatory observations at the national agro-forestry and carbon sequestration workshop, and field visits are serving as sources. Finally for the sub-question 4 covering PES case studies official project reports and baseline studies are analysed. This is supplemented by semi-structured interviews with project managers (PM) guided by a questionnaire (see Appendix III). The questionnaire is derived from the identified key factors for PES in literature and through expert consultation. The design allows collecting primarily qualitative data on PES projects. Furthermore, site visits of two PES projects in Uganda and one SLM project in Rwanda were conducted (see activity list).

The objective of the research implies that it is primarily deductive, building a conceptual framework for successful PES design and making an analysis based on the framework. As the conceptual framework deducted from a literature study is considered as containing the explanatory variables for successful PES this is a positivist approach. In reality however, no research can be entirely deductive and consequently the research also adds empirical insights and observations that can expand the framework. The objective further calls for contemplative and exploratory approach and thus it is of qualitative nature. Qualitative research implies a triangulation of different strategies and methods for data collection. Therefore as mentioned above a number of empirical as well as theory-based sources have been consulted for this research (see table 1 for details). The research is based on data collected in association with an internship with the Kagera Transboundary Agro-Ecosystem Project (TAMP) executed by the Land and Water Division (NRL) of the Food and Agriculture Organization of the United Nations (FAO). The Kagera TAMP is focusing on the Kagera watershed situated in four East African countries: Rwanda, Uganda, Tanzania and Burundi. The project is part of the GEF umbrella programme "Strategic investment programme for sustainable land management in Sub-Saharan Africa" (TerrAfrica/SIP). Working within Kagera TAMP enabled research in the region between 15 October - 17 December 2010, as well as preparatory research based in the FAO headquarter in Rome, Italy in September, 2010 (see Appendix I for an overview of field activities). Interviews and field visits supported the presented research.

The research focuses on the five member states of the East African Community (EAC), Kenya, Uganda, Tanzania, Rwanda and Burundi. Due to its history of conflict and shaky development Burundi is still in a very early stage of NRM and not at all involved in any PES development. Therefore, this national context is not considered here. Rwanda has been selected as in-depth case study of the national context. Similar to other countries in East Africa the national context of Rwanda sees an increasing interest and awareness for PES on the governmental as well as NGO side. With important impulses from an NGO developing a regulatory policy framework and mainstream PES into national policy sectors is a topic on the current political agenda. On the other hand however, the national context is lacking supportive laws and regulations or an assigned national PES authority for capacity building. The country is in the initial phase of setting the stage for PES. The approach of first focusing on a regulatory framework is quite unique and makes it an interesting case study. In most other countries first some PES pilot projects have been developed that then attempted to raise awareness on the concept and mainstream it into the national policy context.

**Table 1:** Overview of Central Sources for the Research Project

Source	Description
<b>Literature Study &amp; Primary Texts</b>	For outlining a framework on key factors that is generally applicable to PES schemes key literature has been studied. Initially the citation index has been used to identify key authors followed by the snow-ball identification of further important publications. Furthermore, policy documents and project reports have been studied.
<b>Participatory Observations</b>	Three workshops were attended. Participating in these events enabled to receive key challenges and developments of the PES concept; map key actors active on PES in the region, as well as regional challenges and to receive an introduction to effective case studies in the region. <b>(i)</b> A Stakeholders Consultation Food Security through Additional Income Generation “ <b>From Payment of Environmental Services to Remuneration of Positive Externalities in the Agriculture and Food Sector</b> ”, 27-28 September 2010, Rome, Italy. This consultation aimed to extract major gaps and challenges in PES research and the development off the mechanism. <b>(ii)</b> The <b>International Conference for Ecosystem Services in Eastern and Central Africa</b> , 20-22 October 2010, Jinja, Uganda <sup>2</sup> . This regional workshop was attended by participants from national authorities from Uganda, Kenya and Rwanda as e.g. the National Environmental Management Authority, Uganda (NEMA); the Rwanda Development Board (RDB) and the National Forestry Authority, Rwanda (NAFA); the Kenya Forest Service (KFS); national and international NGOs as the World Wildlife Fund (WWF), Cooperative for Assistance and Relief Everywhere, Inc. (CARE), the Wildlife Conservation Society (WCS), the World Agroforestry Centre (ICRAF), Pro-Poor Rewards for Environmental Services in Africa (PRESA); international organizations as UNDP, UNEP and FAO; consultant and certification organisations as e.g. Plan Vivo; research institutions and universities as Kenya Agricultural Research Institute (KARI), Victoria Institute for Research on Environment and Development International (VIRED), the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), the Nature Harness Initiative (NAHI), ECOTRUST, Uganda. <b>(iii)</b> Additionally a national workshop on the <b>potential of agroforestry and carbon sequestration in Rwanda</b> organized by ICRAF and WCS has been attended in Kigali, Rwanda (19 November 2010).
<b>Semi-structured &amp; Unstructured Interviews</b>	22 interviews have been conducted that followed suggested themes and key issues. Most of which were semi-structured. Semi-structured talks allowed adding new aspects that interviewed actors found important. They were sources of information on national policies and regulations, awareness on PES, existing sustainable land management (SLM) programmes and planned initiatives connected to PES. Interviewed actors include governmental officials from the Rwanda Environment Management Authority (REMA), the Ministry of Agriculture, Rwanda (MINAGRI), the NAFA, RDB; key NGOs and organizations active in the region on SLM or PES including, CARE, WWF, ICRAF, Vi Agroforestry, ASARECA, Plan Vivo (for an overview of interviewed actors see Appendix II; this list also includes E-mail communications following similar topics as the direct interviews).

<sup>2</sup> The programme of the Jinja conference can be found under Appendix IV.

### 1.5. Structure of the Research

In this research first a comprehensive framework of feasibility criteria for PES is drawn through reviewing key literature on PES focusing on the developing country context. This provides the theoretical framework for assessing the status quo and feasibility of PES in East Africa throughout the remaining chapters. Following this an analysis of the regional level in East Africa is included to gain insight into the current situation and developments concerning PES. The chapter elaborates upon information on structures, key actors, central ES as well as policies and land tenure. Furthermore, a synopsis inventory is made that provides insights into on-going PES projects as well as key actors and forms of existing schemes. Subsequently, the presence of a favourable institutional and policy environment on the national level is assessed based on an in-depth case study of Rwanda. Following this, the research moves to the project level by conducting seven in-depth case studies of current PES schemes. The selected cases are retrieved from the inventory of Chapter 3. The case studies are selected as to include all key ecosystem services central in the region, identified key actors and the four countries subject to this research. Studying these schemes enables to assess the applied design principles, presence of key factors and encountered challenges on the project level. In the discussion shortcomings and experienced difficulties of the research are shared and some suggestions made on prospective research. Synthesising the obtained insights on PES in East Africa in the conclusion the status quo and key challenges are outlined and summarized in a Strength, Weakness, Opportunities and Threats (SWOT) analysis. Thereafter, recommendations are made, how to stimulate the dissemination of PES in the region through addressing identified gaps and challenges on the national, institutional and project level.



## 2. Natural Resource Management and Payments for Ecosystem Services

This chapter approaches the first sub-question on key factors for effective PES found in existing literature. First existing mechanisms of natural resource management and market-based mechanisms to environmental issues are explored. This helps to understand the underlying logic of PES as well as the origin of key factors determining their feasibility. In the second section key pre-requisites, supportive settings and design principles (=key factors) for a feasible application of PES found in the literature are synthesised into two frameworks (figure 6 and 7). The consulted literature is focusing on developing country contexts. The frameworks have further been supplemented with insights gained from the attendance the two PES workshops listed in the section 1.4. above. The two frameworks are the backbone to analysing the status quo and feasibility of PES in East Africa and are applied in all subsequent chapters.

### 2.1. Natural Resource Management and the Ecosystem Approach

One approach to combat resource degradation and environmental issues is natural resource management, a combination of policy, economics, and science to study, manage and restore ecosystems and natural resources (Allison & Hobbs, 2010). It is primarily practiced through interconnected institutional levels and scales (e.g. local, regional, national or international). Sustainable natural resource management is consequentially connected the prevailing social organization and social processes and interaction (Allison & Hobbs, 2010). Participation of all involved stakeholders and especially of regional land owners as well as other natural resource management groups and social capacity building are crucial for sustainable NRM (Ostrom, 1990; Allison & Hobbs, 2010). External actors can play an important role in NRM in situations characterized by lack of trust and limited institutional structures in place (Jewitt, 1995). An improved approach to NRM has to ensure:

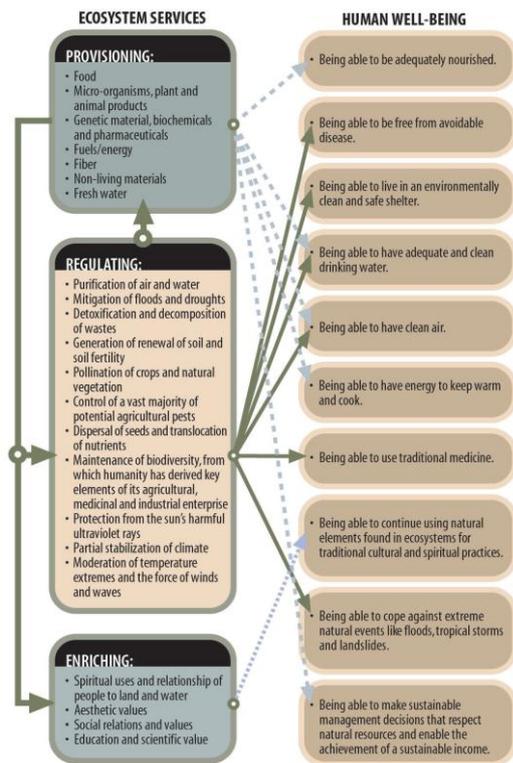
- Development of policies resulting in the best use / sustainable land management
- Strengthening of institutions
- Improved and strengthened systems for planning and management as well as monitoring and evaluation
- Mechanisms facilitating a participatory community based approach (FAO, 2010d).

Taking an integrated ecosystems approach is one mechanism of NRM. The Convention for Biological Diversity (CBD) defines an ecosystem approach as:

“a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way” enabling “conservation; sustainable use; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources” (CBD, 2010).

An ecosystems approach to NRM enables to analyse the link and interaction between people and the environment they are integrated in.

Healthy and well-preserved ecosystems are providing a number of important goods and services that have an effect on human well-being (see figure 3). The Millennium Ecosystem Assessment (MEA) defines ecosystem or environmental services (ES) as benefits received from nature (healthy ecosystems), satisfying human needs without neglecting other species requirements that are usually not internalized in economic decisions (MEA, 2005). Four categories of environmental services are differentiated in literature: regulating, provisioning, cultural and supporting services (Wunder et al., 2008; MEA, 2005). ES can be considered positive externalities from natural assets as soil, water, living organism and the atmosphere. They include greenhouse gas mitigation, hydrological services (for agriculture, consumption, and hydropower), biodiversity conservation and the provision of scenic/cultural beauty for tourism and recreation (see box 1 below for an extended list of illustrative ES). Ecosystem services closely associated with agriculture include inter alia: biodiversity conservation, carbon sequestration, water filtration, flood mitigation and managing cultural landscapes and habitat provision for biodiversity (Daily, 1997). Biodiversity is not considered a direct service itself, but the underlying condition for other ecosystem services as clean water and the provision of food (SAfMA, 2004).



**Figure 3:** Link between Ecosystem Services and Human Well-Being

**Source:** Duraipappah, 2002: 49.

A large part of regulatory ES are directly affected by positive and negative externalities (e.g. upstream water pollution affects downstream users) (Swallow et al., 2007). Most ES are also usually characterized similar to public goods: they are non-rivalry in consumption and non-excludible for free riders. This also has the consequence that many users consider the free use of the ES as a given which is a considerable obstacle for raising awareness on the value of ecosystem services and a willingness to pay (Baijukya, 2008; Wunder & Boerner, 2010). Positive environmental externalities<sup>3</sup> or ecosystem services are consequentially also usually not taken into account in economic decision making processes of individual people. Many ecosystem services have similar characteristics than common pool resources (CPR) with exclusion of other users being not possible or costly. Some ES are also rivalry in their use, meaning that once the service is consumed by one/several users it cannot be used by others anymore (e.g. clean water provision) (Fisher et al., 2010). Furthermore, the use of one ES can also have an effect on the provision level of other ES (e.g. connection of fresh water and crop growing). CPR are based in systems that deliver ES, as for example a community forest (CPR) can deliver water

purification, carbon sequestration and timber. Managing CPR and ES are therefore closely connected.

When aiming at conserving or enhancing ES delivery and creating a new perception of ES, environmental economist suggest that they have to be integrated in decision making and given an economic value (Wunder et al., 2008; Stiglitz & Walsh, 2002; Pagiolo, 2005). This, however, is a major challenge and subject to a debate on the commodification and valuing of nature (see Dimond & Jerry, 1994; Kosoy & Corbera, 2010). Also the actual process of valuing nature is extremely complicated. A number of different methodologies are under development yet they remain contested and so far have not been able to include the multi-dimensional nature of NR. It is often argued that different actors will rank and appreciate ES differently and finding a common understanding is a crucial yet difficult process (Kosoy & Corbera, 2010). Some researchers try to account for the subjective nature of ES valuation through conducting case specific surveys on the household level etc. (see e.g. Maraseni et al., 2002), yet also standardized tools are under development (see WTP-WTA below). Four categories can be considered to make up the total value of ES:

**Nature's Services**

- Air and water purification
- Water flow regulation
- Cultural support
- Biodiversity maintenance
- Aesthetic beauty and landscape enrichment
- Detoxification and decomposition of wastes
- Nutrients translocation
- Generation and renewal of soil and soil fertility
- Pollination of crops and natural vegetation
- Control of agricultural pests
- Wind breaks
- Partial climatic stabilization
- Moderation of temperature extremes

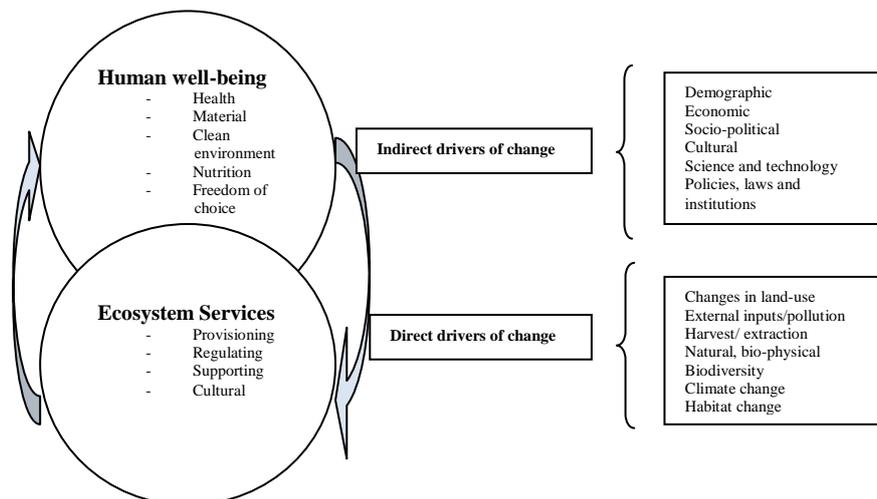
**Box 1:** Illustrative Ecosystem Services

**Source:** Daily, 1997

<sup>3</sup> Positive externalities are defined as: "Impacts on 'outsiders' that are advantageous to them and for which they do not have to pay. Externalities occur where the actions of firms and individuals have an effect on people other human well-being; than themselves. In the case of positive externalities the external effects are benefits on other people. These are also known as external benefits. There may be external benefits from both production and consumption." (Encyclo, 2010).

- *Direct values* of raw materials and physical goods that are water-based or dependent and directly used for production and consumption, as e.g. fuel, timber, non-timber forest goods, medicines, fodder and food;
- *Indirect values* including maintaining and supporting natural and human systems; examples are watershed maintenance (quality and flow), protection from natural disasters as flood control, microclimate stabilization, carbon sequestration, nutrient retention, and supporting consumption and production processes;
- *Optional values* are values assigned to maintaining biodiversity and landscapes for their possible future benefit that may be unknown at the moment as e.g. commercial, agricultural and pharmaceutical applications and their value for leisure;
- *Existence values* refer to the intrinsic value of ecosystems and the components thereof and their potential cultural and landscape beauty function (FOEN, 2005).

ES are also directly linked to development as they form the basis for the livelihoods of many people ranging from food and energy production, to freshwater provision, disease regulation and climate change adaptation (Ranganathan et al., 2008). The MEA (2005) also found that ES degradation and the harmful effects thereof are to a large part born by the poor and are thereby also contributing to social conflict. The link between ES and human well-being is also central in the Southern African Millennium Ecosystem Assessment in which a number of the drivers for change are identified (SAfMA, 2004). The interaction can be depicted as following:



**Figure 4:** Drivers of Change of Ecosystems  
**Source:** Based on SAfMA, 2004 & UNEP, 2008

Figure 4 depicts the connection between ES and human well-being as well as the drivers of change influencing the interaction of the two realms. Thereby direct drivers of change as land-use changes are influencing the provision of ES and indirect drivers as demographic changes influence the human well-being. Any change will consequentially have a direct impact on the other. When trying to take up an ecosystem service approach, this has to be taken into account.

Ecosystem services are not always produced and available on the same location where they are used and required. Benefits or changes in ES levels can be felt locally, regionally or globally. This suggests a definition of ecosystems at the landscape scale as e.g. by Fisher et al. (2009: 650). The authors differentiate between ES:

- Consumed and provided at one location (in-situ);
- Produced at one location yet benefitting the surrounding areas (omni-directional, no directional bias);
- Benefiting one specific location positioned in the direction of service flows (directional).

Both natural and institutional factors influence access to ES and local stewards of ES are usually not compensated or rewarded for the conservation or production of ES and are not always aware of the impact of ES usage on other scales (Duraiappah, 2002). A need prevails to find

innovative possible solutions for imperfect ES delivery based on economic failures but also on underlying institutional and policy failures (GEF & UNEP, 2003).

Negative externalities resulting from the consumption and unsustainable use of natural resources and ecosystem services as well as environmental pollution can be approached by a number of different strategies. Environmental policy tools include:

- Obligatory regulatory requirements (command and control) outlawing negative externalities
- Environmental taxes and subsidies to encourage socially desired behaviour
- Environmental cross compliance and voluntary agreements with e. g. the industry
- Community based approaches
- Research and extension services
- Marketable rights and quotas
- Agricultural-environmental payments (Stiglitz & Walsh, 2002).

Despite having been the most widely spread tools in the past, regulatory or command and control instruments are increasingly criticized for not being very flexible in different settings. They are slow to trigger change, do not contain positive incentives and may bear substantial hidden costs (ibid.). Penalties and taxes are aimed at increasing costs, thus negative incentives and discourage e.g. pollution or overuse, subsidies (stick & carrot) or corrective measures and creating markets for externalities. On the other side, community based and market approaches enjoy increasing attention.

## 2.2. Market-Based Incentives

The need to achieve more integrated long-term incentive systems for NRM has led to the emergence of a number of market-based mechanisms. Such long-term incentives are crucial to overcome initial transaction costs of land-users and to stimulate the adaption of e.g. sustainable land management tools (Vallee, 2010). Voices from the environmental economics side have been focusing on the internalization of environmental values in production and consumption decisions through applying market-based incentives (MBIs) (PREM, 2010; Stiglitz & Walsh, 2002). The notion underlying market-based incentives for sustainable resource or land management (SLM) is to link land-users to the market and to provide positive incentives and enhance economic viability of SLM. This is a challenge as the underlying assumptions of MBI are based on the absence of market failures as negative and positive externalities and non-prices common pool or privately owned resources. In which case the market would not provide an efficient tool thus requiring a more active involvement of the government (Stiglitz & Walsh, 2002).

One prominent theory to address environmental externalities comes from Coase (1960). The *Coase Theorem* departs from the idea that participants of a market are able to solve the issue of negative externalities through negotiating over the allocation of resources. This is yet only possible in the absence of transaction costs for the exchange of resources and when clearly assigned property rights (Stiglitz & Walsh, 2002). Central to the theorem are also appropriate property rights to enable bargaining amongst potential users of resources. Under these conditions markets are successful tools to approach externalities, providing an incentive for efficient resource use and distributing resources without government intervention. In case that the assigned value of a resource or use for one user exceeds the value of the other, this can be balanced through a paid compensation (Stiglitz & Walsh, 2002). However, the costs of reaching an agreement may be high and social marginal costs might be much higher than private marginal costs. There are also two motivations for private parties to undervalue natural resources and to deplete them at an unsustainable rate. One is prevailing insecure property rights and second limited possibilities for borrowing coupled with high interest rates (Stiglitz & Walsh, 2002).

Market-based approaches are based on the assumption that in general prices provide signals of scarcity of natural resources that will consequentially lead to economic efficiency and efficient usage rate (Stiglitz & Walsh, 2002). Overall, two different categories of market incentives can be

identified: (i) Improved market access for SLM products and (ii) compensation payments to the service provider/land-user through either (a) direct payments or more (b) indirect through a governmental mechanism (Buerli, 2006). Examples of direct environmental MBIs are: pollution taxes and tradable air and water permits, deposit-refund schemes, payments for set-aside land for conservation as well as charges for road use (congestion) (PREM, 2010). Options for incentives vary according to the socio-economic setting and the present agro-ecological zones. In the agricultural sector tradable water user rights can be allocated, and commercial global/voluntary carbon sequestration and trading schemes are developing. Furthermore, labelling, fair trade schemes and certification also belong to the voluntary market based mechanisms. Linking this to ES, different types of markets for ES exist that go from voluntary contractual arrangements to systems of marketable permits (Buerli, 2006). Now the attention is turned to one prominent voluntary mechanism to create a market for ES – PES.

### 2.3. Payments for Ecosystem Services

While Coase can be said to have created the basis for payments for ecosystem services, it is especially in recent years that more and more attention is paid to the mechanism for integrated NRM. PES are increasingly considered significant as possible tool for striving towards sustainable development - a positive incentive to combine nature conservation and livelihood development alongside (UNEP & IISD, 2004; Gross-Camp et al., 2010). Furthermore they are considered as a tool to supplement regulatory government approaches to SLM and NRM (Gross-Camp et al., 2010). A number of PES schemes are already established especially in Asia and Latin America, more recently also joined by South Africa. These schemes are primarily focusing on community and/or watershed level. The water PES in Costa Rica is one of the most referred to an earliest PES.

Being rather vaguely defined, Wunder (2005) attempted to define the emerging mechanism based on the five central criteria (see definition provided in the introduction). According to this definition it is a voluntary transaction implying that contracting stakeholders must have the possibility to end and/or re-negotiate the contractual agreements at any time. This criterion of the definition is often criticized as narrowing the concept down too much. A number of interventions considered as PES, e.g. the prominent example of Costa Rica furthermore, do not adhere to this principle (Sommerville et al., 2009). While the definition of Wunder (2005) is acknowledged and widely applied, it is increasingly considered to be too narrow in some aspects and thereby excluding PES-like incentive and effective rewarding schemes (Sommerville et al., 2009; Swallow et al., 2007; Pagiola, 2005). This has led to a number of alternative and extended concepts such as: Markets for Ecosystem Services (MES) (Pagiola & Platais, 2007), Compensation for Ecosystem Services (CES) (Noorwijk & Leimona, 2010), International Payments for Environmental Services (IPES) (UNEP et al., 2006) or Compensation and Rewards for Ecosystem Services (CRES). CRES are defined as negotiated and contractual agreements between ES stewards, ES beneficiaries and/or intermediaries aimed at maintaining, enhancing, reallocation or offsetting of damage to ES (Swallow et al., 2007).

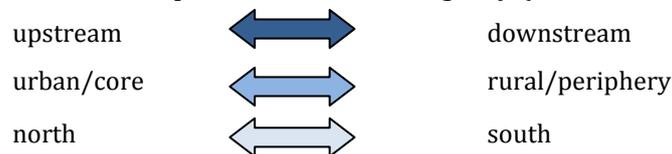
Despite the various concepts common ground can be established and often terms are used interchangeably. This is partially certainly to be explained by the vague definition of most terms when it comes to operationalisation. These various definitions and terms also reflect differing perspectives on the value of ES, the role of the state and the prime objective of rewarding mechanism (i.e. efficiency or combining development and conservation/poverty reduction). Efforts to refine and improve the concept are undertaken (see Karousakis, 2010; Swallow et al., 2007; Wunder et al., 2008; Sommerville et al., 2009). The attempts to find a new term is also due to the fact that most case studies in literature on PES are mainly focused on forestry issues. Authors focusing on different fields of application have attempted to find a new term. Furthermore it can be seen as attempt to lose the negative connotation connected to financial payment aspect of PES often brought in connection to a new term for subsidies of different sectors (Sakuyama, 2005). The use of terms as rewards of compensation is further an attempt to enable the application of the concept in environments that are not open to market-based

sentiments (Bond et al., 2008). PES<sup>4</sup>, however, remains the most widely recognized and used term and it is also applied in this research based on the definition of Wunder et al. (2008).

### 2.3.1. Objectives of PES

Three generic types of functional groups or stakeholders can be identified in incentive schemes for ES provision: ES stewards/providers, ES beneficiaries/receivers and intermediaries (Swallow et al., 2007). Who constitutes a key actor within the three generic types of PES actors is i.e. dependent on the objective set by the PES in question. Driving actors and funds are often steaming from national governments, private sector companies, NGOs, public-private partnerships and other external donors. Incentives are conditional to particular environmental objectives and services and are organized in voluntary transactions. Most literature identifies three central policy outcomes for PES (Jack et al., 2008; Barton et al., 2009; Pagiola, 2005). Next to (i) ES conservation and recovery (environmental effectiveness), PES have two further policy outcomes: (ii) to increased livelihood security for rural poor (equity) and (iii) to be cost-effective (Jack et al., 2008; Pagiola, 2005). A PES is environmental effective if it delivers the agreed ES benefit (Gross-Camp et al., 2010). This is usually defined by physical measuring or as proxy, adopted land-use technologies and use-restriction. The equity of a scheme is containing several aspects e.g. poverty alleviation, spread of opportunity costs, and consumption equity (Jack et al., 2008; Gross-Camp et al., 2010). Finally, cost-effectiveness of PES is given when the same environmental benefits are achieved at lower costs than other possible NRM mechanisms and policies (Karousakis, 2010).

In the ideal, the market-based incentive employed for PES is the creation of a market based on agreed upon and assigned economic values of ES. This enables to bring together providers and willing and (importantly) buyers with the financial capacity to buy the ES (IFAD, 2010). For PES directional and omni-directional ES are of prime importance aiming to incorporate externalities on the local, regional or global level (Fisher et al., 2009). While costs are usually being born on the local level and benefits are often on the national/global level. The relationship of ES providers and consumers can be depicted in the following way (based on UNEP, 2008):



The payments or rewards included in PES are aimed at moving away from the perception of conservation as sacrifice and cost-intensive, and to internalizing benefits of environmental objectives. It is a mechanism to re-distribute costs and benefits of environmental services. The incentives or benefits of PES are directly connected to the income of ES stewards. They are thus a policy option for compensating ES stewards for produced positive externalities that are usually not taken into consideration. Thereby incentives are provided to ES stewards that are consistent with the benefits they provide to ES consumers. Next to the direct incentives non-income co-effects on the socio-economic context are important benefits of PES. These include: natural asset consolidation (land tenure and user rights legitimacy); information and knowledge creation through rural-urban collaboration and the connection of ES providers and consumers; training and capacity building through PES intermediaries and extension services; job creation; strengthening of institutional capacities and the internal organization finally leading to an institutionalization of ecosystem investments combining ecology and economics; as well as possible public grants and tax reductions and increased awareness on the governmental level on the value of ES and PES mechanisms (Lopa, 2010; Sánchez-Azofeifa et al., 2007; Pagiola, 2005; Sommerville et al., 2009; Swallow et al., 2007; FAO, 2010c; Ferraro, 2009). This makes it a valuable mechanism in a setting of land-use policies and projects.

<sup>4</sup> PES are also referred to as payments for environmental services. This is not clearly differentiated in literature and in this thesis it is used as synonym.

Summarizing, most on-going PES schemes mainly have four underlying main functions:

- Provide an incentive for the adaptation of sustainable land-use practices or resource/ES conservation;
- Innovative approach to combine conservation and development objectives;
- Supportive source for funding of environmental conservation and SLM programmes (Support conservation projects);
- Diversification of livelihoods for the rural population and ES stewards (poverty reduction).

### 2.3.2. Existing Categories

PES schemes need to be context dependent, adapted to the prevailing local and national institutions and flexible. In order to enable differing objectives and contexts, a number of variations of PES have been developed (see Table 2: 22). The mechanism is connected to conditionality which implies that a monitoring system<sup>5</sup> must be established ensuring or augmenting the supply of the ES in reference to a given baseline<sup>6</sup> (Wunder, 2007). Conditionality can be connected to the provision of ecosystem service benefits or ecological indicators (performance-based) (Ferraro, 2001; Sommerville et al., 2009). Or rather be based on overseeing the adaptation of the promoted land-use technology (effort-based). This is based on the underlying assumed positive correlation of adopted land-use technologies and improved ES delivery. Also additionality can be behavioural or ecological. This provides a certain assurance to ES buyers and PES founders that there will be a measurable effect or impact of the project that would not have occurred without the project.

PES can contain (i) use-restricting land-use technologies as e.g. land retirement, reducing agricultural expansion, rehabilitation, reduced deforestation, reforestation of degraded lands and forest set-aside conservation. Or (ii) use-modification based on improved cropping or land-use technology and practices as e.g. reduced logging, afforestation and reforestation including Clean Development Mechanisms (CDM), agroforestry, silvo-pasturing<sup>7</sup>, improved/conservational agricultural practices as e.g. no-tillage, no-burn, organic agriculture (Wunder & Boerner, 2010). Use-modifying schemes contain the risk that they reduce the livelihoods of participants especially in the initial phases. Active land management is also more complex to monitor than use-restricting schemes (ibid.). Through payment schemes one specific ES can be targeted, or multiple ES on different geographical scales. Bundling and layering of ES into one scheme can be beneficial to (i) include more potential ES buyers; (ii) simultaneously target multiple ES that coincide spatially; (iii) reduce transaction costs; (iv) enable to include ES into a scheme that are more disadvantaged to attract buyers (Karousakis, 2010).

Four types of schemes can be considered as payments for ecosystem services or rewards for ecosystem services (PRESA, 2010; Swallow et al., 2007; Wunder et al., 2008):

- (i) Public payment schemes to private land owners for maintaining or restoring ES (Government financed schemes on behalf of ES users as e.g. Costa Rica; large size, national, multiple services and side-objectives; co-management);
- (ii) Open trade agreements in formal markets between providers and receivers under either a regulatory cap, voluntary or floor based on ES to be provided (tradable permit/credit system);
- (iii) Private agreements, self-organized and self-negotiated direct contracting of individual beneficiaries of ES with providers (small scale; often individual private-sector as buyers; usually targeting one or two services; more targeted); and

<sup>5</sup> The monitoring system should also feature pre-determined penalties in the case of non-compliance.

<sup>6</sup> This criteria of additionally has to be fulfilled in order to measure the outcome though the scheme with what would have occurred without it (Balmford & Whitten, 2003). It is not, however, made explicit in the definition by Wunder (2005) but rather a silent criterion that is aspired in PES (Sommerville et al., 2010).

<sup>7</sup> Silvo-pastures are systems combining livestock grazing and forestry.

- (iv) *(Eco-labelling of products assuring that the products and production processes involved have a positive or neutral effect on ES.)*<sup>8</sup>

ES for which e.g. farmers are already compensated in PES schemes today include: carbon sequestration, water quality and quantity, biodiversity conservation and provision of landscape aesthetics (FAO, 2010). Agroforestry ES identified by Nair (2008) include: (in-situ or (omni-) directional ES) conservation of soil productivity, increased microbial activity and prevented soil erosion; water quality improvement, reduced non-point pollution and improved water retention; support of biodiversity; carbon storage (sequestration of carbon in biomass and soil); and food and nutrition provision. According to the FAO (2010) measures for improved NRM and additional ES considered in projects of PES are mainly: af- and reforestation, as well as other land-use and production change. Most existing PES schemes focus on ES as watershed management, carbon sequestration, biodiversity and bundled services, combining payments for a combination of water, carbon and biodiversity services. CDM and Joint Implementation Procedures fulfil PES criteria as they are conditional and based on measurable additional emission reductions (Sommerville et al., 2009). Also Reducing Emissions from Deforestation and Forest Degradation (REDD) projects are likely to act as PES scheme approach within the international climate regime.

Payments or rewards are based either on (i) commoditized ES (CES); (ii) rewarding avoided actions (compensation for opportunities skipped (COS), primarily connected to use-restricting PES); or be in form of (iii) co-investment of environmentally beneficial activities (co-investment in ecosystem services (CIS), primarily connected to use-modification schemes) (Noorwijk & Leimona, 2010). Incentives can be (i) direct monetary payments to resource/land managers as stewards of a particular or bundled ES or (ii) in kind as for example land-use rights, access to markets, access to training and information, and access to protected areas (Swallow et al., 2007). These in kind rewards of PES are emphasized here as most payments and compensation schemes are reduced to containing positive incentives in form of monetary payments. Payments can be made to individual farmers, to farmer groups, communities and even governmental level (Sommerville et al., 2009). They can be uniform, with every participant of a PES scheme receiving an equal amount, usually based on the average opportunity costs and agreed in initial meetings, or be based on individuals' opportunity costs and adopted land-use technologies, and specific biophysical factors (size, location, etc.) of the land.

**Table 2:** Principal Forms of PES

<b>Forms of PES</b>	
Community based payments	Individual participants payments
Uniform payments	Individual payment level
Cash rewards	Voucher & in-kind rewards
Performance based payments (ES delivery based)	Effort based (actions adopted by participants)
Use-restricting	Use-modifying
Public payment scheme	Private scheme

<sup>8</sup> The inclusion of labeling as PES is debated. Sommerville et al. (2009) e.g. emphasise that there is no guaranteed positive relationship between certification and positive incentives for SLM as price premium of is not guaranteed but depending on an existing market. Schemes providing a guaranteed price premium for the provision of ES would be PES as e.g. include certified product where the price for the PES is included into the product.

### 2.3.3. Pro-Poor PES

Despite the market-based notion behind PES it has proven that in most developing countries the application of the mechanism leads to a “hybrid of market-like mechanisms, state regulations, and subsidies” (McAfee & Shapiro, 2010: 579). In its multidimensional nature, PES include an economic (payments) dimension, an environmental (ecological) and social (services) dimension. However, the driving force behind PES is the economic internalization of ES and this can impact the role of PES as a pro-poor instrument. PES are often criticized for being purely market-based and oriented, resulting in limited or even negative effects on the poor (Jourdain et al., 2009; FAO, 2010c). Yet, as mentioned before the potential of PES as tool possibly contributing to poverty alleviation is debated (see Pagiola et al., 2005; Sommerville et al., 2010). Still PES are increasingly considered potential tools to mainstream ES values into development planning and objectives (UNEP, 2008). In developing countries often ecosystems with high levels of ES provision coincide with areas marked by high poverty rates and heavy reliance on natural resources (UNEP & IISD, 2005).

PES are not *per se* defined to be pro-poor with the main focus being to secure or increase ES provision by connecting the users, valuing the ecosystem service in question, with ES providers in a market. Yet social equity taking into account the location where most of the ES are produced is central in designing PES. Pagiolo (2007: 1) defines pro-poor PES as scheme “that maximizes its potential positive impact and minimizes its potential negative impact on the poor”. Most experts agree that there trade-offs have to be made depending on the objective of the scheme (e.g. hybrid forms). A trade-off is especially true if the supply of ecosystem services by households is not positively correlated with the poverty level. Special design principles and mechanisms, especially in terms of legitimacy, equity and participant selection have to be developed for PES that have as a central objective to be pro-poor. Another central aspect of PES and poverty reduction are property rights as often rural poor are landless with no appropriate property rights (Sánchez-Azofeifa et al., 2007; Baijukya, 2008). A number of organizations work on special designing issues and frameworks of PES that are intended to be pro-poor, e.g. the International Fund for Agricultural Development (IFAD), the FAO, Rewarding Upland Poor for Environmental Services (RUPES) or Pro-Poor Rewards for Ecosystem Services Africa (PRESA)<sup>9</sup>.

In order to assure that the target group for a PES is accessible for ES stewards in need of a diversified livelihood and rewards for ES provision, the FAO (2010) e.g. has formulated the following premise:

- (i) Participants are dependent on natural resources for their food security and livelihoods;
- (ii) They are major providers of ES that are benefiting others;
- (iii) They currently do not benefit from the ES stewardship role, or additionally, bear the costs of the provision, e.g. in restricted land and/or forest-use.

This premise is clearly linked to the PES policy outcome of equity. Targeting poorer ES stewards in a region can be aimed at e.g. through an ex ante socio-economic impact analysis, household surveys and specific mechanisms ensuring their participation (Pagiola, 2007).

Placing principal focus on PES as pro-poor mechanisms on the other hand is criticized to deter the cost effectiveness of PES and not falling within the definition (Garcia, 2010; Pagiola, 2007). Transaction costs are likely to be even higher in PES schemes that primarily target poverty alleviation and the poorest of society (Ferraro, 2009). The scheme should be independent of external donors or governmental intervention and cover its own operational costs in the long-run (Karousakis, 2010). In a developing country context often this ideal is not very feasible as the use of ES is often considered free of charge or there is simply no financial potential on the side of the buyers to remunerate ES (Baijukya, 2008). It cannot be ignored however, that poverty issues need to be addressed in PES schemes as the impact on the poorest will have an impact on the long-term effect of especially environmental benefits of PES schemes (Grosjean & Kontoleon, 2009).

<sup>9</sup> RUPES and PRESA are both connected to the World Agroforestry Center (ICRAF).

#### 2.3.4. Central Challenges and Limitations of the Concept

Despite the popularity as tool for SLM and NRM in recent times, PES are facing a number of technical as well as conceptual challenges. A considerable burden for the development and spread of PES is that in literature and practice no single straight forward definition or one consistent use of the term payments for ecosystem or environmental services prevails. Scientific discussions continue on whether the definition of PES from Wunder (2005) is too narrow excluding valuable approaches for SLM (Sommerville et al. 2009; Swallow et al., 2007). Others voice the concern of over-loading the concept beyond its capacity and intention (Garcia, 2010; Wunder, 2010). A more general problematic of PES, yet directly linked to the definition issue, is the position it is holding on the international stage in connection to NRM and SLM. It is a new paradigm that raises the hope to become a strong innovative market-based mechanism approaching all the issues in NRM and livelihood diversification of rural poor. This bears the danger of being seen as a panacea, a role that PES alone are most likely not able to fulfil (Vallee, 2010; Wunder, 2010; Kosoy & Corbera 2010). It is also a concept that is appealing to be used broadly as it is attractive for funding at the moment, likely to result in a bandwagon effect (Wunder, 2010). Referring to the section on market based incentives, PES can also be connected to the debate on the valuing and commodification of nature as well as common pool resource management issues. Furthermore, a question on the compatibility of PES with the often use-restricting nature of the schemes with cultural and social aspects arises (Fisher et al., 2010; Bracer et al., 2008).

Two further central challenges to PES are already contained in the definition given above. PES should be voluntary agreements. It is however, debatable if the management of critical natural resources and ecosystem services is a matter that should be depending on voluntary mechanisms. One other central aspect of the definition of PES is additionality. An irreducible uncertainty prevails on the dynamics of the interaction between human activities, ES and land-use technologies as well as on the complexity of ecosystems and drivers of change (Anderies et al., 2004; Constanza et al., 1997). This makes it difficult to measure and ensure the additionality of PES schemes. In turn this forms a hurdle for building strong business cases e.g. for convincing the private sector or governments to invest in PES. Furthermore, the impact of PES schemes is difficult to be establish as they are not operating in a vacuum but coexist with other SLM mechanism (e.g. regulatory or community based conservation projects etc.)<sup>10</sup>.

In order to ensure stability and long-term consistency of PES schemes, resource access and ownership of ES have to be clearly regulated. This is yet a point of conflict in many developing countries where land tenure and ownership often are customary and in a fast changing context (Grosso, 2010). As PES may also increase the attractiveness of land, it may even fuel competition over land and lead to a crowding out of pro-social attitudes and common pool resources management structures (Fisher et al., 2010). Leakages may occur when ES are preserved in one location, yet simultaneously the pressure on ES in another location is increased or other major challenges are expected to arise from the scheme that impact its success (Karousakis, 2010). Financial restrictions are a further critical aspect for the mechanism. One of the key challenges for a wider dissemination of SLM practices is designing proper incentives and technical support systems to stimulate the adoption of such practices (Pagiola, 2005). The central idea behind PES is to provide positive incentives for locally-driven sustainable resource and land-use<sup>11</sup>. These incentives can help to bridge barriers preventing farmers to adopt SLM practices even though these might increase the farmer's net income and improve the environmental quality. Yet, at times even these incentives are not sufficient to encourage especially small-scale subsistence farmers to adopt SLM practices. This can be due to a number

<sup>10</sup> This was e.g. the case in Costa Rica, where the PES scheme fell together with a strong forest and conservation policy. Therefore, the success in reducing the deforestation rate cannot be assigned to the PES mechanisms alone (Miranda et al., 2003).

<sup>11</sup> The focus on positive incentives does not imply that there are no negative incentives within the PES framework. When PES are embedded in a regulatory environment the associated repercussion is a negative incentive, as well as coercion to participate or regulatory fines (Sommerville et al., 2009).

of factors, such as risk adverse behaviour of farmers towards new technologies; opportunity costs in the short-run and transition phase; lack of knowledge and training; and the necessity of capital investment into new technologies which imply the need of credit facilities (Branca et al., 2009). It can also be due to incentives being too small to actually cover the opportunity costs of individual ES stewards that may vary greatly (Gross-Camp et al., 2010). Connected to the financial viability finding potential and able buyers is another complex aspect of PES. Building a business case may be a good approach, yet it has proven difficult to guarantee a specific level of ES delivery (Dosteus, 2010). This makes it more likely private PES schemes will be depending on the good-will of the private actors. A final challenge to be mentioned here is the valuation and calculation of rewards for ES. As mentioned above, the valuation of ecosystem services as well as the willingness-to-pay of ES users is difficult to be estimated and certainly to be mainstreamed for PES designing frameworks (Wunder & Buerli, 2010). Discussions prevail on how to classify ecosystem services as well as whether PES can be beneficial for the poor rural population and how to fulfil attached conditionality (Costanza et al., 1997; Jourdain et al., 2009; Kosoy & Corbera, 2010).

Despite the challenges and limitations of the concept PES can be beneficial tools for providing incentives for sustainable resource management when the contextual conditions are supportive and appropriate (Gross-Camp, 2010). Based on a comprehensive set of indicators and key factors ex ante analysis can be undertaken promising to result in effective and robust design of PES. The following section introduces a number of key factors (pre-conditions, institutional settings and design principles) considered central to enable an effective application of PES.

#### 2.4. Key Factors for Effective PES in Literature

Key factors and settings for successful PES schemes that achieve the set objective have been subject to several publications and research of practitioners, organizations and academics (see e.g. Wunder, 2005; Swallow et al., 2009; Pagiola & Platais, 2007; Corbera et al., 2009). An explicit common conceptual framework for PES, however, has not been developed. In literature different feasibility criteria and components are provided and more weight attached to various indicators by different authors. Also depending on the role and objective assigned to PES different factors and pre-conditions seem to be central. Key factors are usually retrieved from an ex post perspective as conclusions of conducted case studies in developing countries (e.g. Miranda et al., 2003; Kosoy & Corbera, 2009; Sommerville et al., 2010). Further factors are introduced by practitioners in the field, with most manuals and guides being focused on developing countries (e.g. Bracer et al., 2008 (Forest Trends); GEF, 2009; Ranganathan et al., 2008 (WRI)). It is the aim here to provide an insight into basic principles and key factors considered important throughout the literature (i.e. Wunder, 2005; Bracer et al., 2008; Sommerville et al., 2009; Ranganathan et al., 2008; GEF, 2009).

##### 2.4.1. An Institutional Perspective on PES

All the above mentioned characteristics of PES make it clear that an enabling environment for PES is very much connected to the prevailing institutional structures, financial resources and the nature of the ecosystem services contained in the context of a possible scheme (Pagiola & Platais, 2005; Wunder, 2005; Buerli, 2006). Corbera et al., (2009) consider the key factors of PES from an institutional perspective. PES are perceived as institutions shaping and regulating the interaction of humans with the environment or natural resources, with the aim to change the behaviour of the resource stewards (ibid.). Therefore, the mechanism is influenced by institutional dynamics and institutional interaction and needs to be based upon a shared understanding and agreed rules. When taking the perspective of PES as institutions the design principles synthesized by Ostrom (1990) form a central backbone (see table 3).

**Table 3:** Enabling Factors for Sustainable Institutions

Enabling Factors	Description
Clear defined boundaries	The resource system and involved households and individual units have to be clearly defined and demarcated
Costs and benefits are in equivalence	Allocated resource units have to be based on specifying rules that are context dependent and consider the opportunity costs etc.
Rules based on collective-choice and easy to monitor	The group that is able to modify the rules for resource harvesting and conservation consist of members of affected individuals
Accountable officials and monitors	Monitors of user behaviour and biophysical conditions are either resource users themselves (participatory monitoring) or are liable to some degree to the resource users
Sanctioning system	A context-dependent and gradual sanction system in case of breach or non-compliance by either facilitators/officials or resource users
Conflict-resolution	Low-cost mechanisms or local arenas have to be in place
Rights to organize are recognized by external governmental authorities (institutions devised at multiple levels)	Clear long-term tenure or user rights to the resource as well as the right to form user institutions have to be guaranteed by the government
In larger systems: nested enterprises	In a larger system rules and mechanisms need to be organized in nested enterprises in several layers

**Source:** Based on Ostrom, 1990 and Anderies et al., 2004

As mentioned before, managing ES also has similar characteristics to managing common pool resources. Therefore the feasibility of CPR management contains important factors that may also be relevant for PES (Fisher et al., 2010). Agrawal (2002) makes a synthesis of the seminal studies on key enabling factors for CPR management which is depicted in table 4<sup>12</sup>.

**Table 4:** Enabling Factors for CPR Management

Enabling Factors	Description
Resource Size	Small-scale of resource/area to be managed
User-group characteristics	Small groups of interdependent stakeholders with common norms
Relationship resource user-group	Resources are geographically close to users
Institutional arrangements	Clear established and accepted governmental rules/frameworks
Relationship resource-institutions	Overlap of governmental institutions and resources
External environment <sup>13</sup>	Understanding and awareness of exogenous factors that may influence the resource

**Source:** Adapted from Agrawal, 2002

When developing PES this synthesis can contribute useful factors and design principles. The principles above show parallels with factors that can be found in PES key literature and are therefore considered as backbones i.e. feeding into the conceptual framework for feasible PES (Sommerville et al., 2009; see also Kosoy & Cobera, 2010; Fisher et al., 2010). Additionally the indirect and direct drivers of change (chapter 2.2) should be considered. In this research these factors are integrated into the regional analysis together with factors of PES literature. In the next section the context influencing the design of PES is considered in more detail.

### 2.4.2. Designing PES

In order to even consider if PES may be an appropriate tool for SL & NRM a number of steps have to be taken by the initiating or facilitating party<sup>14</sup>. Most guidelines for practitioners describe five phases for PES design and implementation (see Bracer et al., 2008; Swallow et al.,

<sup>12</sup> Central studies on enabling factors for CPR management include: Ostrom (1990) as well as Baland and Platteau (1996).

<sup>13</sup> External factors influencing the feasibility include biophysical and material conditions, formal as well as informal rules and attributes of resource user's communities.

<sup>14</sup> The facilitating party can be e.g. international organizations, governmental authorities, NGOs, or private parties.

2007; UNEP, 2008): (i) the conceptual design; (ii) conducting scoping and baseline studies (biophysical and identifying potential buyers); (iii) assessing the technical and institutional capacities; (iv) brokering, negotiation (structure and design the agreement); and (v) actual implementation. With the aim of establishing well-functioning PES schemes, it is generally considered crucial to take four aspects of the context into account (Sommerville et al., 2009; Jourdain et al., 2009; Pagiola, 2005): (i) the environmental context; (ii) the socio-economic context; (iii) the political context; and (iv) context dynamics. The correlation of these aspects is sketched in figure 5.

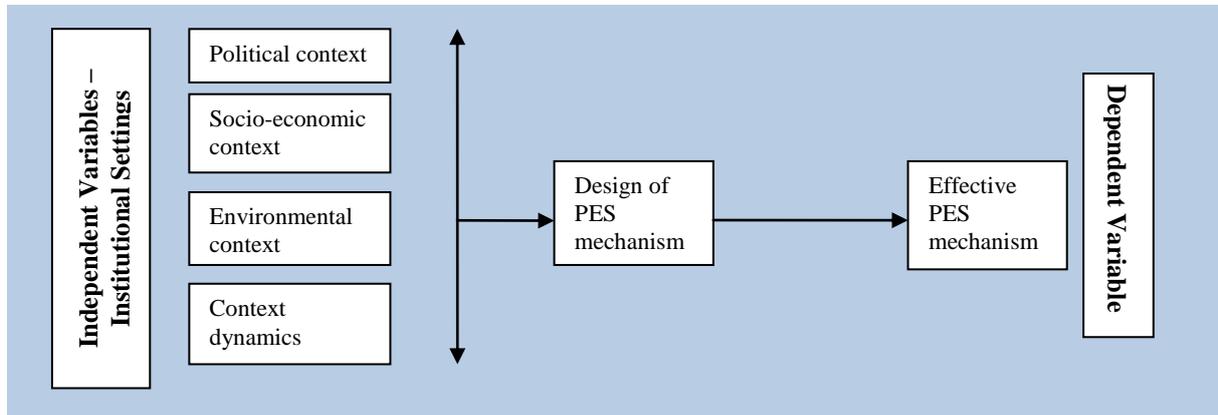


Figure 5: Context Influencing the Design of PES

In the conceptual phase of a PES scheme substantial information is needed on the context of the potential site. The financial scope, geographical scale and objective of the scheme have to be defined. It then has to be established if there is an existing environmental issue or potential threat to ES provision (environmental context). ES in the area have to be identified and their quality and quantity have to be assessed and their value established. Technical specifications of promoted land-use practices, NRM interventions holding the potential to address ES constraints as well as livelihood diversification activities have to be identified. The socio-economic context is associated with the effect PES schemes are likely to have on this scale, particularly on the rural poor. It is also relating to transaction costs, the impact on NRM, the creation of an ES market, land ownership and institutional capacity. When conceptualising PES the transaction costs have to be considered. Transaction costs are all non-payments proper costs (Wunder et al., 2008). For PES these consist of:

- Information and procurement
  - Application: Scheme design and negotiations
  - Approval: Verification/certification
  - Implementation and management
- } ex ante costs
- Monitoring
  - Enforcement, protection and institutionalisation
- } ex post costs

These costs can be quite substantial especially when schemes are applied on the small-scale, local level. The distribution of resources, prices for resources etc. may alter the impact of PES (Jack et al., 2008). The policy context includes funding, subsidies, institutional structures and interaction between present NRM institutions e.g. governmental agencies and NGOs (ibid.). The context dynamics interact with the policy outcomes (see section 2.3.1.) of a PES scheme, which in turn depend on the design and context in which the scheme is implemented.

The value of ES can be calculated using different methods from ecologists and economists (see values of ES above). One possible method is the Net Present Value (NPV) calculator in which present services and products are counted and the currently value calculated applying a discount rate (Costanza et al., 1997). The resulting value should be considered as costs when ES are lost. This is directly connected to the economical yield of ES. Scientists try to develop a

methodology that is generally applicable, collaborative and therefore repeatable for all PES schemes in the conceptual phase (Karousakis, 2010; Kipkoech, 2010). In practice, however, it has shown that the value of ES is very dependent on the local context and multidimensional (Sagoff, 2011). The valuing of ES is therefore a most complex step in designing PES schemes with much influence on the effectiveness, legitimacy and equity of PES schemes.

Another method is based on the voluntary nature of PES making them viable only when service users are willing to pay for received ES. In order to establishing the height of the incentive for a PES scheme the contingent valuation method is applied in most schemes. This methodology establishes the willingness to accept (WTA) a reward and the willingness to pay (WTP) for ES consumption (see Pagiola, 2005; Wunder & Boerner, 2010). The WTP has to be higher than WTA of an ES steward. This depends on the opportunity costs faced by the provider to switch from the current (preferred) land-use to environmentally more benign use. More benign land-use is supposed to increase ES to the user and if the gain exceeds the transaction costs the WTP can be created (Wunder & Boerner, 2010). These are complemented by transaction costs to adopt the new land-use (e.g. buy different plants, technical tools, trees, loss of harvest etc.). Both costs have to be covered by the payments for ES in order to make it attractive for service providers to accept the scheme. If the rewards are not high enough existing adverse incentives are likely to prevent efficient PES (Karousakis, 2010). If land-use changes do not offset costs by e.g. productivity increase need for continued payments to off-set opportunity costs (Branca et al., 2009). This is very much depending on funding sources available in the long-term. In addition the location and overall prevailing livelihood strategies are key factors for defining returns for land-owners (FAO, 2010).

Once ES have been mapped, and a (projected) threat established it has to be analysed if the key actors<sup>15</sup> of PES are present and willing to collaborate in a scheme: (i) ES stewards; (ii) potential buyers benefiting from the ES in question holding the necessary financial capacity and demand for the ES; and (iii) institutional structures that facilitate the cooperation and create dialogue and trust between the local level and the PES scheme. Human capacities prevailing in a locality have to be assessed and local communities consulted on their perception of ecosystem services and the bases for resource degradation. Potential providers and buyers of ES have to be identified and communication between them facilitated. This scoping can help to build a successful business model that is necessary to show the potential benefits to potential buyers as private sector parties and/or governmental agencies (Lopa, 2010; Fisher et al., 2010). Initial awareness raising and consultation is crucial to develop a platform of cooperation and trust (Gross-Camp, 2010). Participating communities and potential buyers must be willing to cooperate and aware on potential benefits of changed land-use promoted through scheme. The results of the initial analysis have to be communication and discussed with the principal stakeholders in the scheme as their awareness and willingness to pay for or produce ES is critical. The availability of information will result in an adequate understanding of what is being sold and bought, and what long-term implications for local livelihoods and resource rights may be (Bracer et al., 2008). Early consultation should also focus on connecting farmers in e.g. associations and interests groups to minimize transaction costs and enhance the development of institutional structures and capacities. The perception of legitimacy of PES schemes is especially central in connection to the selection of participants, inclusion in decision-making processes, and the level of payments (Lopa, 2010; Gross-Camp, 2011).

Political priority areas for NRM and SLM as well as the present land-use systems have to be considered and explored to assess in how far they are compatible with PES and vice versa. Furthermore, the legal context has to be analysed. PES should not be in conflict with any existing legalization and policies. In the best circumstances PES would be explicitly included in national policies and a regulatory framework for their operationalisation (Greiber, 2010; Lopa, 2010). A

<sup>15</sup> Who constitutes a key actor next to the three generic types is also dependent on the objective set by the PES in question. For example in countries where no designated authority is responsible for PES, different ministries and authorities will be responsible and central in the development of a PES scheme (Lopa, 2011; Masozera, 2010).

legal framework that explicitly mentions PES will support the development and also form an assurance to potential investors and private parties. In order to enable contractual agreements based on trust, tenure rights and legal frameworks have to be clear and enforced (Greiber, 2010). So far however, few national authorities have adopted such a framework, with the most prominent case being the PES scheme in Costa Rica (Barton et al., 2009). Existing enforcement mechanisms and stability of legal frameworks have an impact on the level of trust and expectations on equitable outcomes across stakeholders. Land tenure is a critical variable that influences the management of environmental and natural resources and therefore also the feasibility of PES (Pallangyo, 2007). Carbon financing for example is only possible when ES stewards can prove long-term tenure rights to create certainty for investment and long-term sustainability of the plantations. Central legislations that have been considered important in former case studies are e.g. constitutions, water laws, environmental and resource policies, environment and development/poverty reduction strategies, carbon, climate change and biodiversity conservation policies (Greiber, 2010; Sánchez-Azofeifa et al., 2007; Sommerville et al., 2010).

PES demand well-developed institutional capacities and a number of functions which must be accomplished in the designing and development (Bracer et al., 2008; Pagiola & Platais, 2007). These include adequate legal and regulatory frameworks; facilitating administrative bodies; well-established and levelled cooperation between different authorities and local bodies; financial intermediaries and brokers; certification bodies; national registries for ES. Certification and monitoring bodies are especially important to verify and monitor ES delivery as well as the scheme to evaluate and to adapt the design to emerging obstacles and challenges. In the operational and consolidating phase efforts have to continue to ensure the sources of funding for the scheme as well as to institutionalise emerging structures and cooperation between different stakeholders (Sommerville et al., 2010; Lopa, 2010; Pagiola, 2007). Formalising institutions and frameworks will also facilitate scaling-up of existing schemes and to provide a higher level of ES. This is an important stage for the sustainability of the project, yet in practice this has proven to be extremely difficult (Ferraro, 2009). Transaction costs, especially for small-scale farmers can be decreased if institutional arrangements as e.g. cooperatives, farmer groups and associations are formed (Karousakis, 2010; Nantongo, 2010).

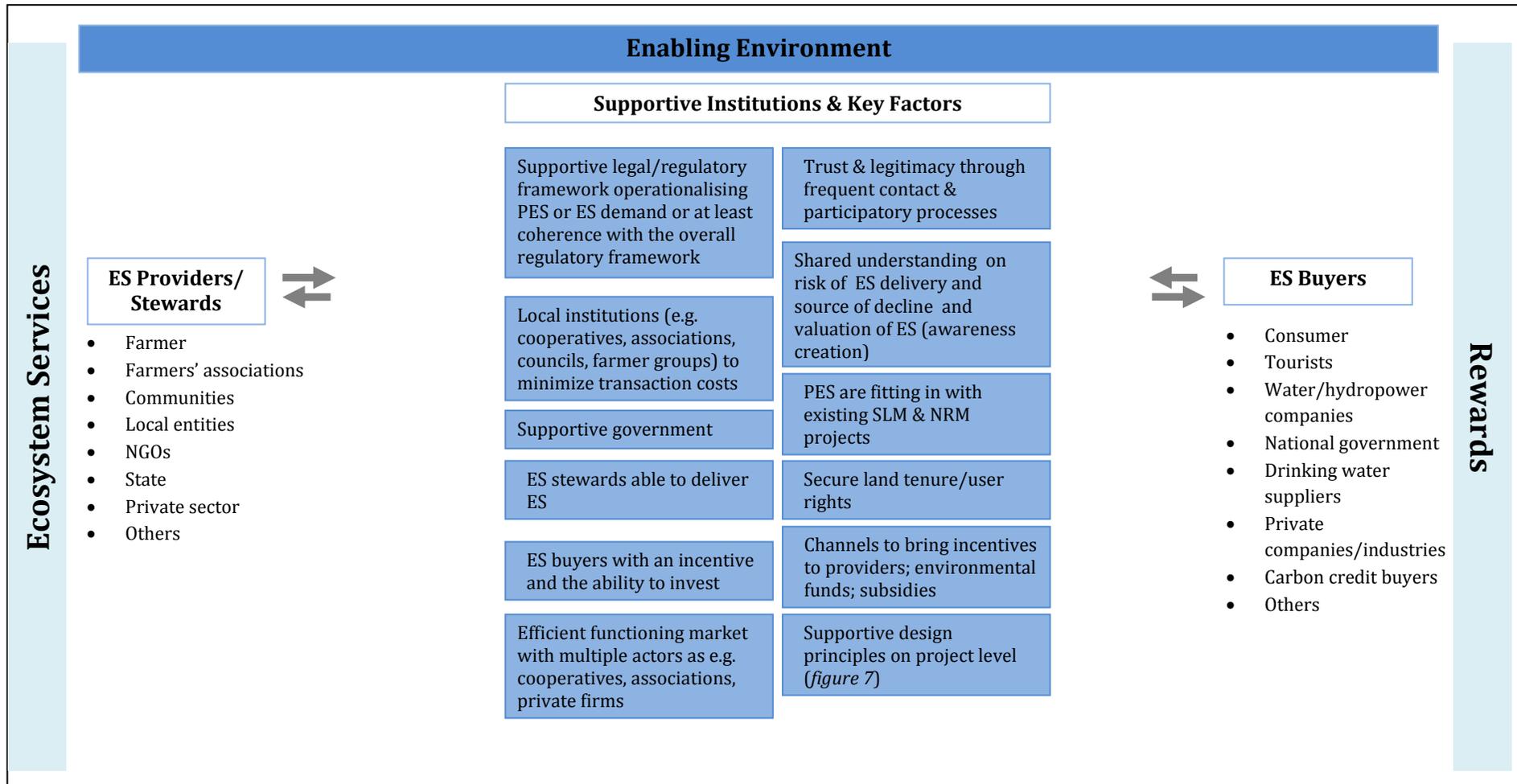
## 2.5. Synthesis and Analytical Framework

This chapter reviewed key literature on payments for ecosystem services, extracting forms, key factors for the feasible application and major debates and challenges surrounding the mechanism. It also touched upon the contextual dynamics and factors influencing the design of PES. Incentive-based mechanisms have in recent years received considerable interest from researchers and practitioners alike. In this context, PES are considered as an additional environmental policy tool that enables to include externalities and align private and social benefits and costs in connection to NRM. Others stress the potential of PES to align development and environmental goals. It is, however, also a contested mechanism that faces challenges especially in the long-term effectiveness and the balancing of its policy outcomes. Originally developing out of a forestry and conservation background the most prominent definition of PES often initiates new debates about the functionality and the operationalisation of PES. Various terms and slight variations of a definition of the term exist that result in a vague use of the concept.

Based on a comprehensive set of key factors it is possible to explore which environments are supportive to PES and which design principles have to be considered. The present research builds upon on independent variables affecting the feasibility of an effective application of PES in existing literature and applies these in the East African context<sup>16</sup>. Based upon the literature review as well as expert consultation, key factors have been extracted and are hereafter synthesised into a framework for the analysis of the regional PES feasibility. Figure 6 contains supportive key institutions and pre-conditions. These are applied to analyse the regional, national and project level. Figure 7 zooms in on the conceptual design of PES schemes thus on supportive design principles on the project level. The two figures are forming the backbone for the analysis in all subsequent chapters.

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<sup>16</sup> A summary of key factors mentioned above can be found in Appendix V.



**Figure 6:** An Enabling Environment for PES

**Source:** Based i.e. on Buerli, 2006, Corbera et al., 2009, Pagiola & Platais, 2005 and own elaborations.

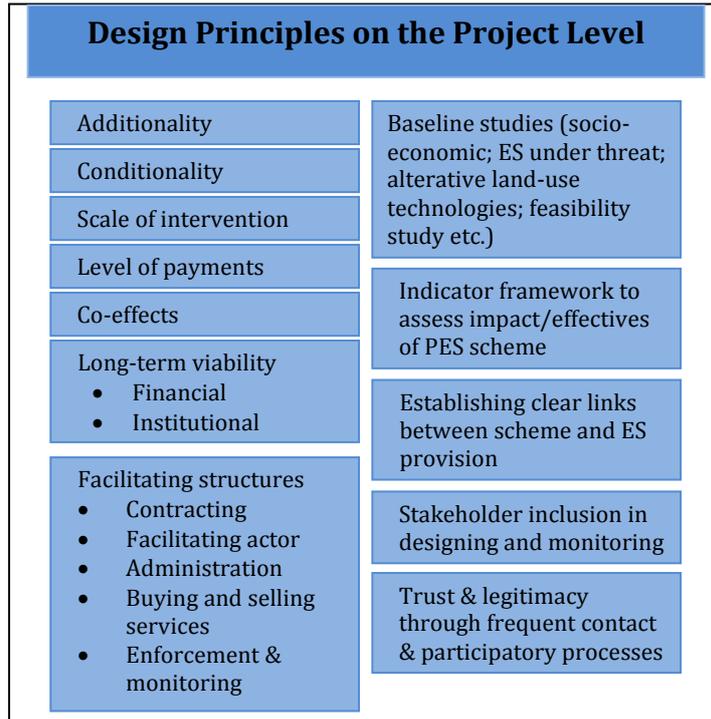


Figure 7: Supportive Design Principles on the Project Level

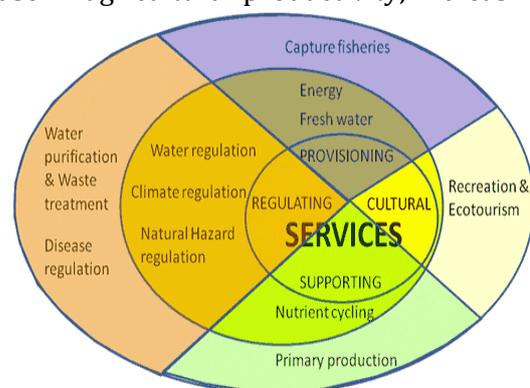
### 3. PES in East Africa – A Review

In the following chapter the research turns towards analysing the feasibility of PES in East Africa. It approaches sub-question 3 on existing supportive policies and structures for PES in the region. The analysis is based on the key factors identified in figure 6 with the prime focus on the presence of supportive legal or regulatory frameworks; governmental support; land tenure; local institutions; acknowledged threat on ES and existing SLM and NRM initiatives. Information is extracted on the institutional context, key actors for NRM and PES, and policies relating to PES as well as on current challenges, opportunities and dynamics. To gain further insights into existing structures, involved actors and forms of PES, a scoping inventory of existing PES is undertaken in the second part of the chapter. This supplements the knowledge on the dynamics of the PES landscape in the region and forms the backbone of the in-depth case studies in Chapter 5.

#### 3.1. NRM and Ecosystem Services in East Africa

The East African region holds several characteristics that make this analysis relevant for other regions in developing countries. These include: increasing land degradation and population pressure; low income; limited institutional capacity; predominantly small-scale farming; limited infrastructure; insecure property rights; limited awareness of NRM and ecosystem service valuation (IISD& UNEP, 2004; Baijukya, 2008). High land fragmentation and population pressure make the NRM a very complex and urgent matter. This is coupled with an in general weak environmental policy framework (Ferraro, 2009). The “financial health of institutions” in the region is another aspect that is likely to have an impact on PES (ibid: 536). Re-investment into the environment is limited (ibid.). Furthermore, many ES and resources in East Africa are open access resources and several direct as well as indirect drivers of change are impacting ES provision. In Sub-Saharan Africa approaches to conservation and natural resource management were primarily based on obligatory regulations and community based resource management/conservation projects with a number of national regulations and laws in place (Swallow et al., 2007). Private involvement for NRM is very low (Ferraro, 2009). Yet, these mechanisms have in most cases not been able to achieve an improvement or to create a new awareness on the necessity and values of NRM also for the livelihoods in the long-run (DeGeorges & Reilly, 2009). In general, trust into the delivery of ES by the government based on requested payments is low (Ferraro, 2009).

The central causes of land degradation can be summarized to result from overexploitation of forest and wood resources; overgrazing; human encroachment into fragile or protected areas and steep slopes<sup>17</sup>; decreasing soil fertility due to continuous cropping and little to no input; unsustainable practices as e.g. slash-and-burn (Baijukya, 2008). Declining ES become visible in increased soil degradation and consequential decrease in agricultural productivity; increasing water turbidity and water shortages (and in case of high reliance on hydropower, energy shortage); and decreasing biodiversity (SAfMA, 2005). As most of the rural population depend on ecosystem services for their livelihoods this has negative consequences. Identified important niches for PES in the region are in degraded watersheds, reforestation and regeneration of degraded landscapes; conserving protected areas rich of biodiversity (tourism); and agro-ecological production areas (Baijukya, 2008). Also the potential for enhanced ES provision by adapting modified land-use/agriculture is estimated to be high (Niles et al., 2002). Government priorities in the region are more in the



**Figure 8:** Key Ecosystem Services in East Africa  
**Source:** UNEP, 2008

<sup>17</sup> The annual rate of agricultural area increase in Sub Saharan Africa (SSA) is about 2.3% /year (Masiga, 2010).

direction of livelihood increase (Masiga, 2010).

The International Institute for Sustainable Development (IISD) conducted a scoping study for the United Nations Environment Programme (UNEP) and identified four services as critical in East Africa (see Figure 8): food and fibre provision; biodiversity maintenance; fuel provision; water supply and purification; and regulation services (IISD& UNEP, 2004; Barton et al., 2009). According to Baijukya (2008) options for ES management in the region may include:

- Water management (water filtration)
- Climate change mitigation (carbon sequestration, flood mitigation)
- Managing cultural landscapes
  - Biodiversity protection
  - Reforestation of degraded landscapes
- Agro-ecological production areas (e.g. organic farming) enterprises based on ecosystems (side activity).

Based on the central ES in the region, a number of potential foci for PES can be identified<sup>18</sup>. These include:

(a) Revenue sharing programmes connected for example to national parks or protected areas. Here it is important to differentiate between existing revenue sharing programmes and PES. In PES projects payments have to be conditional to a specific service delivered and attached to this service only. Revenue sharing programmes are therefore no PES “unless there is an exact conditional (and monitored) arrangement about things local people agree to do and/or refrain from doing, which they are being rewarded for or not” (Wunder, 2010).

(b) Sustainable/eco-tourism: Tourism is an important sector in East Africa with an increasing contribution to the national gross domestic products (EAC, 2011). (Eco-) tourism with special attention to biodiversity conservation, community projects etc. can be enhanced in the form of PES if fees are earmarked to specific ecosystem services (Ruhweza et al., 2008). Biodiversity is one of the most complex ES to include in a scheme as the benefits are even more complex to quantify/qualify and benefits are multi-dimensional and the difficult selection of proxies to assess the increase/conservation thereof (Forest Trends & Ecosystem Marketplace, 2008). Most biodiversity schemes are aimed at use-restriction of the land (Wunder & Boerner, 2010). Current approaches that are identified as PES by the inventory under the Katoomba group include co-management of protected areas and buffer zones and targeted fees for tourism (Ruhweza et al., 2008). Biodiversity projects are also usually considered under supplementing integrated conservation and development programmes (ICDPs) (Masiga, 2010). It is, however, difficult to assess if these approaches are truly conditional on a specified ES and thus PES. Bundling biodiversity with other ES (particularly carbon) is another approach that is considered in the Rwoho Central Forest Reserve in Uganda. The objective of the research PES project ReDirect in Rwanda is to decrease human activities and human threat in a protected area rich of biodiversity though incentives to communities around the national park.

(c) Carbon projects through agroforestry and in some areas reforestation of degraded lands as well as energy saving/efficiency programs: In most of the countries in the region, particularly in Uganda and Rwanda several projects for energy efficiency and renewable energy sources are fostered. Carbon PES are largely based on global payments and therefore offers additional sources of funding outside the restricted sources in the region. Carbon projects are financed through the subsequent sale of generated carbon credits currently exclusively on the voluntary market. The credits are primarily sold to companies valuing Corporate Social Responsibility and aiming to off-set their carbon emissions. One key challenge with carbon market will be the uncertainty if its capacity is large enough to have a growing number of farmers participating and still find sufficient potential buyers. This concern has been mentioned



<sup>18</sup> This section provides an abstract overview of potential foci for PES in the region. Further details and information can be found in the paragraph providing a scoping inventory of effective PES schemes.

by several project managers of on-going PES schemes, especially connected to the question of scaling-up of the projects (Nantongo, 2010; Suazo, 2010). In case of state-owned project areas another problematic feature of carbon projects in the region is connected to carbon rights transfer agreements between project initiators and governmental authorities. Uncertainties about definitions, selling rights and governmental support also have an effect on the CDM market for af- and reforestation projects (Perez et al., 2007). This has been the case in the Kibale National Park project in Uganda between the Uganda Wildlife Authority and FACE in the past or in the development of the reforestation project of the Ecosystems Restoration Associates (ERA) in the Gishwati area in Rwanda (Ruhweza et al., 2008; Zukowska, 2010). Most carbon schemes are based on reforestation or agroforestry. Currently CDM are not widely applied to land-use modifying projects focusing on soil absorption. This implies specific methodological and technical requirements and high validation costs and long-time scales for project validation are expected. The Vi Agroforestry project in Kenya will be a first project to apply this approach. An increasing number of schemes in the region are connected to the Plan Vivo Standard. In interviews made in the course of the research it appeared that many stakeholders on the governmental as well as organizational level primarily link PES to carbon or af- and reforestation projects.

(d) Water resources and watershed management is a crucial ecosystem service in Africa. Many watersheds are under threat especially due to population pressure, problematic land-use, soil erosion, and climate change (Donaldson & Swanson, 2001). In Africa, 86 % of the water withdrawal is directed to agricultural production which makes this sector and large scale producers therein important stakeholders in water management PES (FAO, 2005). Access to water is often not regulated or under multiple informal and formal authorities that have to be addressed when designing PES schemes (Ferraro, 2009). The most prominent example of a water service PES is the public scheme in Costa Rica that is often taken as learning example all over the world and referred to in many articles on PES. Another example is the Working for Water Programme in South Africa, a national programme for watershed management financed largely through the national Poverty Relief Programme. A prominent actor in the development of PWS is the WWF. Worldwide, Equitable Payments for Watershed Services (EPWS) schemes have been and still are developed. In East Africa WWF cooperates with CARE international on a number of EPWS. A scoping for potential sites has been carried out in 2008-2009 under the Poverty, Environment and Climate Change Network. There is also potential for governmental led watershed projects, especially in wetlands or municipal water suppliers. Payments for watershed services stem from five general sources: industrial water users, municipal water suppliers, hydroelectric power suppliers, and tax revenues (Ferraro, 2009). Water based ES may also be bundled into carbon emission trading schemes. Hydropower already is an important source of energy in the region and a number of watersheds in the region still hold the potential therefore. Several large- or small-scale plants exist. Furthermore, large scale industries in the region are still often not paying (or very little amounts) for water withdrawal. Their inclusion in PES therefore holds a high potential (Njenga, 2011; Masozera, 2010). On the regional level, transboundary water management schemes may be possible based on transnational initiatives and policies as e.g. the Nile Basin Initiative (NBI), the Lake Victoria Basin Commission (LVBC, 2004), EAC, and the African Union (AU). The past years have seen increasing prioritizing of water management also based on the direct connection between watershed management and poverty reduction (Donaldson & Swanson, 2001).

(e) Price premiums<sup>19</sup> paid for guaranteed biodiversity/watershed conserving/CO<sup>2</sup> emission reducing production processes (Buerli, 2006) as e.g.:

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<sup>19</sup> Once again it is emphasized here that discussions prevail on how far labeling is a PES as the premium price is not guaranteed for the farmer and can only be achieved if farmers have market access. Only when payments are conditional and guaranteed for the delivery of a single or bundled ES certificates/labels could be added as PES. Eco-labeling currently is often included in inventories and considered as PES in the region (e.g. PRESA). It is mentioned here for the sake of completeness while re-emphasizing the restriction for qualifying as PES.

- Fairtrade: The standard also promotes organic certification with its producers. The products most frequently certified by *Fairtrade* in the region are coffee and tea.
- Organic production: Certification for organic production is slowly gaining ground in Eastern Africa. In Uganda some 206,803 producers were certified in 2007, and in Tanzania 90,222 making these two countries together with Kenya the fastest growing and most important organically certified producing countries (UNEP-UNCTAD, 2010). National policies on organic farming are being developed (e.g. Tanzania has drafted a National Organic Agricultural Development Programme to enhance support to organic agriculture, certification and regulations; in Uganda an organic policy is being developed since 2003 by the Ministry of Agriculture and NGOs (ibid.)). The East African Community has developed the East African Organic Products Standard (EAOPS) which has been adopted by Kenya, Tanzania, Uganda, Rwanda and Burundi in 2007.
- Shade coffee: Initiatives on shade coffee e.g. through ICRAF and their project CAFNET exist especially in the South of Uganda and some emerging initiatives in Rwanda.

### 3.1.1. National Policies and Land Tenure Relating to PES

At the moment none of the countries in the region has a regulatory policy framework for PES. Concrete drafts for PES regulatory and operational frameworks are under development. In Uganda a policy for PES is under development, yet no publication date is given until now. Similarly in Tanzania a draft regulation to incorporate PES into the national water management policy framework is being prepared by national authorities. This will, however, still take considerable effort and time to gain ground and proceed (Nantongo, 2010; Lopa, 2011).

Despite the absence of specific PES policies, a number of sectorial laws can be applied to move PES forward or even contain a reference to PES as potential economic tool. Key documents are:

- Constitutions containing and recognizing the right to “a clean and healthy environment”<sup>20</sup>, or “a healthy and satisfying environment”<sup>21</sup> as well as paragraphs on land tenure and management (e.g. chapter 4 & 5 of the constitution of Kenya (2010))<sup>22</sup>.
- Water and forestry laws (e.g. played a role in the PES project of the WWF/CARE in Tanzania in the Uluguru Mountains), national poverty reduction plans (e.g. in Uganda and Rwanda), environmental action plans (e.g. in Rwanda), and possibly National Adaptation Programme of Action to Climate Change (NAPAs) especially in connection to mitigation projects.
- In Rwanda PES are explicitly mentioned as one mechanism under the Environmental Fiscal Reform overseen by the Rwanda Environment Management Authority (REMA). In Uganda the SLM Investment Frameworks contain references to PES.
- On the regional level the East African Community (EAC) and its protocols on transboundary NRM and environmental management can play an important role. These include the Treaty of East African Community (2000); the EAC Protocol on Environment and National Resources (2010); the Protocol for Sustainable Development containing the Ecosystem and Natural Resources Strategy of the Lake Victoria Basin Commission (LVBC, 2004); the Protocol of Wildlife Development (2008); and the Protocol of the Common Market (2009). These documents containing specific provisions for recognizing the value of ecosystems (e.g. preamble of the Protocol for Sustainable Development) (Okurut, 2010). Still these protocols are not being fully operationalized into the national level, nor do they contain specific references to PES.

<sup>20</sup> National constitution Uganda, chapter 4.

<sup>21</sup> Article 49 of the constitution of Rwanda. In Tanzania the Bill of Rights Article 14 contains the “right to life and to the protection of life by society” which has been interpreted by the national High Court of Tanzania as containing the right to a healthy environment (Pallangyo, 2007: 31). Furthermore, Article 9 of the Constitution requires ensuring national resources are preserved and applied towards the common good (ibid.).

<sup>22</sup> Article 42 of the constitution Kenya.

In East Africa complex and at times overlapping land tenure regimes prevail on the national, local, ethnical and community level (Myers, 2008). Land tenure and insecure land rights contribute to (political) instability and conflict (visible e.g. in Northern Uganda and Northern Kenya) (Place, 2009; Groppo, 2010). Mainly existing forms of land tenure can be differentiated into private or freehold land, governmental land often under leasehold, and customary or community lands. This can also be expressed as user rights, management rights, ownership and generational rights (Myers, 2008). In large areas customary land tenure and user rights prevail. Customary land tenure is recognized in all nations but Rwanda, where this has been officially declared void under the Organic Land Law (2005)<sup>23</sup>. Land reforms have been brought on the way in Tanzania (Land Act 5 (1999); Village Land Act (1999); Land Tenure Act (2007)); in Uganda (Land tenure reform 1998); Rwanda (Organic Land Law in 2005); and Kenya (under new constitution 2010; National Land Policy (NLP), 2009). Distribution of legal titles has been initiated in the region yet is not very advanced in most countries. Often land reforms have not been connected to close cooperation with local communities and customary institutions (Myers, 2008). Furthermore, it is still not perceived necessary by resource users and land owners to receive legal land titles as they are embedded in the cultural conception of (inherited) land ownership (Nantongo, 2010). This complexity is likely to impact the feasibility of PES in the region as secure and long-term tenure rights are considered central for the application of the mechanism (Greiber, 2010; Groppo, 2010; Nantongo, 2010). In the next section a scoping inventory is included in the research that aims to contribute more insights into the status quo and on-going activities concerning PES.

### *3.1.2. An Informative Inventory of On-Going PES Schemes in the Region*

The aim here is not to give an exhaustive inventory of all schemes and PES-like projects in the region. This section rather aims to gain insights into established projects, ES targeted by schemes, involved parties and the quality of existing regional inventories. A full inventory would also go beyond the scope of the research and be only of limited value, especially since many PES schemes only seem to exist on paper or are still in a the scoping phase. The inventory is strictly connected to the definition of Wunder et al. (2008). It forms the basis for in-depth case studies of the PES schemes. After an initial scan of the projects listed in the table below, a number of coherent PES cases have been selected to be analysed in more depth to gain insights into applied design principles, challenges and the presence of necessary pre-conditions for PES (see chapter 5). These were selected based on their location, phase the projects are in, ES targeted in the scheme, and facilitating actors based on the identified key actors for PES in the region.

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<sup>23</sup> Customary land holdings can be transferred through official land registries into legal titles. This process has been going on in the last years, yet still leaves the majority of the national land unregistered. See also below in chapter 4.

**Table 5:** Scoping Inventory of PES Schemes in East Africa

Project Name/Area	Objective of PES scheme	Initiator/facilitator	Buyer / seller
<b>ReDirect - Nyungwe National Park, Southern Province, Rwanda*</b> Initiated 2009	Trial pilot on direct performance based payments for <b>biodiversity</b> conservation	ReDirect (University of East Anglia (UK)) / partnering with Rwanda Development Board (RDB)	ReDirect / community
<b>Emiti Nibwo Bulora (Kagera District, Karagwe Zone, Tanzania)*</b> Initiated 2008	<b>Carbon</b> sequestration (agroforestry) Aim: 90,000 Plan Vivo credits sold by 2012.	Vi Agroforestry / Plan Vivo	Plan Vivo & Vi Agroforestry / farmers
<b>Uluguru Mountains, Tanzania - Equitable Payments for Watershed Services (EPWS) *</b> Initiated 2008	Equitable Payments for <b>Watershed</b> Management	WWF & CARE / support from IFAD, ICRAF, PRESA	DAWASCO & Coca Cola / farmer
<b>Uchindile-Mapanda reforestation project, Southern Highlands, Tanzania <sup>24</sup></b>  Initiated 2002, under VCS 2009	<b>Carbon</b> sequestration; Afforestation/ Reforestation of degraded grasslands <sup>25</sup> <b>Carbon</b> sequestration  Reforestation of 10,814ha and 7,565 ha into conservation; up to date: 611,418 tCO <sup>2</sup>  The Voluntary Carbon Standard (VCS) & Climate, Community and Biodiversity Alliance (CCBA) certification	Green Resources, AS <sup>26</sup>	Interested companies / Green Resources, AS
<b>Small Group and Tree Planting (TIST) of Tanzania, Kenya<sup>27</sup>, Uganda (One site in Uganda within TAMP area: Kabale District)*</b> Initiated 2003	<b>Carbon</b> sequestration (tree planting to restore deforested areas) So far 4,553,409 trees were planted in TIST Uganda.	Clean Air Action Corporation / Institute For Environmental Innovation (I4EI)	Clean Air Action Corporation which in turn sells to interested companies / farmer groups
<b>Trees for Global Benefit (Bushenyi, Masindi &amp; Hoima District, Uganda)*</b> Initiated in 2003, latest expansion in	Carbon sequestration; Agroforestry and reforestation <b>Carbon</b> sale between 2003-2008: 139,575	ECOTRUST / Technical support – ICRAF, Plan Vivo	Tetra Pak (main buyer) & other varying interested companies/private actors / farmers

\* Project is featured in the in-depth case studies in chapter 5.

<sup>24</sup> See <http://www.carbonneutral.com/about-us/media-centre/press-releases/first-forestry-vcs-credits-issued/> & <http://www.greenresources.no/Carbon/CarbonCreditProjects.aspx>

<sup>25</sup> Forestry and Other Land-use (AFOLU) project

<sup>26</sup> Green Resources, AS is a private Norwegian company with 60 shareholders operating in Mozambique, Sudan, Tanzania and Uganda. In Tanzania Green Resources has handed in a project idea note Mnyera reforestation project; in Uganda Green Resources leads the Kachung Forest Project.

<sup>27</sup> The TIST site in Tanzania is located in Morogoro, Tanga, Kigoma and Dodoma.

2009/2010	tCo <sup>2</sup>		
<b>Kibale National Park, Uganda</b>  Initiated 1994 <sup>28</sup>	Reforestation 8,800 hectares average storage capacity of 3.73 million tons of CO <sub>2</sub> over its 99-year FSC certificate until 2013; SGS-Qualifier	Face the Future (NL) / Uganda Wildlife Authority and Forest Authority	Co-operative Bank and others / Face the Future
<b>Kibale &amp; Mt. Elgon National Park, Uganda</b> Initiated between 1996-1998	<b>Biodiversity</b> conservation - Co-management ("rights for responsibilities" <sup>29</sup> ) e.g. shade-grown coffee in buffer zone <sup>30</sup>	Uganda Wildlife Authority (UWA) (government deal)	Uganda Wildlife Authority (UWA) and National Forestry Authority / communities around National Parks
<b>Rwoho Central Forest Reserve - Nile Basin Reforestation, Uganda</b> <sup>31</sup>  2003 under the National Forestry and Tree Planting Act; under VCS since 2007	Reforestation of grassland areas <b>Carbon</b> sequestration <b>Biodiversity</b> Expected carbon sequestration 0.11 Mt CO <sub>2</sub> by 2012 2,137 ha	National Forest Authority Uganda (NFA)	BioCarbon Fund / NFA <sup>32</sup>
<b>Western Kenya Smallholder Agricultural Carbon Finance Project (Nyanza Province and Western Province of Kenya)*</b> Initiated 2010	<b>Carbon</b> project	Vi Agroforestry	Bio Carbon Fund <sup>33</sup> / farmer groups
<b>Kinangop grassland project, Kenya</b>  Initiated 2003	<b>Biodiversity</b> ~72,000 ha  Use-restricting and use-modification leave land uncultivated, and encourage growth of grassland and shrubs.	Nature Kenya, Darwin Foundation / Friends of Kinangop Plateau (FOKP) (Community Based Organization (CBO))	
<b>Naivasha-Malewa Project, Kenya</b>	<b>Watershed</b> management	WWF & CARE	Lake Naivasha Growers Group, Lake Naivasha Water Resource Users Association

<sup>28</sup> The project has not taken a straight development as no emissions purchasing agreement has been signed and the project came under critique of mismanagement. Reforestation has taken place. Yet it is not possible to assess if credits are already sold as complications on the ownership of the credits prevail. The project came under heavy criticism for the applied methodology to remove people from included areas.

<sup>29</sup> See Ruhezwa et al., 2008. This approach is connected to the national revenue sharing programme of national parks.

<sup>30</sup> This component has been abandoned after funding ran out and after it proved unfeasible to market the wild coffee successfully.

<sup>31</sup> See also: <http://wbcarbonfinance.org/Router.cfm?Page=Projport&ProjID=9644>; the Nile Basin Reforestation Project was one of the first reforestation projects in Africa under the Kyoto Protocol.

<sup>32</sup> Community groups participating are paid by NFA per tCO<sub>2</sub> sequestered.

<sup>33</sup> The BioCarbon Fund is an initiative with public and private contributions administrated by the World Bank purchasing emission reduction certificates of reforestation and afforestation projects under the Clean Development Mechanism (CDM) as well as land-use sector projects falling outside of the CDM, e.g. the voluntary carbon market.

(LANAWRUA)			
Planned PES schemes <sup>34</sup>			
<b>Gishwati Forest Reserve, Rwanda</b> <sup>35</sup> Initiated 2008	<b>Carbon</b> sequestration Under VCS First pilot envisioned to be 100 to 150 ha in Nyabihu District.	Ecosystem Restoration Associates (ERA) / Ministry of Forests and Mines & National Forest Authority	Interested companies / ERA
<b>Nyungwe National Park (Western Province, Rusizi &amp; Nyaruguru Region, Rwanda)</b> <sup>36</sup>	<b>Water services, carbon &amp; biodiversity</b> conservation In exploratory phase	Wildlife Conservation Society (WCS) Rwanda / ECOTRUST	Potentially: tea factories in the region, carbon market (still to be explored)
<b>Same and Mwanga Forest Plantation Project, Tanzania</b> Initiated 2009 <sup>37</sup>	Reforestation of degraded or arid lands (Off-farm rehabilitation) - CDM Baseline Methodology to be employed: AR-AM0003  Expected: 200,000 ha; 90,000 tCo <sup>2</sup> per year	Safarijet Services Limited <sup>38</sup> / Technical support: Centre for Energy Environment Science and Technology	
<b>Usambara Mountains Tanzania</b>	<b>biodiversity</b> conservation; <b>(eco-)certification</b> systems Feasibility studies on-going; in past one carbon pilot project	PRESA and ICRAF	
	<b>Watershed</b> protection	WWF	

<sup>34</sup> The inventory also contains a number of planned projects that are listed as they have been mentioned in interviews within the research. The WCS and ERA projects are referred to in the chapter covering Rwanda. It also shows that more schemes are in the process of accreditation and baseline explorations.

<sup>35</sup> ERA is also working on developing an A/R and REDD project in the Kibira National Park in Burundi, yet has not received an official agreement from the national government.

<sup>36</sup> The WCS conducted feasibility studies, conducted first consultations with potential private sectors ES buyers and undertook a biomass assessment. The ES focused on will be water, biodiversity and potentially carbon (under Plan Vivo) (see also under the section on Rwanda).

<sup>37</sup> Project Idea Note (PIN) forwarded to DNA for Letter of Non-Objection.

<sup>38</sup> Is a private bank that is currently acquiring land for reforestation projects. The carbon revenue will be reinvested in Tanzania and 10 % will be spent on community projects.

Conducting this inventory already enabled to make an important discovery. When considering existing inventories the problematic and impact of the vaguely defined nature of PES becomes visible again. Several organizations as the Katoomba Group, UNDP, ICRAF are and have been conducting national inventories on PES in Africa and East Africa (see e.g. Ruhweza et al., 2008; Scurrah-Ehrhart, 2006). Yet, every inventory adopts a slightly different analytical frameworks and perspectives on what it considers under this category. This implies that there are no comparable national inventories for the region. Furthermore, the inventories are often affected by time and resource constraints. This is coupled with a very dynamic landscape of emerging or ending projects and project information that is difficult to retrieve. Accessible descriptions of PES projects are often superficial containing little information on design principles and lessons learned or are even imprecise and out-dated. When engaging in research on PES projects listed in inventories it turned out that the projects at times where no longer existing or are still in a very abstract planning phase or have never been considered as PES by the project managers themselves (Bwiza, 2010). The question is than if some projects and actors are already engaging in PES schemes without officially naming it or if projects have not been assessed under a coherent definition of PES. In order to conduct coherent inventories it requires a nuanced evaluation if projects are PES or integrated conservation and development projects, quota-based trading systems, or government subsidies (Sommerville et al., 2009).

Most existing PES schemes are located in Uganda, Tanzania and Kenya. Only one PES research scheme so far is established in Rwanda and Burundi features no projects yet. Of the on-going PES schemes few are governmental agreements located in protected or government owned areas as e.g. in Uganda in the Kibale and Mt. Elgon National Park. The majority, however, are private projects between two or more private actors and/or NGOs. Most PES schemes in operation are focusing on carbon sequestration (agroforestry, reforestation projects or alternative renewable energy projects). Few focus on biodiversity protection (e.g. shade coffee, organic production, community based conservation) and only two established watershed management schemes have been identified in the region (Uluguru Mountains, Tanzania & Naivasha project, Kenya)<sup>39</sup>. PES are thus mainly based on direct, indirect and optional values. The shift towards carbon projects can partially be explained by the very complex nature of watershed and biodiversity PES schemes (Forest Trends & Ecosystem Marketplace, 2008). Currently it seems easier to access the voluntary market for carbon trade as source of finances than finding potential and willing buyers for water services or biodiversity services.

The contribution of East Africa to the global carbon offset market is increasing slowly, Uganda being most advanced in making large-scale contributions (Masiga, 2010). Uganda was also one of the first Sub-Saharan countries together with South Africa to engage in large scale in the global carbon market<sup>40</sup>. Projects at the moment are focusing primarily on voluntary markets rather than regulated or compliance markets. All member states of the EAC are signatories to the Kyoto Protocol and have assigned a Designated National Authority (DNA). Efforts to become applicable for CDM projects and to mainstream the concept into the national strategies are undertaken in several countries. Forest definitions have been refined in Kenya, Uganda and Rwanda to include agroforestry and to facilitate the applicability of the term CDMs. This is not yet the case in Tanzania which will not allow for any af- and reforestation projects under the CDM mechanism (Williams, 2011). Screenings for the potential of Reducing Emissions from Deforestation and Forest Degradation (REDD) projects are on-going in Kenya, Tanzania, Rwanda and Uganda. Governments in the region seem to favour CDM to voluntary market projects (Scurrah-Ehrhart, 2006; Williams, 2011). This also has underlying political decisions including the ability to better control CDM projects. Most PES are, however, so far connected to the voluntary market and therefore this development may hamper carbon projects to increase.

<sup>39</sup> The PES under development by the WCS in Rwanda also intends to feature watershed ecosystem services. Further feasibility studies have been conducted by CARE/WWF identifying further possible sites as e.g. in the Usumbara Mountains, Tanzania.

<sup>40</sup> Ibid.

### 3.1.3. Key Actors and Institutions for PES in the Region

A number of national and international actors are already actively engaged in PES development or technical operationalisation of on-going schemes in the region. Based on the Jinja conference, internet research, literature study and interviews the following parties described in table 6 have repeatedly been encountered in connection to PES.

**Table 6:** Overview Key Actors for PES in East Africa

Actor	Role
<b>National ministries and authorities</b> especially in the area of water management, natural resource management, environmental management, agriculture, and forestry	At the moment national authorities are primarily involved in PES when the ES in focus falls within their mandate, or they support the technical specifications and monitoring in on-going schemes. It is, however, considered important to strengthen the active involvement of governmental actors to enhance an enabling regulatory framework; to find additional funds; increase the legitimacy of the scheme; and to decrease uncertainties for potential ES stewards and buyers (Masozera, 2010; Corbera et al., 2009; Gross-Camp et al., 2010). Efforts and increasing engagement of some governmental institutions in intermediary bodies can be seen in Rwanda, Tanzania and Uganda.
<b>International organizations</b> as e.g. FAO <sup>41</sup> , the United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP), the International Fund for Agricultural Development (IFAD), the World Agroforestry Centre (ICRAF) and the World Bank Carbon Finance Unit	These actors are often driving actors in initiating research and capacity building workshops/networks and inventories.
<b>International and national NGOs:</b> Particularly often encountered in on-going PES or efforts to increase the capacity for the mechanism were: the World Wildlife Fund (WWF) <sup>42</sup> , Cooperative for Assistance and Relief Everywhere, Inc. (CARE), Vi Agroforestry, Wildlife Conservation Society (WCS), Plan Vivo, and ECOTRUST (Uganda)	NGOs hold a similar function as listed above, yet are often even more directly involved as facilitators in PES schemes also through excising NRM or community projects. In Tanzania and Rwanda they were essential in bringing PES on the political agenda.
<b>Regional and international networks</b> as the Network for Environmental Services in Africa (NESA) <sup>43</sup> , Pro-Poor Rewards for Environmental Services in Africa (PRESA), East and Southern Africa Katoomba Group (E & SA KG), and Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA)	Are central in capacity building, exchange and pooling of PES expertise and experiences, as well as drafting a research agenda for the potential and effectiveness of PES in the region.
<b>National/local farmer associations or groups</b>	PES schemes often use existing structures or initiate and strengthen the latter in order to reduce transaction costs, increase participatory approaches and strengthen local institutions for NRM to enhance the effectiveness of PES.

<sup>41</sup> Especially through its PESAL programme (Payments for ecosystem services in agricultural landscapes).

<sup>42</sup> The WWF is active in a number of PES worldwide, especially in Asia. Most of these schemes focus on watershed management and are called Equitable Payments for Watershed Services (EPWS).

<sup>43</sup> NESA has been formed after the PES conference in Jinja, Uganda (2010). The aim of the network is to foster research on the potential of PES in Eastern Africa, share experiences and knowledge and built an expert network that can support new PES project development. Members include research institutions and universities, PES experts, NGOs, international organizations and platforms.

<b>Local authorities</b> and community institutions	Play a vital role in on-going PES schemes in the region as facilitators, institutional platform for conflict resolution and confirmation of land ownership in case of absence of legal titles. In some schemes the community as a whole is the ES provider and is even envisioned to potentially replace the initiating actor of a PES in the long-run (Njenga, 2010).
<b>National and international research institutions</b> and universities as e.g. in Kenya (Victoria Institute for Research on Environment and Development International (VIRED); Kenya Agricultural Research Institute (KARI); Moi University); Uganda (e.g. Harnessing Initiative (NAHI), Advocates Coalition for Development and Environment (ACODE), Makerere University); Tanzania (Sokoine University of Agriculture; University of Dar es Salaam); Rwanda (Institute of Scientific and Technological Research (IRST))	Universities and research organizations are often part of PES networks and contribute to baselines studies, methodology for ES valuation etc., evaluating the effectiveness of PES schemes, and monitoring.
International and national <b>consultancies</b>	Are primarily involved in the technical specifications, baseline studies and at times in monitoring activities.
International <b>donor organizations</b> including USAID (involved in TIST & with WCS), DFID (UK) (e.g. involved in TGB Uganda), Danida (DK) (in Uganda and NEMA project, Tanzania), SIDA (SW) (Vi Agroforestry project Tanzania), the World Bank (especially through its BioCarbon Fund) and EuropeAID	Provide start-up costs and at times act supportive to raise attention on the national level to the potential of the mechanism (e.g. through workshops or direct bilateral contact).

These actors are either actively (e.g. initiating or facilitating) or passively (e.g. technical advice) involved in supporting PES projects and the dissemination of the mechanism. They will most likely also play a key role in the future development. After the synthesis on this chapter, in the following chapter the insights gained on the regional level are taken to the national environment by analysing the case of Rwanda.

### 3.2. Outlook of PES in East Africa

#### Key Findings on the Regional Level

- PES are in line with national NRM policies, constitutions, National Adaptation Programme of Action to Climate Change (NAPAs), national poverty reduction plans, SLM investment frameworks, and with protocols for transboundary NRM of the East African Community
- A number of possible sectors and initiatives that can be supplemented by PES, e.g. revenue sharing, watershed management (hydropower), and biodiversity conservation
- Central actors for PES initiation at the current moment include: international/national NGOs and organisations, donor organisations, research institutes and networks and local institutions
- No specific PES policies or regulatory frameworks in place yet
- Little active involvement of national governments in advancing to mainstream PES into national context and therefore uncertainty on level of governmental support of PES
- Land tenure very complex and primarily customary tenure prevails
- Small-scale land ownership likely to have a negative impact on transaction costs for PES
- Increasing number of PES pilot projects despite absence of specific policies and land titles
- Very dynamic landscape with large number of projects not succeeding in reaching operational phase
- Existing national inventories do not apply one common definition of PES making comparison very difficult
- Difficult to retrieve up-dated information and data on projects
- Carbon projects very prominent

**Box 2:** Key Findings on the Regional Level

This chapter provided first insights into the status quo of PES in the region. It analysed the presence and nature of factors as regional NRM policies; land tenure; institutions and actors already involved in promoting and designing PES and PES research; and identified particularly important ES and potential PES foci. A great interest from organizations, research facilities and increasingly also from governmental bodies exists. Nonetheless, this is often coupled with limited understanding of the meaning, implications and roles of PES at the governmental level as well as with potential ES stewards and buyers. This bears the danger of a vague understanding of the concept and therefore misguided expectations on the role or potential of PES in the negative (seeing no real benefit of PES) and positive direction (PES as silver bullet). If considered as omni-potential and replacing existing NRM mechanisms the reliance and expectancy of the voluntary PES mechanism is likely to be too high. If depicted and communicated wrongly the expectations also of ES stewards and other PES stakeholders is likely to be disappointed which might have a negative impact in the trust relationship and willingness to cooperate. Due to the high interest in PES it is also likely that actors will be inclined to re-name existing projects into PES in order to get on the bandwagon with easier access to funding (Wunder, 2010). This is especially the case for community based resource management projects, revenue sharing programmes and co-management. Yet, as mentioned above revenue sharing projects as well as co-management of NRs are no PES if not explicitly connected to conditional and monitored arrangements on necessary actions, land-use changes etc. (see Wunder, 2010). Ambiguity about the definition and actual potential as well as concern about the voluntary nature of PES e.g. has been voiced as in the regional workshop. Regulatory frameworks and mainstreaming efforts to include PES into national policies are currently on the way e.g. in Uganda and Tanzania. Yet still it can be said that there are too little concrete national efforts or existing ones fall short of promoting, operationalising, institutionalising or mainstreaming PES into national frameworks. Another barrier observed is that often there is little coordinated enhancement of PES on national governmental level due to limited capacities, understanding and prioritization. It is further possibly enhanced by a gap between the efforts of international and national actors to enhance PES without close cooperation with the national government. This makes the process of PES development not a government-owned process which may impact the support to PES. Often politicians have limited knowledge on the mechanism leading in marginal involvement of national governments in PES enhancement. The “financial health of

institutions” in the region is another aspect that is likely to have an impact on PES (Ferraro, 2009: 536). Furthermore, as mentioned above, the re-investment into the environment remains limited.

Current PES schemes in East Africa are taking place in areas where often customary land tenure prevails. This makes it necessary for project facilitators to seek close cooperation with multiple authorities, formal and informal which is a very time consuming process. External funding is central in on-going PES schemes and this is likely to remain in the future as local budget is often very limited. The largest part of PES initiatives in Africa are funded through international development assistance, international conservation organizations and to a slowly growing extend through governmental agencies. The involvement of the private sector remains very limited. The increasing attention on PES on the international donor level bears yet another danger: the plain re-naming of e.g. existing land management and community based resource management projects into PES. Existing PES inventories are not based on one common definition making it difficult to compare them. During the PES conference in Jinja, Uganda it became clear that there is a high need and interest to exchange information, create a well-connected network and a need to foster a more comprehensive understanding of PES.



#### 4. The Presence of Supportive Key Factors for PES in Rwanda

In this chapter, the presence or development of a favourable institutional and policy environment is explored on the national level based on an in-depth case study of Rwanda based on the key factors identified in chapter 2 (figure 6). The chapter features information on policies and initiatives that may support PES introduction; on actors active in PES developments; potential ES consumers; and existing NRM or SLM initiatives that are in line with PES development. It contributes insights on the degree of a favourable institutional and policy environment, institutional interaction, and the coherence of national structures with key factors of PES. Thereby evidence is retrieved on the readiness of political institutions to support a successful implementation of PES and institutional dynamics as well as major challenges on the national level influencing the feasibility of the mechanism.



**Figure 9:** Location Rwanda  
**Source:** FAO, AQUASTAT, 2005

The chapter is primarily based on interviews with representatives of national agencies, NGOs, and international organizations that are active in NRM in Rwanda<sup>44</sup>. Furthermore, policy documents have been studied in addition to project reports, and other relevant publications. Two workshops have been observed which were attended by several key stakeholders for NRM: the above mentioned workshop on the potential of agroforestry and carbon organized by ICRAF and WCS, as well as a workshop on the national policy strategy on bamboo by the International Network for Bamboo and Rattan (INBAR), the Ministry of Mining and Forestry (MINIFOR) and the National Forest Authority (NAFA).

Rwanda is a relatively small country covering 26,338 km<sup>2</sup>. It is divided into five provinces that are subdivided into 30 districts which are in turn subdivided into the smallest administrative unit, the cells. The country is a member of the New Partnership for African Development (NEPAD), the African Minister's Council on Water (AMCOW), the Nile Basin Initiative (NBI), and since 2007 to the East African Community (EAC). With a population of 10 million in 2009 it has one of the highest population densities in Sub-Saharan Africa (i.e. 380 inhabitants/ km<sup>2</sup>) (Worldbank, 2010). The urbanization rate with 10 % is relatively low. More than 60% of the population lives in poverty with the highest percentage in the rural areas (UNEP & IISD, 2005). Almost 90% of the national population relies on agriculture which makes the sector the backbone of the national economy (UNEP & IISD, 2005). Coffee and tea are the two principal cash crops for exportation. Other important branches are mining as well as the fastest growing sector, tourism (REMA, 2009).

Almost 80 % of the total surface is under agricultural production which increases the heavy soil erosion in the primarily mountainous and hilly landscape as well as food insecurity, thus the vulnerability of the populations and the ecosystems (Worldbank, 2010). Agricultural productivity has been declining in the past decades. Since 1980s also sizes of farms have been decreasing. The situation worsened through the 1990s conflicts and the consequential displacement of people. Pressure on natural resources and land has been increasing which becomes e.g. visible in the degradation of the wetlands and the rapid decline of the size of protected areas especially in the Akagera National Park in the Eastern Province (69 % between 1996 and 2003). More than 64 % of the forest cover was lost between 1960-2007 (REMA, 2009). Ntaruka, one of the most important dams has seen a rapid decline in hydropower potential (Hove et al., 2011).

##### 4.1. Developments towards PES in Rwanda

Similar to other countries in East Africa the national context of Rwanda experiences an increasing interest and awareness for PES on the governmental as well as NGO side (Mulisa,

<sup>44</sup> See Annex II for interviewed actors.

2010; Ntalindwa, 2010; Uwimana, 2010; Dismas, 2010; Foltz, 2010). A national working group has been initiated in 2010 (see box 2 below) and workshops have been conducted discussing how PES can potentially be introduced and operationalized. In interviews demand to participate in capacity building workshops and learn more on the potential and technical design principles of PES schemes has been expressed (Dismas, 2010). Efforts to include PES into national frameworks are emerging. REMA under the Ministry of Environment and Lands (MINELA) has been engaging in PES research and included the mechanism in the Environmental Fiscal Reform (EFR) (2010). The Environmental Fiscal Reform<sup>45</sup> developed by REMA supported by the Poverty Environment Initiative (PEI) of UNDP and UNEP, features economic mechanisms, regulations and taxation mechanisms for environmental management. Within this initiative REMA and MINIFOR and the Ministry of Environment and Lands (MINELA)<sup>46</sup> strive for the integration and mainstreaming of the environment into district planning, national policies, budget planning for implementing the EDPRS. PES are considered as possible economic instrument for sustainable environmental management and poverty reduction and as potential additional source of funding for environmental management (REMA, 2010).

Most active in the enhancement of PES in the past has been the Wildlife Conservation Society (WCS). The international NGO is focusing its work on the Nyungwe National Park in the Southern and Western Province. Concerning PES it is working on the national level, promoting awareness and initiating a working group, as well as on the project level, engaging in baseline studies and ES seller and buyer scoping exercises. The NGO has already initiated first meetings with potential ES buyers, tea factories surrounding the national park benefitting from the water and micro-climate services. Some representatives declared their willingness to pay yet also stressed the necessity of creating a stable environment for PES first. This should be based on legal guidelines and regulations that give security and structure to PES schemes from the government (Masozera, 2010). A potential scheme in the Nyungwe Park may be aiming at bundling water, biodiversity and carbon ES. In 2011 further baseline studies will be conducted<sup>47</sup>.

### The National Working Group on PES

In October 2010 a national PES working group has been called to life through a cooperation of the Wildlife Conservation Society (WCS)<sup>48</sup> and the Rwanda Environment Management Authority (REMA). The initial members of the group included staff from Rwanda Development Board (RDB), Tourism and Conservation (T&C), the National Forest Authority (NAFA), and REMA. Key institutions listed in the first meeting include: RDB T&C; REMA; NAFA; MININFRA (water department); MINAGRI; WCS and MINELA. A national workshop in mid-December 2010, was aimed to identify further interested and key stakeholders including key governmental, NGO or international organizations as well as to promote the concept of PES and to develop a common agenda for enhancing the mechanism. The ultimate aim is to include all major governmental authorities, and NGOs involved in ES management. In the first meeting the Terms of Reference for the national working group were discussed. The working group will be process-focused and serve as a think-tank to envision the process of PES operationalisation (WCS, 2010). One prime aim of this working group is to build capacity on PES and to foster the development of regulations and legal regulations. The workshop confirmed the notion of a national working group and made recommendations to establish a core team coordinated by REMA as well as to initiate a series of policy dialogues on PES (ibid.).

#### Box 3: Introduction to the National PES Working Group, Rwanda

<sup>45</sup> The latest reform of a national EFR aims to coordinate EFR incentives such as taxation, tax rebates and exemptions, full cost pricing of natural resources, subsidies and e.g. PES.

<sup>46</sup> Formerly Ministry of Natural Resources (MNIRENA).

<sup>47</sup> In 2011 ECOTRUST will support the PES scheme development in the Nyungwe region. Another potential partner in case carbon is considered as one feasible ES of the scheme is Plan Vivo.

<sup>48</sup> The WCS supported by USAID was the initiating actor for the working group. The NGO yet places great weight on making the process of PES enhancement in Rwanda a governmental owned process and has after the initial meeting been working closely together with REMA (Masozera, 2010).

In general the awareness on the value of NR and ES seems to be increasing. In 2010 REMA under the national government of Rwanda was awarded the Green Globe Award for the restoration of the Rugezi – Bulera-Ruhondo wetland under the Integrated Management of Critical Ecosystems (IMCE). Furthermore, environmental regulations and monitoring are developing (REMA, 2009). On the other hand however, supportive laws, operationalising regulations or an assigned national PES authority are still lacking. The only existing PES in Rwanda, the ReDirect research project is not well known amongst other national authorities not directly involved in the project. In conversations with members of national authorities or NGOs it became visible that the potential of PES (especially beyond carbon projects) seems to be rather unknown.

#### 4.1.1. Potential Buyers and NRM Programmes

Considering the significant pressure on ES in the national context special attention should be placed on provisional ES as food, fuels, fresh water and fibre provision; regulating services as purification of air and water, mitigation, biodiversity and soil fertility maintenance; as well as enriching ES as social values and aesthetic values (see Duraipah, 2002). Based on its densely populated landscape use-modifying PES seem most promising. A number of governmental programmes as well as other projects are on-going that are likely to be supportive for PES through initiating the development of capacities and structures beneficial for ecosystem management.

##### *Watershed Services*

Watershed management is one possible ES that may become central to a PES scheme. Potential consumers of water ecosystem services include the Rwanda Electricity Corporation (RECO) and the Rwanda Water and Sanitation Corporation (RWASCO), as well as large scale factories that are self-supplied industries directly extracting water from rivers or through the national providers e.g. for tea/coffee, sugar and beverages (e.g. KABUYE SUGAR WORKS or Brasseries et Limonaderies du Rwanda (BRALIRWA)) (see Table 7). In total 15 water treatment plants are in place nationwide, supplying 22.999.197 m<sup>3</sup> water in 2009. Rwanda is also a member to the already mentioned transnational initiatives including water management (NBI, EAC, and AU). This may also include further possibilities for transnational PES.

**Table 7:** Major Industries Depending on Water Withdrawal

Industry types	Number
Agro-processing	40
Chemical industries	29
Printeries and paper industries	14
Metal works	10
Mining	7
Non metals & fabrication	6
leather and tanning	3
Textile	2
Electricity, gas and water supply	1

**Source:** MINITERE, 2005

Most notably has been the decline of water ES in the decrease of hydropower potential at the Ntaruka dam. Together with the Mukungwa station these two dams provide almost 90% of the national electricity. 65% of the total hydropower in Rwanda comes from run-of-river installations. Hydropower currently makes up 50% of the national electricity sources with 27.3 MW produced through hydropower sites in the country and a slightly smaller figure of additional imported hydropower (MININFRA, 2011)<sup>49</sup>. The maximum potential calculated at the moment is 85 MW (ibid.). Electricity costs in Rwanda are quite high compared to other countries in the region with consumer paying 112 Fr/kwh (US\$ 0.19) (132 Fr/kwh (US\$ 0.22) incl. VAT). A governmental programme based at the Prime Minister's Office (2010- 2017) fosters the development of hydropower projects that may also be connected to CDM projects. MININFRA is the central institution for hydropower projects. Private actors that connect their hydropower station to the national grid are paid 70 Fr/kwh (US\$ 0.12) by RECO (MININFRA, 2011). The GTZ and SNV (NL) cooperate on a project that supports private partners in developing their own hydropower project. Four projects have been initiated and contracts signed and two further sites are under construction. Partners have to draft a management plan that has to be approved

<sup>49</sup> Figures provided by RECO for the power supply vary with a total of 98.8 MWH from national hydropower plants and 62.3 MWH imported. Other electricity sources include thermal power, solar power and methane gas, diesel and others (Nturanyenabo, 2010).

by the MININFRA. REMA than conducts an environmental impact assessment (Nturanyenabo, 2010). This project therefore already has some PES-like aspects that could potentially be emphasized.

The awareness of the necessity to manage and protect critical ecosystems and water services has been increasing in the past years with the national Integrated Management for Critical Ecosystems (IMCE). This project lays the foundations for ecosystem management and identifies four critical ecosystems: Rugezi, Kamiranzovu, Akagera and Rweru-Mugesera. The protection of wetlands is identified as central issue and different categories of wetlands have been developed. Up until today projects for ecosystem management have been developed in 10 districts. Through the IMCE local management committees are created, so called Watershed Management Committee (WAMACO) that are centrally involved in the development of community based integrated management plans. IMCE has four components:

- “(i) Development of a policy and regulatory framework for sustainable wetland and NRM;
- (ii) Capacity building and institution strengthening for integrated ecosystem management;
- (iii) Development and implementation of community-based integrated ecosystem management plans for critical ecosystems;
- (iv) Project management and coordination.” (REMA, 2010a)

In cooperation with WAMACOs management plans are drafted outlining key activities and inventories. The approach taken in the IMCE is strengthening local institutions and supports capacity building on natural resource and ecosystem management.

#### *Biodiversity ES*

Turning from water service to biodiversity, the potential lies especially in protected areas. Such areas are central in providing ES as biodiversity conservation, water purification, and partial stabilization of the climate and aesthetic values (e.g. landscape beauty and tourism). Rwanda has five protected areas out of which three are national parks covering ca. 8% of the total national area (see Figure 10). Two of the national parks, the Nyungwe and Volcano National Park are part of the Albertine Rift eco-region and belong to highest biodiversity areas in the rift (WCS, 2010). Apart from the rich biodiversity of these areas, they are of key importance to the national tourism sector (REMA, 2009). Tourism is one of the most important sectors and in 2008 made up 5.3% of the national GDP (US\$ 197.7 million) (ibid.). Due to resettlement and human interference the last years led to a decrease of these areas. Initiatives to enhance tourism as well as the national revenue fund try to approach this issue. The national revenue sharing fund under RDB assigns 5% of the total gross revenue earned in the three parks into a common pool which is then distributed to the three national parks (Ngoga, 2010). The Volcano National Park receives the ration of 40%, Nyungwe National Park 30% and the Akagera Park 30%. The fund is earmarked to support community projects around the national parks e.g. in participatory natural resource management projects (e.g. with CARE) or in infrastructure development. Next to the PES initiative of ReDirect and the WCS in the Nyungwe National Park, the management party of the Akagera National Park, the Akagera Management Company is also interested in applying the mechanism of PES for integrated conservation (Havemann, 2010).



**Figure 10:** Location of Protected Areas in Rwanda  
**Source:** USAID, 2008

#### *Carbon Projects*

Carbon projects are another possible sector for PES in Rwanda. A number of government projects that are undertaken on the national level as e.g. reforestation activities are not yet considered under climate change mitigation and adaptation. The potential for agro-forestry and carbon sequestration in Rwanda is yet still little explored (Mukuralinda, 2010). The exploration of this has also been the objective of the national workshop in late November, 2010 organized by ICRAF and WCS. Currently voluntary carbon market projects in Rwanda seem to face challenges

in the project development and the fact that no clear policy framework is in place (Suazo, 2010; Uwimana, 2010; Masozera, 2010). In 2009, a capacity building project was initiated, positioning REMA as the central authority in CDM and carbon market development as well as to support awareness raising in the private sector and their engagement in CDM projects (Ntazinda, 2010). In 2010 REMA issued a new definition of forest to the UNFCCC secretariat that enables agroforestry to fall within the definition (ibid.). This enables agroforestry projects to qualify as CDMs. The development of a framework and enhancement of CDM projects is the current priority of REMA in carbon projects. A national strategy and implementation plan for the carbon market is expected in early 2011. Clean Development Mechanism projects are connected to the EDPRS. MINELA prepared the second national communication on climate change in late 2010. This document contains currently possibilities and recommendations for climate change mitigation and adaptation. At the moment the three areas of energy production and efficiency, forestry and waste treatment are central to the CDM project development (Ntazinda, 2010).

REDD potentials in Rwanda can be considered to be limited as most of the primary forest has been cut down. Currently, there are two potential projects: one by NAFA focusing on forest and tree cover in state and district forests. Another one is connected to the Congo Basin Forest Fund (CBFF) by the Woods Hole Research Centre (WHRC) for the four Congo Basin countries with the emphasis on capacity building on forest policy and management (Ntazinda, 2010). Several carbon and CDM projects are in different stages of development. Most are private projects with two governmental projects under MININFRA on hydropower and energy efficiency. One registered project with UNFCCC/CDM is initiated by MININFRA and RECO/RWASCO. It is a nationwide energy efficiency electro-gas project initiated in 2006 and certified in late 2009 (until 2018) with support from the World Bank. The second project is a planned hydropower project at Lake Kyvo and Nyabarongo. A further candidate for carbon certification under development is the national domestic biogas programme undertaken by MININFRA with support from SNV (NL). It aims to establish 5,000 biogas stations throughout the country. Stations already exist in 30 districts with a higher concentration in the North. This programme is intended to produce VCRs in cooperation with the Humanist Institute for Development Cooperation (HIVOS). The contract is yet still being reviewed by the national government (Owekisa, 2010). The idea is to include the programme eventually in a multi-country CDM Programme of Activities for domestic biogas of the East African Community. Farmers participating in the programme receive a subsidy to the construction costs and in turn sign away their rights to the emission reductions to the programme.

Another carbon project under development is focusing on the Gishwati Forest Reserve. The initiating party is the Ecosystem Restoration Associates (ERA). The project would mainly be on government owned land and the credits from the reforestation project, to be sold on the carbon market, would be signed over to ERA to be reinvested into the communities. ERA is waiting for the Carbon Rights Transfer Agreement to be signed by the Ministry of Forests and Mines (Zukowska, 2010).

The Clinton Hunter Development Initiative (CHDI) has initiated an agroforestry and tree planting project in 2007/2008 in five districts in Rwanda. The project includes 5,000 farmers and ca. two million trees have been planted up to date (Uwimana, 2010). Land-use systems promoted include boundary planting, fruit orchards and wood load. Participating districts were selected in cooperation with the President's Office and NAFA. Capacity building for tree planting (spacing, seedlings) and carbon sequestration has been provided by the Edinburgh Carbon Credit Management Centre (ECCM). The project was developed in line with Plan Vivo project guidelines and the application of the project to become certified for carbon trading has been accepted by REMA. The due to unexpected financial limitations project was not pursued further (ibid.). Field staff however, is monitoring the proceedings and provides technical advice for tree planting. However, the issue of trust would have to be investigated, as participating farmers entered the project with the perspective of becoming certified for carbon certificates. These expectations could so far not be fulfilled which might have an impact on the relationship between participants and the CHDI.

*Other on-going Projects with PES Potential*

Outside of the governmental agencies, a number of NGOs and international organizations are turning towards PES potentials or are active in NRM programmes with potential for PES. Interest and the intention to research PES has also been voiced by the Nile Equatorial Lakes Subsidiary Action Program (NELSAP) of the Nile Basin Initiative (Kabenga, 2010). PES are considered possible mechanism to be applied in hydropower services and water storage management.

ICRAF Rwanda holds a number of SLM projects such as high quality shade coffee in the Western Province, bamboo planting projects in national park buffer zones in cooperation with the Rwanda Bamboo Society, and agroforestry. One aim of these projects is also to organize farmers in cooperatives and associations. Together with WCS, ICRAF is exploring the feasibility of agroforestry and carbon sequestration in Rwanda. ICRAF also holds expertise in carbon appraisal tools. In cooperation with the Institute of Scientific and Technological Research (IRST) a number of carbon sequestration studies have been conducted. In Rwanda ICRAF is not involved in PES activities, yet an agreement for close cooperation with REMA in the development of a PES framework is initiated (Mukuralinda, 2010). In the East African region ICRAF is involved in several PES schemes through providing technical advice and developing technical specifications for land-use schemes.

The NGO, Vi Agroforestry is working within the Vi-LIFE regional project in Kenya, Tanzania and Uganda. The focus of the work is on small-scale farmers (from ½ – 1ha) that have farming as principal income activities. Core activities of Vi include climate change mitigation and adaptation (especially energy-saving stoves, renewable energies); micro-financing and enterprise development; local institutional capacity building (e.g. farmer groups); technical and material support for agroforestry; and monitoring and evaluation capacity building. Through the programme and field staff present in the districts Vi has developed strong relationships in the districts they are operational in as well as structures for monitoring and capacity building (Suazo, 2010). The NGO is interested in the potential of adding carbon sequestration certification and possibly ES bundling (e.g. water management) to its on-going projects similar to other Vi projects in the region.

CARE Rwanda is currently not active in PES, yet the NGO undertook an appraisal of PES potential for catchment management (2008/2009) in East Africa under its Poverty, Environment and Climate Change Network. The area of research in Rwanda was focused on the Yanze catchment an important area for the water supply in Kigali. The final report could not be written as the water company there accidentally deleted the records of water treatment costs (Ellis, 2010). Due to this CARE was not able to undertake a financial proposition for watershed investment - critical to such studies. The study can yet provide insights for PES development, and the role of national authorities to support PES schemes baseline studies and planning. Also international donor organizations have voiced their interest in PES in Rwanda. Next to potential involvement of USAID in the Nyungwe project, SIDA (SW) initiated an environmental programme in cooperation with REMA and NAFA and is in favour of applying PES (Ntalindwa, 2010). SIDA also intends to encourage REMA to enhance PES application (ibid.). SNV (NL) is involved in the hydropower project together with the GTZ as well as in national domestic biogas projects in East Africa (Rwanda, Tanzania and Uganda) and is cooperating with HIVOS to certify the emission reduction and develop a regional CDM project.

**4.1.2. Key Institutions for NRM and PES in Rwanda**

In the following paragraph important actors and institutions in Rwanda are listed, some of which have already come in contact with PES through the national working group, EFR, the Protected Area Biodiversity Conservation Project (PAB), or the ReDirect project. Other actors are central for NRM and hold the mandate (in case of governmental agencies) for possible ES sectors.

### *Central Governmental Actors*

At the current moment the following governmental actors are central for PES dissemination: the Rwanda Environment Management Authority (REMA); the National Forestry Authority (NAFA); the Ministry of Infrastructures (MININFRA); Rwanda Development Board (RDB); the Ministry of Mining and Forestry (MINIFOR); the Ministry of Environment and Lands (MINELA); the Ministry of Finance and Economic Planning (MINECOFIN); the Ministry of Agriculture and Animal Resources (MINAGRI).

- With a broad mandate to oversee and facilitate coordination of implementation of national environmental policies REMA is a central governmental institution and curator for developing a framework and regulations for PES. As PES development in Rwanda is intended as a governmental-owned process REMA will also be central in enhancing first pilot projects. Awareness on PES is present in this authority and in a next step operationalising PES or engaging in a pilot project needs to be enhanced (Mulisa, 2010, Masozera, 2010). REMA is a member of the national PES working group and coordinated the national workshop to raise awareness on PES in December 2010. Under the Protected Area Biodiversity Conservation Project (PAB) a feasibility study of PES for biodiversity as well as watershed protection, climate regulation, and scenic beauty in the Nyungwe Forest National Park has been conducted (Masozera, 2010). The focus of the agency is at this stage is on how PES can be best be applied and embedded in the national context and potentially also on the transnational level (e.g. international water management or carbon) (Mulisa, 2010). A biodiversity policy is being developed under PAB that will contain the lessons learned. REMA already is the Designated National Authority (DNA) for CDM projects and coordinates collaboration with NAFA, RDB and MINAGRI (Ntazinda, 2010). Based on its broad mandate it will most likely be playing a leading role in PES enhancement in Rwanda (Masozera, 2010).
- The department on climate change mitigation and adaptation is overseen by the Ministry of Land and Environment (MINELA). The Ministry for Infrastructure (MININFRA) coordinates national energy and water supply projects also under RECO/RWASCO. MINAGRI is a key actor for sustainable agriculture projects.
- Another important actor is the Rwanda Development Board (RDB) whose mandate comprises the management of all national protected areas as well as the development of commercial projects. RDB is the focal point for contractual agreements especially in case of government projects and protected areas. The RDB is a key partner of the ReDirect PES project. Central for PES is the department for tourism and conservation (T&C).
- The National Forest Authority (NAFA) is responsible for the coordination of national reforestation projects, forest management, REDD projects, as well as tree planting for energy. It is also developing the national carbon policy which will be providing the legal framework for developing carbon/af- and reforestation projects (expected to be finalized in early 2011).

### *Further Supportive Actors*

Next to governmental agencies, similar to the above identified regional actors, others may be:

- Farmer cooperatives and groups that foster the organisation and grouping of farmers as basis for PES helping to minimize transaction costs while maximizing benefits and co-effects. Farmer groups and cooperatives have been increasing in the last years especially in connection to the Rwanda Cooperative Agency (RCA) established in 2008 or the IMCE programme (WFP, 2010). Several programmes and projects from national authorities as well as international organizations as IFAD, FAO, USAID, SNL and others also focus on promoting these structures e.g. through farmer field schools.
- A number of international NGOs and organizations as WCS, ICRAF, Vi Agroforestry, CHDI, NELSAP, and CARE are already engaged in research on the feasibility of PES with a number of already undertaken baselines studies and capacity trainings of their personnel. In the

future it will also be important to increase the involvement of national NGOs<sup>50</sup> involved in (community-based) NRM as e.g. the Rwanda Environment Awareness Services Organisation Network (REASON); the Association for the Conservation of the Nature of Rwanda (ACNR); or the Rwanda Forum on Water, Sanitation and Environment (RWASEF). Furthermore, national research institutes as the Rwanda Institute for Agricultural Science (ISAR), the Institute of Scientific and Technological Research (IRST) or the National University of Rwanda (NUR) may become engaged in PES research.

#### 4.2. National Policies Supportive to PES

A number of national policies and laws exist that assign an important position to environmental and resource management. These can be considered to be in line with and thus supportive to PES. Article 49 of the national constitution (GoR, 2003) contains the obligation to protect the environment. The National Vision 2020 contains the need to integrate the environment into development plans. This document aims at reversing deforestation; achieve a total of 250,000 ha permanent green cover (30%); reducing soil erosion and siltation of rivers and water; alleviate shortage of firewood, charcoal and electricity; diversification of energy sources also through transboundary cooperation; and sets the goal of total electrification and connection to the water grid by 2020 (GoR, 2000). The national Economic Development and Poverty Reduction Strategy (EDPRS, 2008-2012) under the second Poverty Reduction Strategy places emphasis on the importance of environmental protection as well as sustainable NR and ecosystem management for human and agricultural development. The strategy emphasises cross-sectorial cooperation to define environmental priorities.

The Organic Law N° 04/2005 (GoR, 2005a) contains modalities for the promotion, protection and conservation of the environment. It protects watersheds and water bodies (Article 51) e.g. through the duty of the state to install measures to control soil erosion. Through the law responsibilities for the protection and conservation of the environment were decentralized (Article 61). The Organic Law N° 04 also features a clause under Article 73 on possible tax incentives for industries or individuals that promote the environment. Furthermore, it is including the introduction of obligatory environmental impact assessments for acts and projects having a potential impact on the environment. Soil and water conservation is further consolidated in the Law on Soil and Water Conservation (1982). The National Forest Policy (GoR, 2010) promotes and drafts a forest management and use plan aimed at increased permanent forest cover as well as agroforestry.

The National Water Policy (GoR, 2004) provides for the protection of ground and surface waters and lays the foundation for wetland and water catchment protection as well as buffer zones. The National Strategy and Action Plan for Biodiversity Conservation has been drafted in 2003 under the former Ministry of Lands Resettlement and Environment. It aims at the protection of ecosystems and natural resource availability. Currently a biodiversity policy is being developed under the Protected Area Biodiversity Conservation Project. Through the national settlement policy the government of Rwanda is promoting grouped settlements to approach the highly fragmented land-use and to free land. Furthermore, does it promote income diversification and alternative sources of income. Market access and sustainable production systems are central in the national Agriculture Sector Policy (2004) and the Strategic Plan for Agricultural Transformation (2004).

In addition to the national laws Rwanda is signatory to a number of international conventions, including the Convention on Climate Change (1992), the Convention to Combat Desertification (1991), the Vienna Convention for the Protection of the Ozone Layer, the Convention on Biodiversity (signed 1992), the International Convention on International Trade in Endangered Species (CITES) and the Ramsar Convention on the protection on Wetlands.

<sup>50</sup> The emergence of national NGOs in Rwanda is still young, yet the numbers of organizations has been increasing constantly in the last years.

#### 4.2.1. Land Tenure

The National Land Policy was adopted in February 2004 (GoR, 2004) and in 2005 the Organic Land Law N° 08/2005 (OLL) followed determining the use and management of land in Rwanda (GoR, 2005). This law contains references to the productive and sustainable use of land (Article 62). Land registration became mandatory (Article 30) and customary land rights have effectively been abolished. Rights previously obtained however, are protected and land ownership by the occupants is recognised and can be transferred into legal rights. Article 11 of the OLL recognizes land ownership rights of individuals acquired through custom or written law. Security of land tenure is provided for under Article 3 expressing that the state guarantees rights to own and use land.

The OLL as framework legislation also features principles on land-use and ownership, principles on land lease and land consolidation. The state has supreme powers in managing national land in the public interest. The right to own and use land lies with any legal personality that acquired the land through purchase from competent authorities or through custom as e.g. inherited land, or land acquired as gift, exchanged and shared (Article 5). Article 7 states that land rights acquired through custom or written law are protected equally. State owned land (Article 12) is a public domain and includes lakes and rivers as well as underground water and wells; land reserved for environmental conservation; state infrastructure and boundaries; and land-used by public administrative organs or for public activities. Another categories are private state owned land (Article 14), district, town or municipality land (Article 17), or private district, town or municipality land (Article 18). All people subject to Article 5 are considered to possess their land under a statutory long-term lease (Article 22; with effect from September 15, 2005) (GoR, 2005).



The land tenure reform program (2008) defines land rights and lays out necessary institutional arrangements for the implementation of the land registration. Systemic Land Tenure Regularisation (LTR) is on-going since 2006 through the National Land Centre (NLC) and the Land Titles Office of the Registrar (by presidential order N° 53/01, 2006). LTR is an administrative undertaking in order to recognize and secure existing land rights and convert these into legally recognized rights<sup>51</sup>.

Registration is taking place in all 30 Districts with the current focus on adjudication and demarcations. So far the focus has been on the City of Kigali and the surrounding. In total, 791 cells have so far been covered. Trial areas for the LTR were in the Gasabo, Musanze, Karongi and Kirehe districts. Registration is carried out on a demand led basis. Corrections and objections to land mapping and planning have started. It is estimated that by June 2012 all land will be demarcated and adjudicated with some of the plots waiting for title issuance. Land lease is regulated through the Ministerial Order N° 001/2008 (04/2008). The LTR is a slow process at the moment and insecurities and limited information amongst land owners or users on the country side prevail. The national Vision 2020 as well as the Economic Development and Poverty Reduction Strategy (EDPRS) focus on land-use management and land administration as key factors for sustainable development increased land productivity and reduced conflicts (REMA, 2010). The majority of land owners still hold their land based on customary arrangements (Gross-Camp, 2010). About 15 % of rural households do not own land, 60 % hold less than ½ ha and the remaining percentage owns ca. 1 ha (Rurangwa, 2004). This uncertainty of land rights as well as the highly fractured and small-scale of land holdings may be problematic for PES based on individual participants.

<sup>51</sup> See Appendix VII for outline of the nine steps of LTR.

#### 4.2.2. Environmental Funding and Financial Channels

Next to supportive policies initial investment as well as trusted distribution channels for the rewards are crucial for PES schemes (Bracer et al., 2008; Pagiola & Platais, 2007). National funds can play an important role here and they can also have an effect on investments in the environment and NRM (FAO, 2010b). National funding for the environment is earmarked to different fields as e.g. the Climate Change Adaptation Fund, the National Forestry Fund (1998) and the National Water Fund (not yet in place). The activities these funds aim to support may overlap. In order to streamline extra-budgetary funds, the OLL N° 08/2005 (GoR, 2005) provides for the creation of a National Environmental Fund (FONERWA). Operationalisation notes have been developed by REMA with support from UNDP. FONERWA will merge similar existing and potential future funds. The fund and possible incentives are referred to in Title IV:

“Incentives to persons that conserve the environment, Article 71: Any activity aiming at controlling soil erosion and drought, one that aims at afforestation and forestry, using renewable energy in a sustainable manner, using modern cooking stoves and any other means that can be used to protect forestry, may receive support from the National Fund for Environment.” (GoR, 2005)

According to Article 72 of the OLL (GoR, 2005a) the fund is envisioned to offer support to various actors as public institutions, the private sector, associations and individuals. The legal settings and the operationalisation of the fund still needs to be adopted. The fund will play an important role for PES as avenue for potential PES schemes and for mobilizing resources. FONERWA could be initiated as unit under national authorities as REMA, MINELA or MINECOFIN (REMA, 2010b). Another on-going development connected to supportive financial channels is the national regulation that all people are encouraged to open local saving accounts banking account, so called Saving and Credit Cooperative (SACCO) accounts. These are already used in the ReDirect project.

#### 4.3. Institutional Interaction in NRM

In the past years the policy structure of the environmental sector has been experiencing continuous modifications and re-distribution of responsibilities in new ministerial structures. This is likely to have a negative impact on the capacities to implement, manage and monitor NRM programmes and projects as well as to oversee and assess the environmental conditions. This is also the case on the landscape level. The administrative division of local authorities has been restructured in 2006 aiming at decentralization. It also intended to introduce a new division away from the former subdivision which proved problematic during the 1990s war. Therefore, structures are still young and developing and this may have an impact on trust relationships especially between national authorities and communities<sup>52</sup>. Human resource capacities in governmental agencies are often limited as personnel is often responsible for a large number of programmes and tasks (Gross-Camp, 2010; Mukuralinda, 2010).

##### *The Involvement of the Private Sector*

The involvement of the private sector remains limited and the sector bears no responsibility for best management practices (Andrew & Masozera, 2010). It seems that there is no coherent strategy yet how to embed PES into the policy environment. Fractured responsibilities depending on the objective of the potential PES scheme as described above further make the development of projects or a national framework more complex. This fractured responsibility for monitoring etc. is hampering the capacities for effective NRM projects on the national level. This also becomes visible in the approach to mitigation and adaptation. The complex policy making and splintered mandates are a hurdle e.g. especially for projects targeting the voluntary carbon market.

<sup>52</sup> The need to improve cooperation and trust between communities and national authorities has e.g. become visible in the ReDirect project (Gross-Camp, 2010).

*Supportive Structures*

Efforts to improve coordination are undertaken, especially through the operation of REMA (Mulisa, 2010). Concerning climate change mitigation and adaptation one such initiative is the Climate and Development Knowledge Network (CDKN). This network has been commissioned by the Minister's Office to conduct the Rwandan Climate Change and Low Carbon Development Project. This is a nine month project (ending in June 2011) aiming at undertaking an inventory of the status quo on mitigation and adaptation projects in Rwanda. The outcome should be information on how initiatives may best be mainstreamed and integrated into one coherent policy framework and to develop a national strategy. PES are considered as one mechanism and key stakeholders will be approached on their perspective and knowledge on PES (Dyszynski, 2010). Participatory or community based natural resource management is still emerging in Rwanda. Participation of communities in NRM is enabled e.g. through the national revenue sharing programme, yet is rather limited to the implementing phase of projects (Ngoga, 2010). A number of NGOs and international organizations have initiatives to enhance capacities for CBNRM, e.g. the International Gorilla Conservation Programme (IGCP) focusing on the Volcano National Park, as well as initiatives of WCS.

**4.4. Synthesis****Key Findings on the National Level**

- Increasing awareness on importance of NRM and ecosystems approach (I.e. Integrated Management of Critical Ecosystems (IMCE))
- Supportive sectorial laws for NRM especially the Environmental Fiscal Reform and the contained Environmental Fund (FONERWA) providing for incentives to individuals protecting the environment
- Strong role of NGO in enhancing efforts to integrate PES into national policies focus on making the advent of PES a governmentally owned process
- Development of a national PES working group in 2010 to assess how to integrate and operationalise PES in national context
- Likely overlapping mandates for PES depending on objective and ES in focus
- Continuous modifications and re-distribution of responsibilities on environmental sector in the recent years with a negative impact on capacities and clarity of mandates
- Limited involvement of the private sector and restricted re-investment into the environment

**Box 4:** Key Findings on the National Level

This chapter considered the developments concerning PES on the national level. It contains insights on the policy environment, efforts to embed PES in the national NRM framework, key institutions as well as potential projects and sectors that would enable PES integration. The institutional and policy environment in Rwanda concerning PES at the current state is still in an early phase. Key factors as land titles, environmental and NRM policies and national/local institutions with a mandate supportive to PES have been developing in this last years. The structures are yet not very stable and in operationalisation. Moreover, high land fragmentation and population pressure make NRM a very complex and urgent matter so far entirely addressed by regulatory measures. The mechanism is still little known amongst NRM stakeholders and governmental institutions. Especially carbon projects that are outside of the direct governmental bearing are considered with retention. Developing CDM and especially VCEs projects in the past has been a process taking considerable time and facing bureaucratic burdens as e.g. visible in the ERA project.

Key supportive developments in the political landscape for PES can be said to be: (i) the creation of the implementing agency REMA with a broad mandate to protect the environment in 2005; (ii) the decentralization of the responsibility for the environment; (iii) the establishment of a combined National Fund for the Environment under the Environmental Fiscal Reform; (iv) efforts to mainstream the environment into all policy areas under PEI and the Vision 2020; and (v) the creation of a national PES working group under REMA in 2010.

A hurdle to overcome is that no one existing authority holds the mandate to become the sole responsible institution for PES development. Forestry projects should be addressed by the Ministry of Mining and Forestry (MINIFOR) and NAFA, projects concerning protected areas or national parks fall under RDB's responsibility. REMA with its broad mandate and experience with public expenditure on environmental priorities is a key actor in PES development. REMA is on the other hand already facing a substantial workload due to its broad mandate so capacity constraints are likely to impact its engagement and role for PES dissemination.

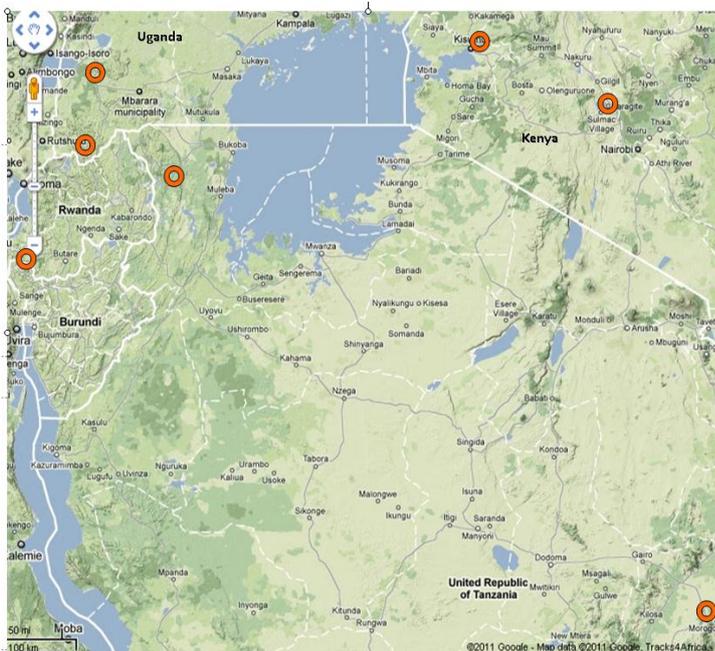
Embedding PES in the Rwandese context is very much focused on bringing a regulating framework in place. This seems particularly important in order to create stability for investors and potential ES buyers as visible in carbon projects and the WCS efforts. Currently some challenges and gaps in the institutional and policy framework prevail. The availability of regulatory and administrative capacities for PES national registration for PES and monitoring would have to be enhanced. Registration of land titles and security to the right to use land will have to be fostered to create clear conditions. The gained insights also confirm the potential danger of raising too high expectations with PES. The project of the CHDI shows the complexity when mobilizing farmers for carbon projects without reliable long-term financial security. This may damage the trust and willingness to participate of farmers.

The national context visualizes the central role that the involvement of the NGO sector, in this case the WCS has in fostering PES. From interviews with staff from governmental agencies it seems that PES have been placed on the political agenda with influence from the national government, NGOs, and international organizations. Yet also through the diffusion of PES experiences on the global and regional level. Field trips have been organized for governmental officials to Costa Rica to gain insight and learn from PES experiences. Individual actors are getting more acquainted with PES and staff members of the RDB as well as NAFA participated in the PES conference in Jinja, Uganda. In conversations interest in PES has been expressed that is so far not met with capacity building workshops or trainings. Uncertainty on the potential and how to actually apply PES in the national context prevails. Experiences and expertise on PES as e.g. the ReDirect project are not communicated well within the country. In Rwanda, as in other countries in the region, it is crucial to foster the awareness on the potential and meaning of PES. Improved coordination, communication, exchange of knowledge and cooperation within the governmental institutions is important. Efforts that bring attention to PES in all policy sectors as e.g. the national working group, CDKN or PAB project may also have a positive impact.

## 5. Established PES Schemes on the Ground in East Africa

In the following chapter the sub-question to what extent key factors identified in literature are present in operational PES schemes is addressed. In order to conduct a project-levelled analysis, key factors identified in figure 6 supplemented by the more design-oriented factors of figure 7 are taken as framework. Moreover, to assess the prevailing forms and characteristics of PES the typology drafted in chapter 2 is considered. The analysed factors are listed in the two tables 8 and 9 below. Based on the inventory in Chapter 3 seven PES schemes are selected here for in-depth case studies (see Figure 11). The projects were selected to cover the key ES in the region underlying most schemes<sup>53</sup> as well as to include all four countries subject to the research. It comprises established and more recent schemes from different facilitators that are part of the identified key actors. The selected schemes are hierarchically analysed based on the characteristics and applied design principles as well as on present supportive policies and centrally involved institutions in the region. This produces information on the presence of key factors in the region on the project level. Sources of information for the study were telephone interviews, direct interviews, e-mail communication, project reports as well as two field visits to the TIST and TGB project.

### 5.1. In-Depth Case Studies



**Figure 11:** Location of In-Depth PES Case Studies  
**Source Map:** Google, 2011

In order to gain in-depth insight into the established PES schemes, a questionnaire was drafted<sup>54</sup>. This has been used as basis for semi-structured interviews with project managers (PM) of the selected schemes. The questionnaire was designed to extract qualitative information on applied design principles, challenges, supportive legislation and key actors involved in the individual projects. It is based on key factors for PES extracted through the literature review on PES, participatory observations and the study of the East African context. Before interviews it has been sent to the PMs. Table 8 below provides an overview of the studied cases and the main characteristics.

Two projects are directly within the Kagera TAMP area and are initiated by facilitators that are active in PES in other countries in the region: the Emiti Nibwo Bulora project in Tanzania by Vi Agroforestry and the Small Group and Tree Planting (TIST) in the Kabale district, Uganda. TIST has further projects in Tanzania and Southern America and is planning a similar scheme in Rwanda. Four further selected projects are well developed or precursor schemes that are often given as examples in workshops<sup>55</sup> etc. on PES capacity building in the region: the Trees for Global Benefits managed by ECOTRUST in Uganda, the Uluguru Mountains projects on Equitable Payments for Watershed Services (EPWS), Tanzania, the Western Kenya Smallholder Agricultural Carbon Finance Project and the Naivasha-Malewa Project. The ECOTRUST project

<sup>53</sup> These are the provision of watershed management, carbon sequestration and biodiversity conservation.

<sup>54</sup> The questionnaire can be found under Appendix III.

<sup>55</sup> Despite the fact that these schemes are often discussed as examples, most presentations etc. are rather on a shallow level, which makes it interesting to retrieve more detailed information.

has been selected as it is a well-established PES already going on for seven years, covering four districts in Uganda and currently expansion to Northern Uganda in the planning. The Uluguru project is a watershed management project and managed by the World Wildlife Fund and CARE. The collaboration of these two NGOs has also been successful in mobilizing private sector buyers in a PES in Kenya and this site is considered a learning-site in Tanzania (Lopa, 2010). The same facilitators are also leading the Naivasha-Malewa Project. The Western Kenya Smallholder Agricultural Carbon Finance Project is an innovative carbon project based on carbon sequestration through biomass and soil sequestration. In order to include a scheme focusing on biodiversity as well as another national context, the ReDirect has been studied. This project is situated in the Southern province of Rwanda, in the area of the Nyungwe National Park. This project adds to the analysis as it is connected to a natural conservation area and taking place in Rwanda, a country where no other scheme is in place so far. It is furthermore a project that specifically focuses on establishing the actual effectiveness of PES schemes.

**Table 8:** Overview Studied PES Schemes

<b>Design Project</b>	<b>Scale of Intervention</b>	<b>Rewards &amp; Conditionality of Payment</b>	<b>Co-effects</b>	<b>Facilitating Structures</b>
<b>EPWS, Tanzania</b> Watershed management	Micro; use-restriction & use-modification; directional & in-situ	Individual in-kind rewards through voucher system; Based on adopted land-use technologies (labour inputs & opportunity costs) & size of landholdings & converted land	Livelihood diversification & trainings	WWF, CARE, local authorities, IG
<b>Naivasha-Malewa, Kenya</b> Watershed management	Micro & Meso; use-modification & use-restriction; directional & in-situ	Fixed amount through voucher system connected to in-kind reward; based on technologies promoted as well as in situ benefits farmers & project finances	Livelihood diversification & trainings	WWF, CARE, WRUAs
<b>Emiti Nibwo Bulora, Tanzania</b> Carbon scheme	Micro; use-modification; omni-directional	Individual cash payment (in future group-based on group-bank accounts); Carbon revenue based on individual CO <sub>2</sub> sequestration rate	Diversification of livelihoods; trainings	Vi Agroforestry, farmer groups
<b>Western Kenya</b> Carbon scheme	Micro; use-modification; omni-directional	Cash payment to farmer groups (planned to be on bank accounts); Benefit sharing system based on carbon revenue	Training on SLM techniques, fostering farmer groups	Vi Agroforestry, World Bank Carbon Unit, farmer groups
<b>TIST, Uganda</b> Carbon scheme	Micro; use-modification; omni-directional	Fixed price/tree & carbon revenue; cash payment to individuals	Income diversification & strengthening farmer groups, training on SLM	TIST, NFA, NEMA, farmer groups
<b>TGB, Uganda</b> Carbon scheme	Micro; use-modification; omni-directional	Based on number of trees & land-use technology; individual cash payments on bank accounts or cooperatives	Training on SLM techniques, farmer groups, livelihoods diversification	ECOTRUST, CCF, NFA, NEMA
<b>ReDirect, Rwanda</b> Biodiversity conservation	Micro; use-restriction; omni-directional	Training on tree planting, livelihood diversification & monitoring; improvement of relationship with RDB & conservation legislation	Training on tree planting, livelihood diversification & monitoring; improvement of relationship with RDB & conservation legislation	ReDirect, RDB, elected community representatives

The presence of the key factors that have been assessed through the case studies is summarised in table 9. The depicted results are based on the elaborations on the case studies following in the next paragraphs. These factors are analysed based in the following indicators.

- **Additionality:** The PES scheme increases the level of ES delivery or at the minimum stabilizes the status quo in reference to a given baseline; additionality can be behavioural or ecological;
- **Conditionality:** The incentives provided in the scheme are conditional on the delivery of ES (performance-based) or the adaptation of the promoted land-use technologies (effort-based);
- **Land tenure:** there is some form of acknowledged and stable land tenure or user right within the area covered by the scheme, either legal titles or customary ownership acknowledged by national law;
- **Long term viability:** The scheme is producing sufficient revenue to cover its operational costs in the long run; the scheme strengthens or puts in place an institutional structure that takes over the operationalisation of the project in the long run (e.g. the scheme is not entirely dependent on donor and NGO input and facilitation through external actors);
- **Trust and legitimacy:** The relationship between ES providers and the facilitating actor is marked by trust through frequent interaction and participatory processes exist; the project design and its effects are accepted by all stakeholders as being legitimate and based on consideration of equity;
- **Effectiveness / framework of indicators:** The scheme does actually achieve the intended effects on ES as well as co-effects (measurable) or has a measurable positive environmental/social impact; a framework of indicators has been developed in the conceptual phase for measuring the impact and effect of the project;
- **Infringement procedures:** Enforcement mechanisms, procedures in place in case of breach as well as procedures that allow for conflict resolution, or grievance from participants;
- **Adherence to rules:** Participants (ES stewards) of the scheme adhere to rules set in scheme ranging from adopting promoted land-use technologies or non-use aspects, proper land-use after initial phase;
- **Coherence with overall national regulatory framework:** PES scheme is in line with national NRM and SLM policies and the constitution;
- **Active involvement of governmental agencies:** Governmental actors are involved in the operationalisation of the scheme, or even in the conceptual phase (++);
- **Capable buyers and ES stewards:** ES stewards able to deliver the aspired ES; ES buyers able to pay for the ES in focus.

Table 9: Performance of PES Case Studies<sup>56</sup>

<b>Design &amp; Pre-Conditions Project</b>	<b>Additionality</b>	<b>Conditionality</b>	<b>Land Tenure</b>	<b>Long Term Viability</b>	<b>Effectiveness &amp; Indicator Framework</b>	<b>Trust &amp; Legitimacy</b>	<b>Adherence to Rules</b>	<b>Infringement Procedures</b>	<b>Participatory Project in Operationalisation</b>	<b>Coherence with overall Regulatory Framework</b>	<b>Active Involvement of Governmental Agencies</b>	<b>Capable Buyers &amp; ES Stewards</b>
<b>EPWS Tanzania</b>	++	++	+	?	?&+	+& -	+	+	+	+	+	?&+
<b>Naivasha-Malewa</b>	+	+	+	?	?&+	+&?	+	?	++	+	-	++&+
<b>Emiti Nibwo Bulora</b>	?	++	- <sup>57</sup>	?	+&+	+&?	+	?	+	+	?	?&+
<b>Western Kenya</b>	?	++	+	(+) <sup>58</sup>	(?)&+	?&?	(?)	++	?	+	?	?&+
<b>TIST</b>	+	+	+	+	-&?	+&?	-	-	++	+	+	+&?
<b>TGB</b>	+	+	+	+	+&+	++&+	?	-	++	+	+	+&+
<b>ReDirect</b>	?	++	-	(-) <sup>59</sup>	?&++	+&++	+	++	++	+	+	(-) & ?

<sup>56</sup> The presence of the indicator is measured on a scale from ++ = present or well elaborated; + = present; ?= not clear, questionable or no information; - = not present or not taken into account.

<sup>57</sup> Title distribution is in progress.

<sup>58</sup> This is based on the expectations and project design document envisioning 30 years duration. As the scheme is still young and developing this is an estimation.

<sup>59</sup> As ReDirect is a limited research project the factors marked with ( ) are not really applicable.

The cases are studied following according to initiating actors and not based on geographical aspects. They are structured to first give an overview of the location, objective and facilitating actors. Thereafter information is provided on the central ES, involved buyers and ES stewards, the promoted land-use, and monitoring processes. Finally the observed effects and aspired co-effects are described.

### *5.1.1. The Uluguru Mountains EPWS - Tanzania*

This Equitable Payments for Watershed Services (EPWS) scheme is located in the Kibungo sub-catchment of the Ruvu River in Tanzania. The ultimate aim of the project is to cover the whole basin and possibly also the East Usumbara Watershed. The Ruvu catchment is an important supplier of water to the city of Dar es Salaam. The valleys in the catchment have in the past been marketed by declining spoil productivity and heavy soil erosion, especially due to increased land pressure and unsustainable land-use technologies. The project aimed to introduce incentives for sustainable and alternative land-use systems and technologies as terracing, boundary planting, no more slash-and-burn etc. in order to decrease the water turbidity and improve the quality of life for participating communities. The objective of the scheme is:

“To modify unsustainable land-use [...] in watersheds to conserve and improve reliable supply/flow and quality of water; To improve quality of life of the communities through substantial benefits to the rural poor hence contributing to poverty reduction” (Lopa, 2008).

The project has two phases: the conceptual phase (2006-2007) included a seller livelihood analysis and capacity assessment as well as various baseline studies (hydrological assessment, cost-benefit and legal analysis) and identifying land-use change interventions. The stakeholder mapping and buyer profiling identified two potential and able buyers: the Dar es Salaam Water Supply and Seward Corporate (DAWASCO) and Coca Cola Kwanza Limited (Lopa, 2008). Sensitization and mobilization meetings were conducted in 2008 to assure farmers to engage in the project implementations. Open meetings were organized to inform villages on the project and PES. Participating farmers formed farmers' groups in each project village who received various technical trainings. The second operational phase (from 2008 onwards) focused on contracting farmers in 2009 and fostering the aggregation of land-owners into farmers' groups. The EPWS pilot scheme in Tanzania was launched in 2008 envisioned to end in 2011. Currently an extension for another three years to fortify and expand the project is assessed.

#### *Ecosystem Service Providers, Buyers and Promoted Land-use*

The initiating parties and drivers of the project are WWF and CARE under the EPWS programme financed by DANIDA (DK). The project is targeting the improvement of water quality (less turbidity) and quantity in the Ruvu River, focusing on the Kibungo sub-catchment as pilot area. Promoted land-use-modification practices to limit water run-off and improve resource management are: soil conservation technologies as bench terracing, af- and reforestation, boundary/contours plating with grass and fruit plants (pineapple), agroforestry, riparian restoration; sugar cane strips; carbon crops planting; and no-tillage and no-burn practices. A use-restricting aspect is the restoration of riparian (buffer) zones of the watershed. Specialization on high value crops as well as the application of animal manure is expected to support the livelihoods of participants. The scheme is therefore expected to have a positive effect for participants independent of the PES.

Currently four villages (Kibungo, Lanzi, Nyingwa, Dimilo, and Lukenge) participate. About 650 farmers whose subsistence activity is agriculture have engaged in implementing improved land-use change practices (Lopa, 2011). The local structure and tenure system has been assessed on the livelihood study. Participants hold small pieces of customary land (on average < 2 ha) mostly inherited from their elders. Interested farmers (land-owners) have been organized into five farmer groups and one central farmer group network. Farmers need to implement improved land-use practices and technologies specified in their management plan. They are informed about the costs and benefits of proposed technologies and receive trainings and supervision (Lopa, 2010). Initial inputs such as hand hoe etc. and trainings to ensure high rate of technology

adoption are also provided. In order to assure continuation of the application and use of the technologies the programme provides such support every year. In principal 352 farmers were verified to qualify for payments after measuring and mapping farms and in 2010, 144 farmers received the first payment (ibid.). Originally it was planned to have two instalments per year, yet due to delay and difficulties in the adaptation of the proposed land-use/technologies, the first payment to 144 participants (ca. TZS 2.03 million i.e. US\$ 1376) has only been made in 2010. Payments are in form of in-kind payments (e.g. seeds etc.) and monetary through the village authorities or councils and a CARE/WWF consortium. They are targeted to individual land-owners and are performance based (actions adopted). Participants that already implemented at least part of the SLM management plan are qualifying for receiving the payment (Lopa, 2010). The calibration is based on the size of landholdings, size of converted land, opportunity costs, technology/land-use change applied, maintenance costs and labour input. Studies on the costs of implementation per technology determined by labour inputs and opportunity costs (for loss of production) have been conducted. Costs to adopt the promoted land-use vary between US\$ 200 and US\$ 50 per acre. The land-size converted under new technologies/land-use is measured in cooperation with the participants. In case of non-compliance and insufficient management no payments are made. The appropriate use of the land and maintenance of the technologies (e.g. stabilizing ridge edges, clearing land with tree planted, thinning, pruning etc.; and the control of fire on their lands) is monitored in the following years. The aim is group payments to spread the benefit to whole community and to overcome limitation of the scheme to land owners (Lopa, 2011).

The two identified buyers DAWASCO and Coca Cola Kwanza Limited agreed to a non-binding Memorandum of Understanding with the ES providers after extensive negotiations (DAWASCO (signed 2008) and Coca Cola (2007)) (Lopa, 2010). DAWASCO agreed to pay US\$ 100,000 in four years and Coca Cola KL US\$ 200,000 in the same period. Through a business case exercise the water treatment costs and potential savings for the two buyers have been calculated and used as reference point for the negotiations. The payment is connected to the performance of farmers to adopt promoted technologies. Due to the small-scale of the pilot project and other uncertainties no guarantee could be given as to how high their return and saved costs will be which weakened the business case. In order for WWF/CARE to pay on behalf of the buyers, the NGOs entered into annual contractual agreements with the village leaders.

#### *Facilitating Actors and Monitoring*

As mentioned above, the scheme was designed by the WWF in cooperation with CARE, connected to the international programme for Equitable Payments for Watershed Services (EPWS). Funding comes from DANIDA, CARE and WWF. Experts from responsible national authorities, e.g. the Forestry Authority are hired for technical specification of suitable land-use and plant species. Further important stakeholders are the village councils that engage in the whole project implementation process as facilitators and supervisors. Providers and users are brought together through a CARE/WWF consortium. Payments are going from the buyers via WWF and CARE to the Village Council as autonomy local authority. The councils consist of a village chairperson, an executive officer and council members. In total the project cooperates with 25 leaders. The WWF/CARE consortium is supporting this effort. The project initiated an intermediary group overseeing implementation, mobilizing farmers and fostering institutional development. This group consists of members from key sectors as e.g. the Ministry of Water, the Directorate of Water Resources, the Wami-Ruvu Basin Water Office; local communities; private companies CSOs and CARE/WWF.

Hydrological monitoring stations have been positioned at different locations in the watershed (installation in March 2010) with technical support of Wami-Ruvu Basin Office the local water authority and custodian of the basin. Involved parties in monitoring are the village councils, CARE field staff, trained farmers, national water authorities. In the future it is planned to foster peer review and enhance the training of farmers on monitoring. CARE and WWF as programme initiators report to the buyers. Verification is done through local authorities twice per year. So

far 170,000 trees have been planted between 2009-2010 with a survival rate of 85 %, and terracing and buffer zones have been disseminated successfully. It is too early in the project to assess if the water turbidity has decreased yet a sediment reduction has been observed. The actual improvement of watershed services is also dependent on the future scale of the intervention. Currently the project covers a micro-catchment yet the aim is to cover the whole watershed (Lopa, 2010). Soil tests in late 2010 have shown that the average moisture level in areas with terraces is 1.6% which is higher than areas without terracing structures (0.3%). Also average soil compaction is higher (3.05km/m<sup>2</sup>) in areas with no terraces compared with areas with terraces (1.0505km/m<sup>2</sup>). This implies that crop performance in areas with interventions has improved in terms of crop growth rate and yields (ibid.).

#### *Co-benefits and Effects*

Farmers receive training on SLM techniques, tree planting and management, nursery creation, agronomic practices and animal husbandry. Regular study tours and pilot sites visits are organized to exchange experiences. It is not likely that the proposed land-use techniques would have been adopted on this scale without the scheme. Attempts to introduce similar technologies several years ago failed and very few local farmers adopted measures such as agroforestry and reforestation (Lopa, 2011). People were not practicing contour farming in appropriate way either (ibid.). With the presence of EPWS programme the number technologies implemented by local farmers has increased. Participants are also integrating other activities to improve their farming such as livestock keeping which were not important livelihood activities before the presence of our EPWS programme. Under phase I, a seller livelihood analysis and capacity assessment has been carried out. Through improved land-use and management it is expected that farmers can increase their livelihood. Furthermore, cash crops are promoted and the connection to local markets fostered. Production levels in some areas of the project have been increased three fold. Revenues obtained from agricultural products were used for purchasing inputs, building materials like iron sheet, nails and timber for their houses and animal shed construction and also for covering school fees and treatment costs.

The project at the moment only covers the Kibungo sub-catchment which makes it hard to make commitments or attempt to change the overall quality and quantity within the larger catchment. There are several activities going on in the catchment that can undermine the efforts of Kibungo Juu communities in providing watershed services. Some of these activities include illegal gold mining in the river floor and banks; poor sanitation; and unsustainable land-uses. Farmers in the selected catchment are small-scale and depending on agriculture for their livelihoods, yet face increasing land pressure and declining soil quality. So far only land-owners are included in the scheme which brings up the question of the inclusion of the poorest. General speaking, the Kibungo Juu community members are very poor. However, socio-economic assessment conducted several times by the programme team showed that the middle class of the wealth ranking of the Kibungo Juu area is the one engaged in the initiative. The project in its current form is still depending on support by its main donor DANIDA for covering the operational costs and additional buyers are needed to consolidate the scheme. A national brewery has announced potential interest/willingness to pay. There is also hope to benefit from the Eastern Arc Trust Fund for conservation. Based on close cooperation with the national authorities in the whole development process the involvement of the governmental authorities increased. The project also substantially supported the development of the awareness for a necessary regulatory framework and engagement of the national authorities.

The project was initiated through an elaborate phase of sensitization and mobilization meetings in 2008 to interest farmers to engage in the project implementations. The approach of WWF and CARE is very much based on creating a business case for potential buyers to show benefit of PES scheme. The project also demonstrates how long the negotiations can last before any agreement is reached. Strong focus was placed on organizing farmers into farmer groups and networks. Disappointment in the exclusion of other interested villages (equity dilemma) prevails that might impact the project's success. Important policies that were applied for developing the

scheme were the Land Act 5 (1999) recognizing customary ownership of land. The national policy declares all land as public land, issuing no land titles to individual farmers. The village authorities manage the land on behalf of central government and are entitled to enter contracts. Another policy was the Water Resources Management Act: Paragraph 96 (2009: 406) states that, “Water Basin Boards may announce charges with respect of ‘payments for environmental services’”. Instruments for economic incentives are also found in the Environmental Management Act (2009), Chapter 191 (Lopa, 2010).

Village councils engage in the whole project implementation process as facilitators and supervisors. Therefore they also receive a certain amount of money from the project. Another important national partners were the Ministry of Water, the Water Basin Authority, the Uluguru Nature Reserve Office and the Wami-Ruvu Basin Water Office in Morogoro. The project is further supported by the Uluguru Mountain Agricultural Development Project (UMADEP) under the Sokoine University of Agriculture. Fostering the draft of a PES framework into the national policies is another aspect the project tries to take up (Lopa, 2010). The project initiated an Intermediary Group (IG) overseeing implementation, mobilizing farmers and fostering institutional development. This group consists of members from key sectors as e.g. the Ministry of Water, the Directorate of Water Resources, the Wami-Ruvu Basin Water Office; local communities; heads of private companies and CARE and WWF. In order to ensure the long-term existence of the scheme this IG was first considered to play a key role. This idea has been reconsidered in the last time and no mechanism is in place yet (Lopa, 2011). A fundamental hurdle to overcome here is that limited knowledge and appreciation of the mechanism prevails at the administrative level where regulations are drafted. The programme has trained 25 farmers to be expert farmers to establish a community-based extension agency.

### 5.1.2. Naivasha-Malewa Project - Kenya

Another project of WWF/CARE is the Naivasha-Malewa Project located in the Malewa River Basin in the Central Province, Kenya. The project is on a sub-catchments level and two critical sites were selected as pilots: the Upper Turasha (639 ha) and Wanjohi (4680 ha) area both situated in the Malewa Basin. Within these, five sub-basins have been selected. This PES project is designed similar to the EPWS project of CARE and the WWF in Tanzania. The scheme was initiated in cooperation with CARE under the larger WWF management project in the area: the Integrated Water Resource Management (IWRM). The project is connected to a larger WWF management project, the Integrated Water Resource Management (IWRM)<sup>60</sup>. The objective of the scheme is:

“To develop a viable mechanism for payments for watershed services that delivers sustainable natural resource management and improved livelihoods and serves as a pilot and learning model for further expansion and replication” (CARE & WWF, 2010: 9).

The project is aiming to address the decline in water services (quality and quantity). Ex ante baselines studies on hydrological quality etc. as well as socio-economic studies have been undertaken. Selection criteria for PES pilot sites in the watershed included:

“(i) Water yield from the sub-basin-surface and ground flow (ii) Sediment yield from sub-basin (iii) Population density and poverty (iv) Land-use/land cover dynamics and (v) Potential buyers and sellers” (CARE & WWF, 2010: 4).

#### *Ecosystem Service Providers, Buyers and Promoted Land-use*

The contracts between buyers and sellers were signed in 2009 and the first payments have been made in May 2010. The facilitating role of WWF/CARE will officially end in late 2011, yet the annually renewed contracts between sellers and buyers are envisioned to continue independently thereafter. ES stewards in the scheme are small-scale farmers in the identified hot spots. In total 565 are participating with another 150 already applying the promoted land-

<sup>60</sup> The Integrated Water Resource Management (IWRM) Programme focuses on livelihood improvement, environmental sustainability and policy development.

use technologies voluntarily. These are to be included in the scheme in 2011. The average size of landholdings of participants ranges from 2-10 acres (0.8-4.05 ha).

The payment level is based on land-use technologies promoted as well as *in situ* benefits farmers receive from implementing the scheme and available project funds at that time. A business case study was drawn establishing the opportunity costs that farmers would undergo as a result of setting aside land for conservation. This was too high for the buyers to afford since the concept was not yet operational. Agreement to the sum as reached with and between sellers and buyers after a rigorous negotiation process. The negotiation process consisted of a series of negotiation meetings between the buyers and sellers who could then give this input to revise the draft contracts which were then discussed together in the seller-buyer forum. Payments are made annually to individual farmers. The sum is fixed to UDS\$17 per participant in the first three years. The scheme applies a voucher system, with each voucher worth US\$17. They are redeemable with agro-inputs at agreed and convenient outlets. The opportunity costs of participating providers are expected to be covered through the payments of the sellers (Njenga & Nyongesa, 2010). Conditions to qualify for payments are based on adopting promoted land-uses and technologies. During verifications in the field, those farmers who have not met agreed conditions are not awarded the *ex situ* benefits. Promoted improved land-use and technologies are: riparian protection areas; agroforestry; indigenous tree planting (95 % survival rate); contours grass strips; high value crops; and other SLM and soil and water conserving practices (e.g. bench terraces). Especially agroforestry and soil protection technologies can be expected to benefit farmers independently of the PES scheme. Participants have to contribute the labour. Material inputs (fodder crops, tree seedlings, and high value crops) are provided by CARE and WWF. Current buyers are the Lake Naivasha Growers Group and Lake Naivasha Riparian Association (LNRA)<sup>61</sup>. The legal agreement has been signed on their behalf by the Lake Naivasha Water Resource Users Association (LANAWRUA). Payments are delivered through the WRUAs facilitated by WWF/CARE on behalf of the buyers. The first payment in 2010 mounted to USD \$ 10,000 (Njenga & Nyongesa, 2010).

#### *Facilitating Actors and Monitoring*

Initial sensitization meetings with the local Water Resource User Associations (WRUAs) were organized to select target groups, connect to the provincial administration and create capacity and awareness on PES (Njenga & Nyongesa, 2010). Hotspot farms were identified based on geographical factors as e.g. the location of the farm, steep slopes, distance to rivers; poorly cultivated farms; and farms with water unfriendly trees. Participants had to be land-owners and willing to adopt change and join the project. Central for the project design were WWF and CARE. Technical support and baselines were undertaken in cooperation with national universities. Funding stemmed from DGIS through WWF NL, WWF international, CARE international and CARE Kenya. Technical advice also comes from national authorities on the local and national level, e.g. the Ministry of Agriculture, the Kenya Wildlife Service (KFS) and the Water Resource Management Authority (WRMA). Sellers and buyers are brought together in a forum facilitated by WWF/CARE and in connection to Water Resource Users Associations (WRUAs). Contracts are renewed annually. By the time WWF/CARE retreat from the project the WRUAs will take over the facilitating role completely.

Four staff gauges in respective rivers of intervention (Wanjohi, Kinja, Karoroha and Turasha) have been installed as well as four turbid meters. On-farm verification and monitoring is undertaken by the buyers and support institutions (e.g. LANARWUA) as well as by the sellers separately. Biannually, consultants are hired for evaluation and monitoring. In case of conflict or non-compliance WRUAs are responsible for conflict resolution meetings. Assistance is necessary primarily in the beginning for capacity building and tree seedling distribution. Contracts were endorsed and signed for one year, renewable with revised terms and conditions agreeable

<sup>61</sup> An association of large-scale horticulture farmers around the lake.

between sellers and buyers. Current contracts are still valid. Problematic are complex and dynamic land ownership due to inheritance and land-use change. In case of non-compliance and conflicts the WRUAs are the facilitating institutions.

#### *Co-benefits and Effects*

The approach is pro-poor and was arrived at after community participatory sensitization on PES scheme (Njenga, 2011). The project is expected to cover its operational costs (Njenga, 2011). Trainings on SLM techniques; livelihood improvement; soil and water conservation exercises; tree planning; contour planting; riverbank protection; organic farming; proper use of agricultural chemicals; good farm planning; adoption of high value crops; farming as a business; contact farming; coping with climate change; and farming diversification, etc. were conducted by WWF and CARE. Expected co-effects are livelihood expansion (provision of firewood, sale of fruits, reduced cost of fruits purchase and health improvement), capacity building and institutional strengthening on community level (WWF & CARE, 2010). Observed effects are increased tree cover, reduced soil erosion. There is a 95% survival rate of the agro forestry trees, grass strip planting and endemic agroforestry trees, riparian land restoration. Promoted practices are also applied by non-participants. It is not possible to say to what degree this is taken over from the scheme. The project built on existing Water Resource Users Associations (WRUAs). The project put strong emphasis on creating a buyer-seller forum that is envisioned to take over the project facilitation once WWF and CARE retreat from their facilitating role (Njenga & Nyongesa, 2010). Plans are developed to upscale the project internally and externally.

Major challenges for the project include: complex and dynamic land ownership due to inheritance and land-use change; degraded public lands that influence the water quality yet are not under the scheme; high interest of more participants that can at the moment not be included; limited commitment of new buyers. Kenya currently has no specific PES policy. Water Act (2002) provides for water user fees by large scale users that are to be invested in catchment management. This is, however, not yet operationalized. The Lake Victoria Basin Commission of EAC features strategies for targeting Ecosystems, Natural Resources and Environment.

#### **5.1.3. The Emiti Nibwo Bulora Project - Tanzania**

This scheme in Tanzania is situated in the Karagwe District within the Kagera Province (Nyaishozi, Bugene and Kaisho zones). The project was initiated by Vi Agroforestry, under the Lake Victoria Regional Environmental and Sustainable Agricultural Productivity Programme (RESAPP). The prime attention of the scheme is increased soil carbon storage as well as carbon sequestration in biomass through agroforestry (tree planting) and promoting sustainable land-use management techniques (Vi Agroforestry, 2010). The project creates Verified Emission Credits (VERs) to be sold on the voluntary carbon market through the Plan Vivo scheme. It is expected to contribute to the mitigation of climate change and greenhouse gas emissions; income diversification; soil conservation; and improved land-use along with capacity building. The calculated emissions reduction capacity is 40,000 tCO<sub>2</sub>/year (Vi Agroforestry, 2010). Used measurements are based on determining the annual (stem) volume increments (m<sup>3</sup>/yr.) of trees. The scheme was initiated in 2008, and in 2010 the project has been certified as Plan Vivo project. First payments were made in 2010. The project is envisioned to have a duration of 11 years.

#### *Ecosystem Service Providers, Buyers and Promoted Land-use*

Currently, 23 farmers are participating, covering 15.9 ha (Masologo et al., 2010). Individual plot sizes range from 0.06 to 1.0 ha. Payments are made during ten years in five instalments i.e. 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 5<sup>th</sup> and 10<sup>th</sup> year. In total the pilot group will receive TZS 11,166,000 (US\$ 7360) in the five instalments in the 10 years of their contracts. The piloting group has received the 1<sup>st</sup> payment in June 2010 (14 qualified farmers). Every farmer has his/her own amount to be paid depending on amount of tCO<sub>2</sub> his/her plot will sequester. The payment is 60 % of the revenue from the carbon emission reduction purchase. In the first instalment these participants received

30 % of this share (in total TZS 1,848,400 (US\$ 1218) with the highest individual payments mounting to TZS 252,000 (US\$ 166) (ibid.). The buyer of the ES for the pilot group is SCC-Vi Agroforestry. Payments from buyers are deposited with Vi Agroforestry which than are distributed onto farmers individual bank accounts. The first payments in 2010 have been in cash as participants were still in the process of opening their group bank account (Masologo et al., 2010). Subsequent payments are expected to be made on group bank accounts enabling group savings. This is also connected to a loaning system assisted through the overarching Vi Agroforestry project. In order to qualify for the payments participants have to adhere to their personal Plan Vivo which features technical specifications, i.e. numbers of trees to be planted. Based on the land tenure structure, no women are direct participants of the scheme, however, the activity is based on family structures and gender mainstreaming is considered at various stages of implementation. The project operates through participatory community-based processes and builds on structures and channels initiated under the larger sustainable land management project of Vi Agroforestry (Masologo et al., 2010).

Promoted land-use changes are: Boundary planting, woodlot, fruit orchard and dispersed inter-planting (Vi Agroforestry, 2010). Tree planting is restricted to native and naturalized species. Grazing, cutting trees for any use during the contract period is not allowed (use-restricting). Due to expected soil and water quality improvement, yield increase and income diversification through agroforestry farmers would benefit also without carbon credits.

#### *Facilitating Actors and Monitoring*

The scheme was designed by Vi Agroforestry with technical support and carbon baselines conducted by Camco (Kenya). Camco also made the technical specifications for the four agroforestry systems that are promoted in this project. Initial feasibility studies were carried out by U&W another national consultancy (2007). The facilitating party is Vi Agroforestry simultaneously being the central collecting point for payments. The performance of the scheme is shared in the annual report. Monitoring is planned to be undertaken on an annual basis for the carbon credits, yet Vi field staff is always present to monitor the implementation and tree planting and support farmers. The project has been verified under Plan Vivo in 2009. When recruiting farmers, applications from farmers are verified by village government to prove to us the ownership of the land to the applicant. Contracts are made for 10 years. After initial capacity building and distributing tree seedlings the project is expected to carry itself (Vi Agroforestry, 2010).

#### *Co-benefits and effects*

The project aims to contribute to capacity building; livelihood and income diversification; and improved land-use along with increased yields (Masologo et al., 2010). At the moment there is a lack of tree planting by small-scale farmers in the region. Vi-Agroforestry has so far received more than 1,000 applications to join the scheme. Land tenure issue is not a top priority of this scheme as customary ownership with testimonial from local authorities is accepted. Farmers currently do not hold land title deeds, yet are in the process of acquiring titles. The Land Act (1999 & 2007) which enables tenure of land over long time periods and protects existing rights in land ownership by statutory and customary rights alike. The Village Land Act (1999) regulates how each village may declare its village land. The issue of insecure land tenure is still identified as potential risk factor in the long run. On the national level the project is closely cooperating with the district and regional office of the Ministry of Natural Resources. Important policies for developing the scheme included the land acts and the National Strategy for Growth and Reduction of Poverty. Based on the governmental priority on poverty reduction, climate change adaptation and mitigation and carbon sequestration the project found support on the authority level.

#### 5.1.4. Western Kenya Smallholder Agricultural Carbon Finance Project

This is the second PES carbon project of SSC-Vi Agroforestry in East Africa. It is situated in 27 locations in the Nyanza Province (Siaya and Kisumu District) and Western Province (Bungoma District) of Kenya. The development of this project started in 2007 and the implementation in 2009. The Emission Reduction Purchase Agreement (ERPA) between Vi Agroforestry and the Bio Carbon Fund has been signed in 2010 (Vi Agroforestry, 2008). At the moment it is in the implementation phase and the final validation is expected in late 2010/early 2011 (Lager, 2011). First payments are expected to start in 2011/2012. The overall duration of the project is envisioned to be 30 years. The developer of the project is Vi Agroforestry while the Joanneum Research, Austria and Unique Forestry consultants, Germany have been instrumental in the development of the methodology. It is one of the first projects in the region to focus on carbon sequestration of soil.

The objective is to reduce greenhouse gas emissions through carbon sequestration by trees and soil by applying Sustainable Agricultural Land Management (SALM) practices (Lager, 2011). Other expected outcomes are: increased and diversified food supply; climate change adaptation; increased production of marketable agricultural and agroforestry products; improved capacity of farmers to assess market information; strengthened farmer organizations; increased tree cover; income diversification through carbon revenue. The assumed total amount sequestered over a 20 year period, 2009-2029 is 1.2 MtCO<sub>2</sub>. The project has produced a carbon finance document, an emission reduction purchase agreement as well as monitoring guidelines and developed a carbon appraisal methodology. In order to establish a baseline, 200-300 farmers were sampled. In the baseline assessment, the present predominantly agricultural systems have been mapped and a modelling has been developed to estimate biomass and soil carbon sequestration.

##### *Ecosystem Service Providers, Buyers and Promoted Land-use*

Currently 10,000 small-scale farmers are registered. The average land holding is 0.5 ha per farmer, in total covering 45,000 ha. Registration to the project is group-based, meaning that farmer groups enter a contract with Vi Agroforestry that is signed by all members of the group (Lager, 2011). Participants were selected based on their willingness to join the scheme. The PES scheme promotes use-modification land-use mainly focusing on agroforestry. Different SLAM practises that are promoted based on the different categories have been identified (cropland management, restoration of degraded lands, bio-energy, and livestock management).

- Multiple cropping (agronomy, agroforestry, agro-silvo culture, shade growing of perennial crops, silvo-pasture; improved tillage & residue management; water harvesting for agriculture, terracing, erosion control);
- Restoration/rehabilitation of degraded land (organic amendments to restore soil productivity; riverbank tree planting);
- Livestock management (promotion of zero grazing and fodder, manure).

Tree planting and sustainable soil management are beneficial activities for farmers independent of carbon credits. For farmers the cost consist mainly labour input and purchasing improved seeds (Lager, 2011). To determine if participants qualify for payments as well as the level of payment, a scoring system has been developed. Still there is the need to find and calculate a benefit sharing system. In the first period Bio Carbon Fund has the right to purchase 100% of the produced credits. The emissions reduction purchase agreement signed assigns yet only a certain percentage to the Fund leaving the rest available to other interested companies focusing on voluntary market. So far no further buyers are identified.

##### *Facilitating Actors and Monitoring*

Farmers are contracted by Vi Agroforestry which is also distributing the payments. Farmer groups need to hold a bank account for the carbon payments (Lager, 2011). In order to support and monitor progress one Vi Agroforestry field adviser is attached to each of the 27 locations providing advisory services. Monitoring is based on activities in combination of modelling using

Roth model. The project is verified through a third party. The annual report is written by Vi Agroforestry. Financial support comes from the Foundation Vi Planterar träd (“We plant trees”); Swedish International Development Agency (Sida); Sida, Lake Victoria Initiative (LVI); World Bank Carbon Finance Unit and in the development of the project through the carbon revenues (ibid.).

#### *Co-benefits and Effects*

Due to its early stage the project is in it is not yet possible to measure any impact or ES delivery. In case of non-compliance and conflicts, grievances procedures have been developed (Vi Agroforestry, 2008). Contracts are signed for a period of 10 years. Leakage risk is expected to be insignificant as no land conversion to other land-uses and land set aside etc. are required. Activities are carried out exclusively on the sites. The project has close links to the Lake Victoria Basin Commission (LVBC) of the EAC. Farmers hold legal titles to land. Extension plans of the approach exist in East Africa. It is expected that the carbon revenue will cover the operational costs of the project.

#### **5.1.5. The Small Group and Tree Planting project (TIST) - Uganda**

The Small Group and Tree Planting project is located in three districts in the South of Uganda - Bushenyi, Kabale and Kanungu. The project is implemented and on-going since 2003. TIST<sup>62</sup> is an initiative of the Clean Air Action Corporation (CAAC) (USA). This Corporation is the initiator and facilitator of all TIST projects. It is one of four similar TIST projects in East Africa focusing on the ES of carbon sequestration (Tanzania, Uganda and Kenya). Further projects of TIST exist in India, Honduras, and Nicaragua. The objective of the scheme is promoting sustainable agricultural management, basic business management and reforestation of degraded landscapes linked to carbon sequestration certificates (Williams, 2011). In Uganda it emerged out of the observation of a needed remedy against landslides that was expressed by local leaders and the National Environmental Management Authority (NEMA). The project remains open to further applications of interested farmers. A further project is planned to be established in Rwanda in the near future. Expected environmental benefits include (ibid.): erosion control (through both improved agriculture and trees); shade and windbreaks for crop land; nitrogen fixation in soil; improved soil fertility from sustainable agriculture; improved biodiversity; raised water table; no addition of contaminants or pollutants; sequestered carbon from the planting of indigenous species of trees and improved agriculture techniques.



#### *Ecosystem Service Providers, Buyers and Promoted Land-use*

The targeted ES providers are small-scale farmers located in the three participating districts and respective 20 sub-districts. Currently 5,315 participants are registered covering an area of ca. 2,100 ha. In order to qualify for payments farmers must sign a greenhouse gas reduction contract with the CAAC and have to plant the specified number of trees (at least 500 per small group). These have to be planted complying with specifications on spacing and only covering a limited percentage of their total landholding. Trees than have to be quantified after six month by a TIST quantifier. The payment consists of a fixed per tree payment (0.02 US\$/“well-cared-for” tree/year for the first 20 years) and 70 % of the net revenues generated from sale of carbon credits. The payment of 0.02 US\$/“well-cared-for” tree/year was determined through an ex ante

<sup>62</sup> TIST was initiated in 1999 in Mpwapwa, Tanzania by the Anglican Bishop Simon Chiwanga of the Diocese of Mpwapwa (DMP) and a team of missionaries from Truro Church in the USA and the Clean Air Action Corporative (CAAC). The focus was on organizing the community members into self-supporting, cooperative Small Groups. See also <http://www.tist.org/tist/aboutus/goalsobj.php>.

economic analysis and consultations with farmers. It is also based on the value of the carbon credits and the fact that farmers were very interested in planting trees. CAAC sells the credits to interested companies and in the future it is considered to deliver the existing carbon certificates in Uganda to an institutional buyer. Currently there are two companies purchasing the credits (both are resellers). Prices for carbon credits are depending on the voluntary market. Payments flow to the CAAC and thereafter are delivered to the communities by TIST field staff in cluster meetings.

Required land-use changes for the reforestation of degraded landscapes are: tree planting for timber, medicines, or fruit trees (endemic species as well as fruit tree planting and mixed species are encouraged); and agroforestry (Baanyanga, 2010). Especially timber, fruit and medicine trees are additional sources of income for the farmers. The carbon credit sale is yet an added source of income. It is not likely that tree planting would occur on the prevailing scale without support of the PES scheme (ibid.). Furthermore, trainings are conducted to enhance sustainable agricultural management, and basic business management. Sustainable agricultural practices the project aims to promote are based on the guidelines of conservation farming from FAO. A potential obstacle may be the preference of farmers to plant timber trees and rather focus on one species as e.g. eucalyptus (Baanyanga, 2010).

### *Facilitating Actors and Monitoring*

The scheme was designed by the Clean Air Action Corporation in cooperation with the Institute For Environmental Innovation (I4EI)<sup>63</sup>. Up-front costs are covered mainly through corporate revenues of the CAAC and the Berkeley Reafforestation Trust (NGO UK) that funds sustainable development aspects of the project. TIST under the CAAC is the intermediary between buying companies and participating communities. The role of TIST is financed through the corporate revenue of CAAC as well as through carbon revenue. Since TIST is an international approach that is constantly developed with shared attributes operational costs are considered globally (between US\$6 and US\$10 million) (Williams, 2011). Further key actors for developing the project were the National Forest Authority (NFA) for technical support and assessment of locations for tree plantations; NEMA for technical support and assessment of locations for tree plantations; the National Agricultural Advisory Services (under Ministry of Agriculture) as well as ECOTRUST for technical support and training. Further important support came from local chiefs and community groups as e.g. religious groups.

Trainings etc. are organized in the small groups outside of existing administrative and political channels and monthly node meetings of different groups are organized. Monitoring is undertaken by district quantifiers located in the different counties. They work with GPS and count the trees, take pictures, measure the distance and monitor that farmers adhere to the guidelines. The first visit is done after six month. The goal is to have monitoring taking place on an annual basis. No annual reports are published since the project is internally financed. Current field data can be found on the project website where participants and quantifiers enter their measurements. Verification through an approved verifier is aspired once carbon credits are included in a carbon standard. Participants are informed about the performance through regular meetings, newsletters and trainings.

### *Co-benefits and Effects*

The special approach of TIST is the very strong focus on cooperation with local chiefs in the project selection and development as well as the organization of farmers into small groups that are central in the application, implementation and monitoring of the project. These structures can than also be used for other capacity and knowledge building as e.g. training on how to build energy saving cooking stoves or sanitary and health education (Baanyanga, 2010). In general strong local institutions and organizations emerging from PES schemes can also help to access credit schemes for e.g. seeds or small enterprises. Selection criteria for participants are vague

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<sup>63</sup> I4EI is an international NGO receiving funding from the Berkeley Reafforestation Trust (NGO UK), and USAID in other countries as Kenya and Tanzania.

and little targeted. There are no explicit mechanisms in place that make the project focused on poor and small-scale farmers only. Technical specifications for promoted species etc. are only non-binding recommendations depending on the good-will of the farmer. Despite the absence of clear enforcement and penalties, the principles of collective action and social pressure through local chiefs seem to be effective in the project. In case farmers do not comply with guidelines on land set aside for crop growing potential negative effect on food production. Contracts are made for 60 years and after the first 20 years trees may be harvested and replanted. It is expected that farmers reinvest the carbon revenue into tree nurseries and trainings on tree planting in order to enable self-sufficiency after an initial phase (Baanyanga, 2010). Disputes and non-compliance are settled within the communities/groups with support of local chiefs. Legal remedies are available in case of breach of the contractual agreement. Up to date no breach has occurred. Communication within the project is frequent, with so-called cluster meetings being held on almost a monthly basis and a monthly newsletter is distributed with articles and reports written by the participating farmers.

Co-effects of the scheme are income diversification through fruit trees or timber. Carbon sales are encouraged to be reinvested in nurseries and the project uses the emerging small groups to foster other aspects as e.g. training in building energy saving cooking-stoves. Currently the carbon revenues are not sufficient to cover the operational costs of TIST in Uganda (Williams, 2011). Trees still have to mature. So far 4,553,409 trees have been planted in the participating communities. Small-scale carbon schemes by design face high transaction costs (Wunder & Boerner, 2010). TIST tries to avoid this by reducing monitoring costs, developing a global basic framework for its projects and emphasizing the active role of local institutions and farmer groups. A frail point of the TIST may be that most technical specifications as e.g. on tree species are not obligatory but rather recommendations to farmers. Farmers are also encouraged not to plant the major part of their landholdings with trees to still leave space for agriculture. Yet again, this is only a recommendation depending on the good-will of the farmer. In case of non-compliance, there are no clear regulations for consequences. The direct delivery of the cash payments are also prone to stealing as the field staff has to drive at times long distances and payments are announced in the communities. Therefore, in the future TIST is exploring the opportunity to use transfer services through mobile phone providers.

#### **5.1.6. Trees for Global Benefit Project (TGB) – Uganda**

Trees for Global Benefit (TGB) in Uganda (Bushenyi, Masindi and Hoima District) is a project facilitated by ECOTRUST, a national NGO. The project is on-going and was initiated in 2003, with the latest expansion in 2009/2010. Out of the pilot in the Bushenyi District between 2003-2006 TGB was expanded in 2007 to the districts of Masindi (Pakanyi, Kajurubu and Budongo), Hoima (Kiziranfumbi and Kidoma parish; Kabwoya and Kyangwali sub-counties) and the Kasese district (2009/2010). The project aims to increase livelihoods of participants through tree planting and agroforestry as well as to increase the soil and water quality. Planting trees (carbon sequestration) is used to qualify for carbon credits. Financial support in the beginning was given by DFID (UK) which was also a major actor in approaching the government of Uganda (forest division) to enable the pilot project. The objective of the project in the pilot phase was to test PES in Uganda to see how the mechanism may be operationalized and which technical/design lessons could be drawn from it (Nantongo, 2010). Driving actors were the Bio-Climate Research and Development (BRDT) with support from the Edinburgh Centre for Carbon Management (ECCM). ECOTRUST was approached to be the facilitating body (implementation, administration and management) and ICRAF was subcontracted for technical support (ECOTRUST, 2010). The project is certified through the Plan Vivo System (in 2003) and in 2008 it was verified by the Rainforest Alliance.

#### *Ecosystem Service Providers, Buyers and Promoted Land-use*

About 500 farmers have received carbon payment which translates to over 100 ha. Another 300 farmers are at different stages of verification and over 200 farmers are currently on the waiting

list to join the project. The level of payments are based on technical specifications for different farming systems as carbon sequestration potential varies in different land-use systems, tree species and environmental conditions (ECOTRUST, 2010). The amount paid to participants thus depends on how many trees are planted/how much carbon sequestered. The carbon sequestration/ha in a farming system is quantified in the monitoring processes. Five instalments are made in the first 10 years. Farmers receive payments based on reaching the milestones set in their individual Plan Vivo management plan which defines the objective of the participant. In order to qualify for the payment of 30 % of the saleable carbon value, farmers have to have planted at least 50 % of the number of trees specified in their management plan. Payments are transferred by ECOTRUST using village banks or cooperative structures, if in place (Nantongo, 2010). The carbon credits from the current 12 producer groups are sold through ECOTRUST and Plan Vivo. The system is based on ex-ante buying of the credits by Plan Vivo which then in turn sells the certificates to companies as e.g. Tetra Pak (initial main buyer). Varying on an annual basis different companies, consultancies, private actors as e.g. The Carbon Neutral Company, the International Network for the Availability of Scientific Publications (INASP), the Katoomba Group (2008), Camco, U&W, Live Climate and others have bought credits.

Individuals wishing to participate have to buy the first 50% of trees of their management plans or be trained for tree nurseries. Costs for seedlings are relatively high however, a credit system for seeds is in place. Promoted use-modified land-use are boundary tree planting and agroforestry systems consisting of mixed intercropping and woodlots of native tree-species, and fruit orchards (mango, avocado, jack fruit). Fruit trees are additionally envisioned to generate livelihood benefits. PES seem to provide the necessary incentives and financial support for tree planting. Yet, it is difficult to say if farmers would not engage in tree planting without the scheme as ECOTRUST has already been involved in some of the project areas in tree planting initiatives.

#### *Facilitating Actors and Monitoring*

Monitoring is undertaken twice per year by ECOTRUST field coordinators and technical managers along with peer reviewing by the various associations (Nantongo, 2010). Selected individual farmers out of associations receive training for this purpose. Specific monitoring protocols have been developed. The trees are counted and the tree growth of farmers in their 5<sup>th</sup> year of participation is measured using the Diameter at Breast Height (DBH) methodology to measure the flow of the ecosystem service of carbon sequestration. ECOTRUST staff is based in project offices in all existing sites. Reporting is done by ECOTRUST, verification through the Rainforest Alliance. Next to this ICRAF and the ECCM are important actors that shaped the scheme especially through technical advice. Initial start-up costs were provided for by DFID (UK department for international development). The project expansion is supported by e.g. PRESA, USAID through the Wildlife Conservation Society (WCS), IFAD, the World Bank and ASARECA (ECOTRUST, 2010). A farmer-led approach is applied to identify preferred farming systems (Nantongo, 2010).

#### *Co-benefits and Effects*

The project is self-sustaining with funds from the certificates sold and money from the funding of ECOTRUST donors<sup>64</sup>. In order to cover the operational costs ECOTRUST receives a percentage of the sold carbon credits. Assistance for the scheme is especially based on the initial phase with capacity building, organizing farmers into groups and training on tree planting and nursery building. Contracts are signed for 25 or 50 years. In case of non-compliance with the agreements ECOTRUST places a one year break of financing for this instalment. However, ECOTRUST is trying to take a very case-specific approach taking into account the reasons for failure (Nantongo, 2010). A Community Carbon Fund (CCF) has been created that finances capacity building and trainings as well as spreads the benefits of the project to the wider community through a certain percentage from the carbon sales (Nantongo, 2010). Capacity of participating farmers in carbon management was enhanced and farmers acquired simple carbon accounting

<sup>64</sup> ECOTRUST has created an independent fund for environmental projects.

and monitoring techniques. Diversification of livelihoods is targeted through agroforestry, fruit trees and wood lots. In the beginning a socio-economic assessment was conducted including clarification on land-holdings, tenure security and possibilities for land set aside. A socio-economic impact assessment was repeated in 2008.

In Uganda in most cases customary tenure is widely spread and can be processed into legal titles yet this is still culturally not perceived as necessary. High land fragmentation prevails. ECOTRUST closely works with chiefs of villages and with inheritance documentation to establish prove of land tenure. National authorities that work together with ECOTRUST range from the Wildlife Authority in areas of national parks, the National Forest Authority (NFA) for reforestation or the National Environmental Management Authority (NEMA). A national PES policy is under development by the national government, yet will still take considerable time to be established (Nantongo, 2010). A request has been handed in from the Tree Talk programme (national NGO) of the Straight Talk Foundation for ECOTRUST to conduct a feasibility study and prepare a concept for a possible expansion of TGB to Northern Uganda, West Nile and Mt. Elgon area. Supportive national policies were the National Forestry and Tree Planting Act (2003) as well as the National Environment Act (1995) (ibid.).

A number of issues emerged in the cause of the project that make it difficult to encounter non-compliance especially due to miss-management or natural disasters/extreme conditions as e.g. drought (ECOTRUST, 2010). The process of the interested farmer from application to being allocated a buyer is extensive and involves verifying the land tenure status. Carbon financing is only possible as long as a farmer can provide prove of long-term tenure rights (ibid.). In Uganda in most cases customary tenure is widely spread and can be processed into legal titles yet this is still culturally not perceived as necessary (Nantongo, 2010). High land fragmentation prevails. To cope with the situation ECOTRUST closely works with chiefs of villages and with inheritance documentation to establish prove of land tenure. National authorities that work together with ECOTRUST range from the Wildlife Authority in areas of national parks, the National Forest Authority (NFA) for reforestation or the National Environmental Management Authority (NEMA).

ECOTRUSTS is very active in Uganda already for 10 years, enjoying considerable trust with local communities and also good relations with national authorities. The biggest challenge for the project at the moment is the large request for further communities to join. This goes beyond the technical and financial capacity of ECOTRUST. The growth of the project has positive effects (economies of scale) yet also negatively affects the monitoring and technical support that can be provided. Soil erosion and watershed protection are not currently included in the project, yet are planned to be in the future. A model is under development by ASARECA to bundle these ES into the scheme. Requests for up-scaling the project have been handed in for a possible expansion of TGB to Northern Uganda, West Nile and Mt. Elgon area.

#### **5.1.7. ReDirect - Rwanda**

ReDirect is a PES scheme focused on conservation of biodiversity in the Nyungwe National Park (NNP), Rwanda. It takes place in four cells in the Southern (Nyaruguru and Nyamagabe District) and Western Province (Rusizi District). Four additional communities are part of the scheme that serve as control group and that are not included under the scheme. It is a research project initiated in 2009 designed as a 3 ½ years pilot until 2013 with funding from the European Union (overall funding 1,000,000 €) (Gross-Camp et al., 2010). The project is designed and conducted by the University of East Anglia, UK in close cooperation with the Rwanda Development Board (RDB) and the Wildlife Conservation Society (WCS). The area of the project is directly neighbouring to the national park and frequent illegal human activities and resource abstractions prevail in the protected area or the buffer zones. Communities around the park are often facing a high degree of poverty and dependence on resources from the buffer zones or inside of the park (Gross-Camp et al., 2010). The objective of the scheme is to create evidence for the effectiveness of PES as mechanism to combine development and conservation objectives.

The focus is on whether PES are legitimate, equitable and effective in conserving natural resources/biodiversity in the Nyungwe National Park (ibid.). Expected outcomes are livelihood expansion and a reduced dependency on natural resources out of the park of the bordering communities.

*Ecosystem Service Providers, Buyers and Promoted Land-use*

The ES under focus is biodiversity conservation in the Nyungwe Forest National Park, Rwanda. As mentioned above natural resources and biodiversity of the Park are under increasing threat from human pressure and activities within the protected area. Baseline situations were established through household surveys and initial scoping of indicators for human activities in the park areas (mapping of human threat in park). The main focus of the scheme is on indicator of human activity in the Park. The providers of the ES are the four selected cells/communities including approximately 3,675 households. Most participants own land, yet without any kind of formal land tenure rights (Gross-Camp, 2011). In initial sensitization meetings 20 representatives for the negotiations for contracts were selected in each participating cell. In the selection of the representatives equal representation of men and women is encouraged. Representatives receive a nominal stipend (500 – 1000 RWF/ US\$ 0.83-1.67) for their time.

A catalogue of indicators is checked for assessing if the communities qualify for payment (ibid.):

- Combined Encounter Rate of human activities in the National Park (NNP);
- New trails & mining activities;
- Sensitization (NNP/RDB) – awareness of the population based on a random subsample done once annually;
- Sensitization (ReDirect) – awareness of the population based on a random subsample done once annually;
- Decrease in gender gap for awareness of ReDirect and NNP/ RDB;
- Number of new trees planted (exotic species – excluding *Eucalyptus* spp. and *Grevillea*) - Outside the NNP, private or public lands;
- Number of trees planted (indigenous species) – Outside the NNP, private or public lands;
- Number of bamboo planted) - Outside the NNP, private or public lands;
- Assistance provided by the community to RDB (crop-raiding, fire and other threats to the Park).

Each indicator is valued with a certain amount that is in the positive case added, in the negative case deducted (cell specific amounts). The conditionality is therefore a mix of ES performance (based on the indicators for biodiversity) and adopted technologies. The annual payments are monetary and made on household level, yet are community based meaning that all members of the community receive the same amount<sup>65</sup>. The payment level was based on a prior study<sup>66</sup> that calculated the average annual household income (ranging from \$US 127 to \$US 778) and proportion of income coming from forest resources (<1% to 60%). Opportunity costs to abandon the use of park resources and to adopt changed land-use have been calculated arriving at the crude average of 15,000 RwFr (ca. 25 US\$)/household/year (lump sum)<sup>67</sup>. Through household level surveys and consultations were carried out for a livelihood assessment. Findings were that the opportunity costs varied between the involved communities and a mean value had to be drafted. Willingness-to-pay and willingness-to-accept scenarios have been drawn in the initial survey and livelihood surveys are made before and after the project. Concern was voiced by national authorities that the scheme is rewarding communities to adhere to

<sup>65</sup> The decision to have equal payments to all members is positive for the project's equity yet led to discussions in the communities as to the issue of free riding (with 7 % of the members not owning any land) and varying opportunity costs. It was discussed and explored in behavioral economic games in the open meetings.

<sup>66</sup> This is referring to the article: Masozera, M. and J. Alavalapati (2004). Forest dependency and its implications for protected areas management: a case study from the Nyungwe Forest Reserve, *Scandinavian Journal of Forest Research*, 19 (4): 85-92.

<sup>67</sup> In total annual forest based income is calculated to be 25 US\$ (ranging between 2-72 US\$). Opportunity costs have been found to vary largely in between different individuals and communities. This is likely to have an impact on the success of the scheme as for some individuals the lump sum does not cover their opportunity costs.

existing regulation and restrictions (Gross-Camp et al., 2010). According to Swallow et al. (2007), this concern is also expressed by other critics of the mechanism. In order to encounter this, the payments were not differentiated based on the level of illicit activities and respective opportunity costs (Gross-Camp et al., 2010).

A certain percentage of the payments made go directly to the community. Each participating community could decide how high the percentage shared are and results varied largely ranging from 10-80 %. Participants received 5,000 RwFr (ca. 8.50 US\$) unconditional up-front payments to cover transaction and other initial costs as e.g. for opening a local bank account. Each community additionally receives an annual fixed budget of ½ million RwFr (845 US\$) that are predominantly for monitoring activities determined by the project but also have some flexibility to be spent on their priorities, e.g. on training for monitoring, tree planting and nursery establishment.

#### *Facilitating Actors and Monitoring*

The project applies a biodiversity proxy method. Proxies applied to measure biodiversity loss are: Observing and documenting trail systems in the park, signs for human activity as e.g. beehives, mining or snares presence (also see list of indicators above) (Gross-Camp et al., 2010). These are measured every four month. Monitoring generally is organized internally through community members that were selected by the cells (4-6/cell) and external through field staff of ReDirect, the RDB and NUR interns. Community Monitors (CMs) keep a log book on activities and report to the RDB and report on measures adapted e.g. to reduce crop loss. The CMs receive a small monthly sum and are voted for by the community. External monitoring focuses on livelihood surveys and the mentioned parameters. It is also undertaken with support from students of the National University of Rwanda (NUR). Furthermore, regular meetings with community monitors and organizational partners are organized. All monitoring staff meets every 4-6 weeks. Especially in the sensitization phase frequent meetings were necessary. The costs therefore are difficult to be précised (Gross-Camp, 2011).

#### *Co-benefits and Effects*

The project aims to stimulate alternative sources for resources that are developed in cooperation with the participating communities (priorities). Communities are supported to find supply alternatives and receive training in e.g. on tree nurseries. This has led to especially tree planting being favoured by communities. Initially this has primarily been resulting in the planting of eucalyptus and grevillea. Especially the first is a debated species in Rwanda and both are incompatible with crops. Therefore in the current state the project eliminated support for these two species and organizes training on promising agroforestry species together with ISAR and ICRAF (early 2011) (Gross-Camp, 2011). Supporting alternative livelihoods and sources for natural resources outside the park is beneficial for the participants independent of the PES scheme. One popular alternative, tree planting is very complex to be assessed in terms of additionally. There is some concern is the scheme may also be supporting activities that would occur also without the incentives (Gross-Camp, 2010). Nevertheless, promoting agroforestry is a clear additionality of the scheme. The complexity to balance the cell level with the sector or national level regulations and programmes might have an impact on the success of the project. The project aims to have long-term impacts on establishing alternatives for natural resources from the national park. Contracts between ReDirect and communities are renewed annually to be more adaptive and flexible on emerging issues/developments<sup>68</sup>. In case of breaching the contract a termination thereof or return of payments in subsequent instalment may follow. In case of non-compliance in some indicators payments are reduced and a financial penalty can be raised.

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<sup>68</sup> One unexpected development was that many farmers used the income to plant more eucalyptus, a controversial species. As it is not the interest of the project to foster this development and therefore has been taken into account in the new version of contracts.

The area targeted by the project is marked by a high incident of poverty. Payments are made to all community members, no matter if they are owners of land or not (7 % of the involved people do not own any land). Furthermore, a certain percentage of the payments go directly to the communities. The project encourages long-term benefits through tree planting etc.. Communal funds are also used for livestock schemes that benefit the poorest of the communities. The selection process of the 20 representatives of each community is an essential aspect of the project. The distribution of payments on SACCO accounts as well as ensuring that activities paid out of the community fund are truly supported by the whole community have proven to be demanding further attention and support.

The project shows that opportunity costs for individuals or different communities vary greatly. Therefore, it is extremely complex to select one common payment level as this will be too little for some communities. On the other hand, however, establishing one common payment has an impact on the perceived legitimacy and equity of a scheme which is an important condition for success. Furthermore, there were initial difficulties to explain the use of an equitable payment scheme also benefitting members not having any land. Annually renewed contracts enable the scheme to be flexible to emerging unforeseen issues etc.. One of the major developments observed are improved relations between RDB and the cells in which the scheme operates (Gross-Camp et al., 2010). People also generally speak of a greater respect for the no use laws in the NNP and indicate that they help enforce this by speaking with others that continue to use Park resources. As learning-by-doing approach and pilot to actually prove the feasibility and potential of PES, the ReDirect project may play an important role here on the national and international level. Despite the substantial lessons that can be shared through the project experience, the project is not widely known on the national level. The project brings special attention to the criteria of legitimacy and equity that are key principles for successful and well-accepted long-term PES schemes (Gross-Camp et al., 2010).

## 5.2. Conclusion on PES Case Studies

### Key Findings on the Project Level

- Central role of external facilitators in initiating existing PES schemes
- Pilot schemes support to raise PES on political agenda and also aim to support mainstreaming and PES framework development
- All studied PES projects in the region are targeted at poverty alleviation or livelihood diversification and focus on small-scale farmers
- Effectiveness or actual impact remains difficult to be assessed due to stage of projects, lack of indicator frameworks and small-scale of pilot projects
- Challenge of customary land tenure addressed through close cooperation with local institutions
- PES schemes building on pre-existing cooperation and NRM projects benefit from existing structures and trust relationship
- Financial constraints and complex land ownership on local level central
- Schemes contribute to livelihood diversification and capacity building through trainings and participation

#### Box 5: Key Findings on the Project Level

This section of the research contained an in-depth study of on-going PES schemes. It focused on characteristics and applied key factors, thus enabling and challenging features as well as important actors for current projects. These insights and examples of scheme designs can be supportive for the dissemination of PES experiences in the region. Table 9 below summarizes the performance of studied schemes concerning the identified key factors from literature.

The on-going schemes in the region are embedded in an environment without specific PES legislation, however, most project managers referred to a number of sectorial laws and policies that were relevant for the development of the scheme. In Tanzania these include the Water Resources Management Act (2009); Environmental Management Act (2009), Cap. 191; in Uganda the National Forestry and Tree Planting Act (2003) and National Environment Act (1995); and in Kenya the Water Act 2002 (featuring the Water Resource Users Associations), Agriculture Act, Environmental Management and Co-ordination Act (EMCA) (1999). The signature of the Kyoto Protocol has also been mentioned several times in the context of carbon projects. The participation of regional or local governments and community institutions as key partners for project developers may also play a supportive role in the absence of specific regulations. It has yet also been emphasised negatively by project managers that no explicitly supportive legislation exists that fostered the development of the PES schemes. Ferraro (2009) emphasizes that there is no clear causal relationship between enabling legislation and the development of PES in Africa. The author concludes that the lack of enabling legislation does not necessarily form a barrier to PES schemes. Cases as Costa Rica, yet demonstrate that a supportive policy environment benefits PES development. Most interviewed project managers have expressed the opinion that an enabling and operationalising framework would be beneficial, especially for the up-scaling of on-going projects (see Lopa, 2011; Nantongo, 2010). This could contribute additional sources of funding. Furthermore, uncertainties and insecurities on the mechanism and the governmental support prevail. Clear regulations could create more certainty for potential ES buyers and providers. This has been confirmed by project managers (see Masozera, 2010; Lopa, 2011).

Most schemes are embedded in national contexts that are predominately based on customary tenure rights. This implies that long term tenure or user rights have to be established in the conceptual phase in cooperation with local leaders and often take long. The process is therefore very cost and time intensive. Furthermore, the very complex and at times swift changing land ownerships make PES intended as long-term mechanism difficult and may form obstacles for the maintenance of the scheme. On the other hand, however, it also implies that PES are also possible in areas where no statutory tenure rights are dominating. In order to establish recognized user- or generational rights project facilitators collaborated closely with local or

community institutions that are also part of the monitoring and insurance mechanisms<sup>69</sup>. In case of community-owned land the projects usually try to include the community as whole. Local institutions and farmer groups have proven to be important facilitating actors in PES schemes. Community cooperation and frequent meetings potentially also help to encounter and solve arising conflicts and issues and also plays a role as intermediaries in contracting. Strengthen institutional structures can further be instrumental to enable learning and capacity building in other fields. Monitoring or technical specifications are often established in cooperation with governmental agencies, yet also in coordination with community or participants' preferences<sup>70</sup>. Cooperation with national authorities may also be positive for the relationship of ES stewards. In the case of ReDirect improved cooperation with the national authorities has been observed (see Gross-Camp et al., 2010).

Three of the studies schemes emerged out of on-going land or resource management programmes of the same facilitator<sup>71</sup>. Already created institutional capacities (e.g. strong farmer groups) and trust relationship were supportive in developing a PES scheme (see Masologo, 2010; Nantongo, 2010). In most projects the participation was especially focused on selecting land-use methodologies in line with preferences of participating ES stewards and agreeing on forms and levels of payments. Most of the schemes also seek the participation and training of participants in monitoring and conflict resolutions. It was, however, difficult to obtain information on the preparation of the shared understanding of the importance of ES and the cause of the decrease in the conceptual phase of the projects. All projects had sensitization meetings that explained the logic behind PES and prevailing ES decrease. Yet no information could be obtained on the level of agreement of the causes of the decline. This is, however an important aspect according to the literature especially for the long term participation and motivation of ES stewards and consumers.

When considering monitoring and implementation, there is a lack of clear procedures in case of breaching the agreement or miss-management of the promoted land-use technologies. The behavioural change and compliance with the rules set can be considered as proxy for institutional performance and would therefore be an important indicator for the effectiveness and feasibility of PES. Another challenging factor for PES development appears to be the development of baseline studies. Methodologies are still complex and under development or are not existing for some promoted land-use technologies. Methodologies and proxies for clear link between scheme and ES delivery are applied in the preparatory phase, yet it remains vague if the adopted land-use technologies actually bring the intended results. Participants in tree planting projects especially in the beginning were found not to adhere to technical specifications which certainly has an impact on the ES delivery. Especially in case of watershed or biodiversity projects the small-scale (or in the case of TGB very scattered) nature of the PES schemes makes it difficult to ensure measurable positive impacts on ES. The analysed water schemes are so far all still on the sub-catchment level reducing the possibility of impacting the watersheds on the larger scale. This in turn impacts the possibility to build a strong business case calculating the value and saved costs for ES provision as well as the willingness of buyers to commit to schemes (see Lopa, 2010). Commitment of the private sector may then be a form of Corporate Social Responsibility project as presumably the case in the WWF and CARE project in Tanzania.

All of the studied PES in the region are targeted at poverty alleviation or livelihood diversification and focus on small-scale farmers. Especially poverty alleviation is in line with the national governmental priorities. The concept is yet by definition not linked explicitly to government priorities (see Masiga, 2010). Possibly this places too high expectations into the mechanisms that in the long-run cannot be achieved. Most schemes so far cannot prove a long-term impact on the livelihoods. The quality of the PES mechanism further makes it focused on

<sup>69</sup>For example in TIST, ReDirect, Naivasha, or Uluguru scheme.

<sup>70</sup>This has explicitly been the case in the Naivasha project, TIST, ReDirect, Kenya small-holder project and the EPWS project.

<sup>71</sup>TGB, Emiti Nibwo Bulora and Naivasha-Malewa project.

working with people with property rights and this is one of key weaknesses of PES to ensure benefits to the poor as most of the poorest groups are property less (such as landless)<sup>72</sup>. Nearly all PES cases explored are still in an operational phase too immature to quantify actual environmental and social impacts. The documentation often is rather poor with only some projects featuring annual reports and detailed descriptions of the design and preparation phase which may be an important source for future PES learning. Many projects also fall short of establishing a comprehensive framework of indicators for assessing the project success in different time phases. Especially additionality is very difficult to be assessed as some schemes have been embedded in on-going projects or strategies that were already targeting e.g. tree planting and promoted land-use changes or ES developments take a long time to manifest themselves. Conflict resolution mechanisms, sanctioning systems are not well addressed or not elaborated upon in many schemes. The danger of leakage is not considered high in most projects, however, in two carbon projects the plantation of monocultures (ReDirect eucalyptus and fire wood with TIST) has been mentioned as potential negative development. This potentially has a negative effect on biodiversity and does not feature agroforestry which in the case of TIST forms a promoted land-use. Especially in the case that promoted land-use technologies are mere guidelines or recommendations, the impact and development remains unclear.

The level and form of payments varies. Carbon PES mainly base payments on the market value of carbon credits and sequestration models e.g. based on adopted land-use and number of planted trees. In other schemes the work required to adopt the promoted land-use and the size of the converted land etc., thus the opportunity costs are taken as indicator. These costs for individual participants may, however, vary greatly as e.g. became visible in the ReDirect project (see Gross-Camp et al., 2010). Budgetary constraints furthermore, may make it impossible to cover opportunity costs (see Njenga, 2011). Other projects are working with fixed amounts in order to address the issue of equity and legitimacy. These fixed amounts are yet complex to be established and often compromising beyond the opportunity costs. Payments may be rather small providing limited possibilities and incentives to participants. This may have an impact on the long-term success and level participation of schemes. Project managers often stressed the function of PES as initiating mechanism for promoting new land-use technologies, providing trainings and capacity building and in some cases material (e.g. tools or seedlings). Co-effects as e.g. the harvesting of planted trees after an agreed period take a rather long period to materialize. Additional factors to increase the support to participants may therefore be initiatives as bee-keeping in connection to eco-labelling of the products as applied in the TBG project or supporting seed acquisitions as in TGB. Such efforts as well as capacity building and in-kind support may be very important for making PES feasible as otherwise the economic incentives alone may not suffice to motivate and guarantee efforts of participants (see Perez et al., 2007).

Within the studied schemes a number of national authorities have been involved in PES schemes, yet this was entirely limited to technical advice and specifications, and official approval of planned PES schemes<sup>73</sup>. Whereas their active involvement in initiating PES has been very limited. At the current state, none of the five countries of the region have a focal point or central designated authority that is supporting the development of PES. In Rwanda to some extent this role is aspired to be fulfilled by REMA. In countries where no designated authority is responsible for PES, different ministries and authorities will be responsible which makes the coordination very difficult (see Lopa, 2010; Masozera, 2010). Most initiating parties of PES are from the NGO sector, thus from external actors. External actors can play an important role in NRM in situations characterized by lack of trust and limited institutional structures in place (see Jewitt, 1995). This

<sup>72</sup> This issue becomes especially visible in the EPWS project as well as in the TIST project. TIST aims to work with small-scale and poor farmers, yet there are no mechanisms to ensure that the participants actually are among the poorest.

<sup>73</sup> See Appendix VII for an overview of formerly involved governmental agencies.

has is the case e.g. in the ReDirect project where the relationship between communities and the RDB seems to be improving through the scheme.

There are also a number of challenges encountered by PES projects that are connected to the design and long-term viability of supporting institutions and finances. As mentioned before, currently almost half of all PES schemes initiated in East Africa stop at the conceptual or designing phase. Key encountered challenges for up-scaling of on-going schemes include: financial barriers; restricted development of national funds up to date; low level of engagement of the government; insufficient political support for further up-scaling and mainstreaming of projects; institutional and technical constraints; community level barriers due to complex land ownership; limited capacity to include participants in the schemes; as well as limited market access and potential committed buyers.

Developing PES schemes is connected to high start-up costs to link ES stewards and ES, conduct baselines, business cases, negotiations with potential buyers or private sector, capacity building and awareness rising. It is a very long process that may be underestimated by project designers. From the governmental level there is still limited engagement and reluctance with PES project development. This can partially certainly be explained based on limited knowledge and capacities, yet also by the fact that private PES schemes are difficult to be assessed and supervised for national authorities (see Bwiza, 2010). Furthermore there is some reservation on rewarding people to adhere to the legislation (see Gross-Camp et al., 2010; Swallow et al., 2007).

According to project managers the issue of selecting participants especially became important at a more advanced phase of the project once success has been shown and other ES stewards want to apply and participate. The legitimacy and equity of the selection was not explicitly addressed in any of the schemes but ReDirect. Transaction costs and project development costs at the conceptual phase are high and negotiations with potential participants are taking considerable time (see Lopa, 2011; Gross-Camp, 2011). Currently none of the analysed schemes can carry the operational costs without additional funding through trust funds, donors or corporate revenues. This makes the long-term presence and impact uncertain. Equity of payments and rewards is another complex factor all schemes are facing. One option to ensure equity is to have community levelled schemes. Yet this brings high costs, the necessity to deviate from individual's varying opportunity costs and the issue of perceived free-riding e.g. of landless participants (see ReDirect project). Some of the projects<sup>74</sup> have annually re-formulated contracts which enable project facilitators to be flexible and react on emerging unforeseen issues and developments (see Gross-Camp, 2011; Njenga, 2011). These changes are often minor and usually are connected to small additional costs.

Despite the complexities and challenges mentioned above, most schemes can be considered to have a positive impact on livelihood diversification and capacity building as well as on the interaction and cooperation of involved ES stewards. Trust and well-established, frequent contact between the facilitating party, ES stewards and (potential) ES buyers was mentioned as central aspect by all project managers. The projects function as catalyst for SLM and sustainable NRM initiatives and support participants in making shifts in land-use as well as to acquire technologies and seedlings. Many of the promoted land-use technologies require initial and periodical assistance.

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<sup>74</sup> This is referring to the Naivasha-Malewa, ReDirect and EWSP project.

## 6. Discussion

It is important to emphasise that there are regional and national diversities that do not allow up-scaling of all observations and outcomes of this research. Due to time restriction the research had to focus on selecting one national context and a limited number of case studies. Furthermore, it is likely that the awareness and interest in PES expressed by national authority representatives in interviews is influenced by the fact that PES are an increasingly popular tool promoted on the international level. This has been balanced to some extent through other sources of the research. Especially through the study of policy documents and drafts and by considering the attitude of active organisations towards promoting PES. Some detailed information on key factors in the studied PES schemes has been very difficult to verify and project managers are prone to depict their projects in a rather positive light. Again the use of multiple sources and field visits were applied to minimise this potential bias.

Assessing the feasibility of PES is usually approached on the local project level. Regional studies are rare and the level of abstraction hence may be criticised. The framework of key factors developed as backbone to the regional analysis here is based on an extensive literature review and expert consultation. Nonetheless, as mentioned before, different researchers may attach more weight to some factors that were not considered central here. Therefore, they may reach slightly different conclusions on the feasibility and required developments. Overall, however, the basis of agreed key factors for PES is contained in the framework and therefore variations are not expected to be significant.



Despite the limitations it is still the believe of the author that the applied methodology and data analysed in this research produce valuable insights on the current status of PES in the region. Especially concerning key factors for improving the feasibility of PES as NRM mechanism it adds new insights. The analysis of the context in East Africa can provide valuable insights on encountered challenges in the next generation of PES in developing countries.

Furthermore, it can contribute to knowledge on which design principles and institutions seem most important to deal with factors such as e.g. insecure land tenure or missing regulatory frameworks. Based on the insights and findings produced here, broadening and deepening of the factors and national contexts could follow.

Throughout the research it became clear that the causal relationship between supportive framework and PES development, and the actual role and necessity of a specific framework are not well explored in existing literature. In many articles it is considered an important and supportive factor to have clear PES frameworks in place. Yet the case studies confirm the more complex correlation of specific PES legislation and effective PES schemes. So why do most project managers express the necessity of policy framework when Ferraro (2009) states that there is no clear positive correlation at the moment? A number of ad-hoc PES have been established in less favorable contexts. In some cases such pilots are even considered to having contributed to the development of institutional structures and capacities (e.g. the EPWS scheme in Tanzania). These dynamics remain little explored and should be integrated into an extended PES research agenda.

There are a number of aspects of PES that have been subject to many articles that have also become visible in this research. Number one remains the necessity of developing a workable definition of PES. This is connected to many different aspects. It is on the one hand debateable if one rigid definition is even desirable as PES are obviously not a static but constantly emerging concept. On the other hand, a vague definition makes it harder to integrate the mechanism in the national frameworks or to compare PES schemes and assess their effectiveness. Further research on this can also be linked to the appearing gap between theoretical discussion on and the practical application of PES. Throughout this research this gap between theoretical literature and the practical application has also become visible. Theories on institutional change may provide possible sources to draw on.

Another often mentioned aspect is valuation of ES. Existing methodologies still fall short especially to include multiple ES. Net valuing can also lead to PES schemes not covering opportunity costs of participants and therefore not providing sufficient incentives for a change in ES use or protection. This is yet again linked to another aspect, the aspect of the level of payments and the objective thereof. It often remains unclear if payments are made as incentive that is mainly functioning due to the co-effects that make it attractive for participants, or if PES in the practice really aim to be equivalent to the value of ecosystem services and alone suffice to be an incentive for a change of land-use and NRM. Further research has to be undertaken in order to do in-depth analysis of possible forms of incentives.

Focusing on positive externalities in the extended context of PES is an attempt to move towards mechanisms fully integrating the social, economic and environmental dimension expanding the traditional definition of PES. Criteria of all three dimensions will influence the implementation requirements, market rules, ecosystem services and performance criteria (e.g. ecological efficiency, economic efficiency and social effectiveness)<sup>75</sup>. The research also links to the issue of use-modifying schemes as opposed to use-restricting projects. Most case studies showed that use-modification seems more popular especially when considering the prime objective of livelihood diversification in the East African context. The actual potential of use-modifying schemes therefore has to be explored in more depth. Especially the long term effects of PES remain little explored.

On the regional level it is striking that so many PES projects do not reach the operational level. The underlying reasons and consequences remain little explored. Therefore it seems interesting to analyse former PES schemes that ceased to exist concerning the underlying factors for the ending, the impact on e.g. community trust in environmental resource management tools, level of ES before, during, and after. Still, uncertainty about the restoration potential and possibility to achieve financial independence remains. This is an indication for the need to have well-elaborated indicators to measure the actual impact as well as commitments from the private sector and governments to guarantee financial viability. Developing such indicators for effective PES is another aspect for further research as already demonstrated by the ReDirect project.

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<sup>75</sup> An example of economical efficiency is optimal financial resource allocation; of ecological efficiency the impact on ecosystem services; and of social effectiveness impact on unemployment (FAO, 2010c).

## 7. Conclusion and Recommendations

This research has analysed the status quo and feasibility of PES as mechanism for natural resource management in the regional context of East Africa. The central research question on the feasibility has been approached on the regional, national and project level. Thereby key actors and institutions; the coherence of PES with national policies; on-going initiatives and developments; a number of possible foci for PES; as well as the socio-economic context have been explored. In East Africa the mechanism seem particularly valuable as incentive to turn to more sustainable land-use technologies; diversification of livelihoods through introducing and financing new land-use technologies; increase awareness on implications of consumption and negative externalities; help overcoming critical relations between governmental actors and land-users (see ReDirect); and as supplement to currently applied regulatory approaches to NRM. PES can also be important for translating and mainstreaming environmental and NRM concerns into a language understood and paid attention in other policy realms.

### Synthesis Conclusion

- PES hold potential in East Africa as source of additional funding for constrained governmental budgets; for mainstreaming the environment into other policy areas; initiating alternative land-use technologies; and livelihood diversification
- PES are in line with national and regional policies and constitutions
- NGOs and international organisations central in placing PES on political agenda
- Development of regulations and operationalising frameworks on the national level has been initiated
- Increasing awareness on importance of an integrated ecosystems approach and environmental funding
- Socio-economic context in the region seems to be supportive to PES
- Recent formation of a PES network on regional level and increasing number of research projects
- Limited involvement of the private sector in NRM and re-investment into the environment
- Limited institutional capacities and involvement of the governmental level in regulatory developments concerning PES
- Need to develop a unified definition of PES
- Make PES advance government-owned process
- Embedding PES into local institutions
- Improved communication and sharing of lessons learned in PES pilots
- Procedural improvements on project level necessary

**Box 6:** Synthesis Conclusion

### 7.1. The Readiness for PES in East Africa

The current status of PES in the region is summarized in form of central Strength, Weaknesses, Opportunities and Threats (SWOT) below in figure 12.

<p><b>Strength</b></p> <ul style="list-style-type: none"> <li>• Decentralization and reforms in environmental, land, water and forestry policies</li> <li>• PES in line with existing NRM policies and national constitutions</li> <li>• Necessity for improved ES</li> <li>• Potential for bundling ES</li> <li>• Existing work in the area gaining importance</li> <li>• Increasing awareness on PES</li> <li>• Potential for ES stewards and buyers</li> <li>• Growing number of feasibility studies conducted by national ministries</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Complex land ownership and user rights to natural resources</li> <li>• Weak legal provisions for contractual agreements ES perceived to be free of charge and no awareness of the need to compensate</li> <li>• PES concept not well known and fully understood</li> <li>• No strong guidelines and standards for operationalisation of PES (e.g. funding channels)</li> <li>• Limited institutional capacities</li> <li>• Limited re-investment into the environment</li> <li>• Limited market information and involvement of private sector</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Increasing number of organizations and governmental actors are aware of PES</li> <li>• Emerging efforts for the inclusion of PES in national policy frameworks</li> <li>• Development of national environmental funds</li> <li>• Very active role of NGOs</li> <li>• Increasing number of PES pilots</li> <li>• PES networks and research institutes catalysing policy support and private sector participation</li> <li>• Increased attention to carbon market potential (CDM, REDD or voluntary)</li> <li>• Co-effects of PES (hybrid forms of PES)</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>• No full guarantee for technologies for improving ES due to complex institutional structures</li> <li>• Monitoring effectiveness remains difficult</li> <li>• Financial sustainability of initiatives unclear</li> <li>• Equity of PES schemes not guaranteed</li> <li>• No clear demand for ES due to limited awareness on value and connection to human well-being</li> <li>• No clear definition of PES</li> <li>• Level of governmental support to participatory land management or private schemes unclear</li> <li>• No national authorities with central mandate for PES</li> <li>• External factors affecting investment in land management (e.g. property rights)</li> </ul>

Figure 12: SWOT Outlook on PES in East Africa

#### *On the Regional and National Level*

In general there is a growing interest on the governmental, NGO and local level for PES. The awareness amongst encountered organizations and governmental agencies is highest on carbon projects. Within the regional context PES are primarily considered as mechanism to integrate conservation and development e.g. in the national poverty reduction strategies. A number of existing SLM and NRM programmes are in place on the national level that could be supplemented by PES e.g. integrated watershed management programmes. The environmental and socio-economic context in the region seems to be supportive to PES. The mechanism is in line with existing national constitutions, environmental as well as natural resource management regulations and policies and regional protocols of the EAC. Decentralization of environmental responsibilities is on-going. Nonetheless it is still going to require considerable time. Key factors as land titles, awareness on the value of ES and national and local institutions with a mandate supportive to PES have been developing in the last years yet are still only present in few areas. Customary land tenure is acknowledged in all countries with the exception of Rwanda. The development of national environmental funds and conservation trust funds can be positive for PES. National environmental funds similar to the FONERWA in Rwanda can act as central channel for PES schemes as well as potential sources of funding for public schemes. With the development of national environmental funds and the increased awareness on the value of ES the potential of public payment schemes to private land owners for maintaining or restoring ES increases. The development of regulations and operationalising frameworks on the national level has been initiated, especially in Uganda, Tanzania and Rwanda. Policy diffusion is likely to gather speed in the future with national efforts, networks and international support on the advent.

### *On the Project Level*

The number of small-scale pilot projects is growing and a number of scoping studies from NGOs, networks or universities are on-going. With few exceptions these schemes are private agreements, self-organized and self-negotiated with external actors as key initiators. In the initial phase up-front costs are covered primarily by international donors, funds and in the case of carbon projects through sold credits. Current PES initiatives are still young and the long-term effects cannot be assessed with certainty. Nonetheless it already becomes visible that schemes promote and enable the application of alternative land-use technologies. Necessary incentives and up-front payments are provided to land-users. This is essential for promoting alternative land-use systems particularly when long term benefits are not yet visible to farmers. Established projects can be considered to contain positive synergies and immediate side-effects as e.g. capacity building; strengthening of local institutions and social capital through frequent interaction and negotiations; increased capacities for NRM and monitoring; strengthening local economies through diversified livelihoods; and increased awareness on the role of ES.

Existing projects moreover show that schemes can emerge despite the absence of national regulatory frameworks for PES or registered legal land titles. In the existing PES schemes local institutions play a significant role e.g. in confirming tenure rights, in conflict resolution. Participation also seems important to increase the potential co-effects. Livelihood diversification is central in almost all on-going initiatives. Initiation of PES has so far been entirely based on external actors. Governmental agencies were mostly exclusively involved in technical specifications, and to ensure accordance with national legislation. In few cases national authorities also support monitoring. On the regional level NGOs are playing the key role in encouraging governmental engagement and in promoting scaling up and regularization of PES. The readiness of the East African context to support PES is thus increasing. Still a number of challenges have to be addressed before an effective application of PES is facilitated.

### **7.2. Challenges**

The advent of PES is marked by uncertainties and challenges to operationalise the mechanism. With NRM policies in the region currently being primarily regulatory, discussions on the voluntary nature of PES prevail considering the urgency of improved NRM. Institutional structures in East Africa possibly make it more important to have regulatory frameworks for NRM. This is also connected to required mechanisms to mobilise the private sector. Community based, or participatory NRM programmes are still only emerging. The potential and underlying notion of PES are still too little known and especially carbon projects that are outside the direct governmental bearing are considered with retention. Uncertainties for project initiators prevail, as e.g. visible with carbon projects facing long-term negotiations and often perpetual complications on the ownership of credits. As the mechanism is new to many actors in the region the underlying notion of having to compensate for consuming ecosystem services is not easily spread amongst stakeholders. Capacity constraints of national agencies, limited re-investment in the environment and weak involvement of the private sector form major barriers to enhancing PES. Another barrier observed is that often there is little coordinated enhancement of PES or a regulatory framework on national governmental level. Furthermore, when PES are applied in a setting with weak and problematic land tenure rights the effectiveness can be limited especially in the long term. The distribution of land titles is on-going in most countries, yet will still take considerable time. It is also not envisioned necessary by many land-users that are accustomed to customary land rights.

Within on-going PES projects a strong focus on carbon projects exists. Most of the interviewed actors queried for their perspective on potential PES think only in terms of carbon sequestration projects with little attention to other ES. Yet, especially the promotion of carbon projects should be handled with care as the market is uncertain. The number of VRC projects may soon exceed the demand and therefore have a negative impact on the prices paid. Almost all PES schemes studied face uncertainty concerning the long-term financial feasibility. Their actual effectiveness

remains hard to measure due to the early phase most schemes are in. Timely limited and mostly relatively newly established pilot projects are not yet able to achieve measurable impacts on level of ES or co-effects as e.g. livelihood diversification in the long run. It is therefore a challenge to establish if costs and benefits of PES are in balance at the current state and therefore create sustainable institutions. Complex and unpredictable dynamics of ES further make it difficult to build convincing business cases to potential ES consumers. This can also be linked to the limited level of commitment of private parties which is often restricted and in some cases non-binding but rather CSR. Considering this uncertainty coupled with the current financial means it seems over ambitious to create PES schemes that provide a reward for participants that fully covers the opportunity costs. Due to the small scale approach most pilot schemes have based on very small-scale ES providers as well as due to capacity constraints of local institutions, transaction costs remain rather high. In general at the current state the involvement of private actors and industries in NRM or other policy programmes is rather inadequate and many ES are open access resources. Furthermore, capacities on the governmental level to monitor implementations as e.g. environmental impact assessments and best management practises remains limited.

Existing inventories on PES do not apply one common definition of the mechanism. This makes it difficult to compare national inventories and furthermore, increases uncertainty of what is a PES scheme and what not. Often projects are listed as on-going that ceased to exist, have never properly functioned or were not even considered under the term by the facilitator. This is certainly also connected to the time constraints most consultants face when conducting inventories as well as to the fact that acquiring updated information is a very challenging task. Similar time and information constraints are at times faced in conducting socio-economic and ES baseline studies. Different expectations and definitions further make scaling-up of projects very difficult.

### 7.3. Recommendations

The feasibility of PES as mechanism for natural resource management will depend on carefully designed PES and tackling and overcoming the challenges identified in this research. A favourable institutional environment is certainly a key condition to enable a sound integration in national SLM and NRM programmes. Developing a common definition of PES in the region seems particularly important in this early phase of PES development. It is likely to abridge the operationalisation of PES and capacity building on the institutional, operational and individual level. This definition furthermore, has to place special attention to balancing the policy outcomes of PES, equity, cost-effectiveness, and environmental effectiveness. It also has to consider the envisioned role of PES (initiating change in the short term or continuous mechanism in the long-term) and the associated objectives and adequate design principles. The question if PES are even a viable mechanism to introduce in the particular context has to be addressed first.

PES touch on other non-environmental policy areas as health, poverty reduction, market development, the role of business and climate change adaptation and mitigation, mainstreaming the mechanism into these areas is indispensable. The mechanisms should not be adopted and imposed from outside and top down to jump on the bandwagon. PES always have to be considered in the national, regional and local context as well as with special attention to the socio-economic and environmental context. With poverty alleviation being central to most current PES activities this may also imply to consider hybrid forms of market-based mechanisms, subsidies, and state regulations as elaborated by McAfee & Shapiro (2010). Purely market-based solutions seem insufficient as only solution. Rather should MBI be part of a package of regulatory and community-based approaches. PES alone will thus not become the silver bullet for sustainable NRM in East Africa.

Synthesising the gained insights on the regional, national and project level, a number of recommendations can be made for enhancing the feasibility of an effective application of PES.

### *On the Regional and National Level*

- In order to resolve the disarray and reluctance of governmental agencies to enhance PES application, the advent and promotion of the mechanism has to be met with knowledge and capacity building efforts. It is central to increase the awareness and capacity of national and regional institutions and organizations to understand the potential of PES and necessary developments.
- A unified definition so as to reduce the uncertainty and to foster coherence between different initiatives is central to move ahead with PES. This also helps to encounter mere renaming and a bandwagon effect while enabling coherent and up-dated PES inventories.
- To facilitate capacity building and awareness raising it is necessary to strengthen the will and means of national agencies to engage in PES development. Governmental authorities need to be centrally involved the process of policy development otherwise the sustainability of projects as e.g. seen with voluntary market projects is not secured. At the current state NGO involvement compensates the lack of active involvement of the national governmental agencies in developing a framework for PES. This is likely to have an impact in the long time effect of PES and therefore more active involvement of national governments is needed.
- The integration of PES into national policies and the development of a regulatory framework as e.g. under way in Tanzania in the water legislation, or in Uganda and Rwanda needs to be strengthened and accelerated. Here again NGOs, as the WCS that take over a leading role, are indispensable.
- Clear regulatory frameworks, responsibilities and proceedings for project development are necessary to overcome the reservation and uncertainty on the mechanism that prevails on the side of private actors and NGOs. Moreover this provides a signal on the level of governmental support to PES.
- The involvement of national institutions and organisations from the region in e.g. pilot projects and baselines studies should be augmented. Increased research from national research institutions or universities would be beneficial to foster the awareness, understanding of and involvement in PES on the national and regional level. This also can contribute to the mapping of ES as well as to develop formalized methodologies for baselines and ES valuation.
- Regional networks for PES knowledge and expertise have to be strengthened and mandates of national authorities created to clarify responsibilities for PES.

### *On the Project Level*

- In order to achieve sustainable PES, reliable institutions are necessary that are trusted by PES stakeholders. Especially on the local level institutions are central to PES and therefore should be enhanced and strengthened. Central roles have to become well-embedded in the local institutional structures and involve all stakeholders in shaping the scheme. This is especially the case in schemes where external actors are the facilitators and their participation will expire.
- The complexity and dynamics of land tenure make PES conceptualisation very intricate and time consuming. Close cooperation with local institutions and sufficient resources need to be ensured by project facilitators.
- The identified financial constraints of most PES projects make it visible that long-term financial feasibility only seems possible with access to additional funds or corporate revenue that exist independent of the project as e.g. TGB or TIST. When considering PES in other countries as e.g. Costa Rica, Mexico or South Africa most schemes beyond the first operational years are connected to state funds and institutions. Cooperation with national

authorities and fostering their engagement in PES projects and regulatory framework development is therefore an important development.

- The involvement of the private sector in NRM should be enhanced by national efforts to mainstream environmental concerns into the business sector. Initiatives as undertaken by WWF and CARE e.g. in Tanzania as well as by WCS in Rwanda to mobilise and create awareness of private industries are very important. They help to create an understanding of the value of ES for the industry and the costs that can or are saved by the conservation of ES. Especially since the trust in the government to ensure these ES is often limited, this is a potential strength of PES.
- The need for better communication and sharing of experiences has been stressed several times during the Jinja conference and during interviews. The research pilot ReDirect for example is not well known on the national or international level despite the valuable insights it contains. This is connected to the presence of interest and motivation as well as capacity to learn of governmental actors.
- In addition to inventories, case studies should be conducted that provide detailed information on processes involved and key factors of the operationalisation of schemes. Results can be shared in e.g. the regional network NESAs in order to learn from experienced problems and to assess the actual impact and effectiveness of PES schemes. This in turn provides insights on the potential or effectiveness of PES in the region.
- In order to improve the possibility to assess the effects and impact of PES schemes it is important to develop clear indicator frameworks. The performance of PES can be measured by e.g. similar indicators used to assess institutional performance. In case of immature projects preliminary outcomes can be used as indicators. Especially the ReDirect project is a positive example for a well-designed assessment framework focusing on the legitimacy and equity of the scheme.
- Identified remuneration possibilities have to be reviewed, validated and developed in cooperation with key actors. Clear procedures for the enforcement of ES delivery or the adoption of promoted actions as well as in case of breach and for grievances by ES stewards have to be in place. These aspects are already realized e.g. in the Vi Agroforestry project, yet are not emphasized sufficiently in other schemes.
- Especially in well-established systems and structures, it seems most difficult to create awareness on the potential of PES and the need for payments. Therefore, currently emerging environmental programmes, SLM or NRM projects as e.g. planned hydropower plants hold high potential for PES integration.
- Concerning the increasing number of carbon PES the absorption limit should be taken into account and only when sufficient committed buyers can be found should a scheme be initiated. Carbon PES can in a next step form the basis for bundling other ES to carbon sequestration, as e.g. water management, preventing soil erosion, conservation of biodiversity. Bundling of ES is not yet applied in the region yet may enable to spread the mechanism to ES which are more difficult to “sell”.

## References

- Agrawal, A. (2002). Common Resources and Institutional Sustainability. In Ostrom, E., T. Dietz, N. Dolsak, P.C. Stern, S. Stonich, and E.U. Weber (eds.): *The Drama of the Commons*. National Academy Press: Washington DC.
- Allison, H. and R. Hobbs (2010). Natural Resource Management at Four Social Scales: Psychological Type Matters. *Environmental Management*, 45:590–602.
- Anderies, J. M., M. A. Janssen and E. Ostrom (2004). A Framework to Analyze the Robustness of Social-ecological Systems from an Institutional Perspective. *Ecology and Society*, 9 (1): 18.
- Andrew, G., and M. Masozera (2010). Payment for Ecosystem Services and Poverty Reduction in Rwanda. *Journal of Sustainable Development in Africa*, 12(3): 122-139.
- Baanyanga, A. (2010). Personal Communication. Project Manager TIST Uganda. Kabale, Uganda, 25 November 2010.
- Baijukya, F. (2008). Agro-ecosystems of Kagera River Basin in Tanzania: Niches for PES to Enhance Sustainable Land Management. In: FAO-CARE (2008). Payments for Environmental Services from Agricultural Landscapes (PESAL). Capacity-building Workshop. *Final Report*. Dar es Salaam, Tanzania, 4-6 February 2008.
- Baland, J.-M., and J.-P. Platteau (1996). Halting Degradation of Natural Resources: Is there a Role for Rural Communities? Clarendon Press: Oxford.
- Balmford, A., and T. Whitten (2003). Who should Pay for Tropical Conservation, and How Could the Costs be Met? *Oryx*, 37 (2): 238–250.
- Barton, D. N., D. P. Faith, G. M. Rusch, H. Acevedo, L. Paniagua, and M. Castro (2009). Environmental Service Payments: Evaluating Biodiversity Conservation Trade-offs and Cost-efficiency in the Osa Conservation Area, Costa Rica. *Journal of Environmental Management*, 90: 901–911.
- Bracer, C., S. Waage, and M. Inbar (2008). Payments for Ecosystem Services. Getting started – A primer. The Katoomba Group, UNEP and Forest Trends: Washington, DC. Retrieved 08 September 2010 from: <http://www.katoombagroup.org/documents/publications/GettingStarted.pdf>.
- Branca, G., L. Lipper, B. Neves, D. Lopa, and I. Mwanyoka (2009). New Tools for Old Problems: Can Payments for Watershed Services Support Sustainable Agricultural Development in Africa? *ESA Working Paper*, 09-10. Agricultural Development Economics Division, FAO, Rome, Italy.
- Bond, I., S. Waage, and A. Ruhweza (2008). Payments for Ecosystem Services (PES) in East and Southern Africa: Assessing Prospects & Pathways Forward. The East & Southern Africa Katoomba Group. Retrieved 09 October 2010 from: <http://www.katoombagroup.org/regions/africa/assessments.php>.
- Buerli, M. (2006). Options for Enhancing Economic Viability of Sustainable Land Management Practices and Incentives for Reversing Land Degradation. *Working Paper*. Food and Agriculture Organization (FAO), Rome, Italy.
- Bwiza, C. J. (2010). Personal Communication. Programme Manager Bwindi Mgahinga Conservation Trust. Kabale, Uganda, 25 November 2010.
- CARE and WWF (2010). Payment for Environmental Services: An integrated Approach to Natural Resource Management and Livelihood Improvement - A case of Naivasha-Maleaw Project, Kenya. *Project Report*. World Wildlife Fund (WWF) & CARE, Nairobi, Kenya.
- CBD (2010). The Ecosystem Approach – Introduction. Convention for Biological Diversity (CBD). *Official Website*. Retrieved 12 October 2010 from: <http://www.cbd.int/ecosystem/>.
- Coase, R. A. (1960). The Problem of Social Cost. *Journal of Law and Economics*, 3: 1- 44.
- Corbera, E., S. C. Gonzales, and K. Brown (2009). Institutional Dimension of Payments for Ecosystem Services: An Analysis of Mexico's Carbon Forestry Programme. *Ecological Economics*, 68: 743-761.
- Costanza, R., R. d'Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, K. Limburg, N. Shanid, R.V.

- O'Neill, J. Paruelo, R. G. Raskin, P. Sutton, and M. van den Belt (1997). The Value of the World's Ecosystem Services and Natural Capital. *Nature*, 387: 253–260.
- Daily, G. C. (1997). *Nature's Services: Societal Dependence on Natural Ecosystems*. Island Press: Washington, DC.
- De Georges, P. A. and B. K. Reilly (2009). The Realities of Community Based Natural Resource Management and Biodiversity Conservation in Sub-Saharan Africa. *Sustainability*, 1: 734-788.
- Diamond, P. A. and J. A. Hausman (1994). Contingent Valuation: Is some number better than no number? *Journal of Economic Perspectives* 8 (4):45-64.
- Dismas, B. (2010). Personal Communication. Director of Forestry Field Programme Unit, National Forest Authority (NAFA). Kigali, Rwanda, 10 December 2010.
- Donaldson, S. and S. Swanson (2001). Water Quality. In: NEMA (2006). Ecosystem Services and Their Linkage to Poverty Reduction in Uganda. *Official Report*. National Environment Management Authority (NEMA) and Centre for Resource Analysis Limited (CRA), Kampala, Uganda.
- Duraiappah, A. K. (2002). Poverty and ecosystems: A Conceptual Framework. UNEP Division of Policy and Law Paper. United Nations Environment Programme (UNEP) Nairobi, Kenya.
- Dyszynski, J. (2010). Personal Communication. Climate and Development Knowledge Network (CDKN) Research Assistant for Adaptation. Kigali, Rwanda. 09 December 2010.
- EAC (2011). Productive Sectors in the EAC. East African Community (EAC). Official Website. Retrieved 15 March 2011 from: [http://www.statistics.eac.int/index.php?option=com\\_content&view=article&id=142&Itemid=117#tourism](http://www.statistics.eac.int/index.php?option=com_content&view=article&id=142&Itemid=117#tourism).
- ECOTRUST (2010). Trees For Global Benefits (TGB) Program in Uganda - A Plan Vivo Carbon offset Project. *Annual Report*. Retrieved 17 November 2010, from: [http://planvivo.org.34spreview.com/wp-content/uploads/TFGB\\_PlanVivo\\_Annual-Report-2008\\_publicversion.pdf](http://planvivo.org.34spreview.com/wp-content/uploads/TFGB_PlanVivo_Annual-Report-2008_publicversion.pdf).
- Ellis, M. (2010). Communication via E-mail. Focal Point PES CARE International. December 2010.
- Encyclo. Positive Externalities. Online Encyclopaedia. Retrieved 12 September 2010, from: <http://www.encyclo.co.uk/define/Positive%20externalities>.
- FAO (2005). Irrigation in Africa in Figures: AQUASTAT Survey—2005. *Water Report*, 29. Food and Agriculture Organization of the United Nations, Rome, Italy.
- FAO (2010). Payments for Environmental Services from Agricultural Landscapes (PESAL – official website). Food and Agriculture Organization of the United Nations (FAO), Rome, Italy. Retrieved 12 July 2010 from: <http://www.fao.org/es/esa/PESAL/aboutPES10.html>.
- FAO (2010a). Transboundary Agro-ecosystem Management Programme for the Kagera River Basin - Results, Lessons Learned & Methodologies. Food and Agriculture Organization of the United Nations (FAO), Land and Water Development Division: Rome. Retrieved 08 October 2010 from: [http://www.fao.org/landandwater/fieldpro/kagera/methodologies\\_results.htm#economic\\_incentives](http://www.fao.org/landandwater/fieldpro/kagera/methodologies_results.htm#economic_incentives).
- FAO (2010b). Designing a National PES Approach in Bhutan – Feasibility Assessment and Proposal. *Final Report*. Food and Agriculture Organization of the United Nations (FAO), Rome, Italy.
- FAO (2010c). From Payment of Environmental Externalities to Remuneration of Positive Externalities in the Agriculture and Food Sector - Stakeholder Consultation. (unpublished document). Food and Agriculture Organization of the United Nations (FAO), Rome, Italy.
- FAO (2010d). Integrated Approaches to Sustainable Land Management. *Official Website*. Food and Agriculture Organization of the United Nations (FAO), Rome, Italy. Retrieved 13 September 2010 from: <http://www.fao.org/nr/land/sustainable-land-management/integrated-approach-to-slm/en/>.
- Ferraro, P. J. (2009). Regional Review of Payments for Watershed Services: Sub-Saharan Africa.

- Journal of Sustainable Forestry*, 28:525–550.
- Fisher, B., R.K., Turner, P. Morling (2009). Defining and Classifying Ecosystem Services for Decision Making. *Ecological Economy*, 68: 643–653.
- Fisher, B., K. Kulindwa, I. Mwanyoka, R. K. Turner, and N. D. Burgess (2010). Common Pool Resource Management and PES: Lessons and Constraints for Water PES in Tanzania. *Ecological Economics*, 69: 1253–1261.
- FOEN (2005). Water-related Ecosystems for Water Management: Environmental Services and Financing for the Protection and Sustainable Use of Ecosystems. Federal Office for the Environment of Switzerland (FOEN). Bern, Switzerland.
- Foltz, J. (2010). Personal Communication. Economic Growth Officer USAID, Kigali, Rwanda, 10 November 2010.
- Forest Trends and Ecosystem Marketplace (2008). Payments for Ecosystem Services: Market Profiles. Produced by Forest Trends and the Ecosystem Marketplace. Retrieved 22 February 2011, from: [http://ecosystemmarketplace.com/documents/acrobat/PES\\_Matrix\\_Profiles\\_PROFOR.pdf](http://ecosystemmarketplace.com/documents/acrobat/PES_Matrix_Profiles_PROFOR.pdf).
- Garcia, C. (2010). Landscape Labelling. Presentation at the Stakeholders' Consultation *From Payment of Environmental Services to Remuneration of Positive Externalities in the Agriculture and Food Sector*. Food and Agriculture Organization of the United Nations, Rome, Italy. 27-28 September 2010.
- GEF and UNEP (2003). Transboundary Agro-ecosystem Management Programme for the Kagera River Basin (Kagera TAMP). *Full Project Brief*. Global Environment Facility (GEF) Washington DC, USA & United Nations Environment Programme (UNEP), Nairobi, Kenya.
- GEF (2009). Payments for Environmental Services and the Global Environment Facility - A Scientific and Technical Advisory Panel (STAP) Guideline Document. Global Environment Facility (GEF) Council, GEF/C.35/ Inf.12, Washington DC, USA.
- GoR (2000). Rwanda Vision 2020. Government of Rwanda, Ministry of Finance and Economic Planning (MINECOFIN). Kigali, Rwanda.
- GoR (2004). National Land Policy. Government of Rwanda, Ministry of Lands. Kigali, Rwanda.
- GoR (2005). Organic Law N° 08/2005 Determining the Use and Management of Land in Rwanda. Government of Rwanda, Ministry of Environment and Lands (MINELA). Kigali, Rwanda.
- GoR (2005a). Organic Law N° 04/2005 Determining the Modalities of Protection, Conservation and Promotion of Environment in Rwanda. Government of Rwanda, Ministry of Environment and Lands (MINELA). Kigali, Rwanda.
- GoR (2010). National Forest Policy. Government of Rwanda, Ministry of Forestry and Mines (MINIFOR). Kigali, Rwanda.
- Greiber, T. (2010). Legal Frameworks of PES. International Union for Conservation of Nature (IUCN) Environmental Law Centre. Presentation at the Stakeholders' Consultation from *Payment of Environmental Services to Remuneration of Positive Externalities in the Agriculture and Food Sector*. Food and Agriculture Organization of the United Nations. Rome, Italy. 27-28 September 2010.
- Grosso, P. (2010). Personal Communication. Technical Officer, Land and Water Division (NRL). Food and Agricultural Organisation (FAO). Rome, Italy, 06 September 2010.
- Grosjean, P., and A. Kontoleon (2009). How Sustainable are Sustainable Development Programs? The Case of the Sloping Land Conversion Program in China. *World Development*, 37: 268–285.
- Gross-Camp, N. (2010). Personal Communication. Senior Research Associate, University of East Anglia, International Development DEA. 07 December 2010 Butare, Rwanda.
- Gross-Camp, N. (2011). Communication via E-mail. Senior Research Associate, University of East Anglia, International Development DEA, 28 February 2011.
- Gross-Camp, N., A. Martin, S. McGuire, B. Kebede, and K. Munyarukaza (2010). PES in African Protected Areas: Exploring Issues of Legitimacy, Fairness, Equity & Effectiveness. In Review with *Oryx* (forthcoming).
- Havemann, B. (2010). Communication via E-mail. Manager Akagera Management Company.

- December 2010.
- Hove, H., J.-E. Parry, and N. Lujara. (2011). World Resources Report Case Study. Maintenance of Hydropower Potential in Rwanda through Ecosystem Restoration. World Resources Report, Washington DC. Retrieved 22 March 2011, from: <http://www.worldresourcesreport.org/files/wrr/WRR%20Case%20Study%20Ecosystem%20Restoration%20and%20Hydropower%20in%20Rwanda%200.pdf>.
- IFAD (2010). Payments for Watershed Services. International Fund of Agricultural Development (IDAF), Rome, Italy. Retrieved 01 October 2010, from: <http://www.ifad.org/english/water/innovat/topic/payments.htm>.
- IISD and UNEP (2004). Human Well-being, Poverty, Ecosystem Services: Exploring the Links. International Institute for Sustainable Development (IISD) & United Nations Environment Programme (UNEP). Retrieved 04 October 2010, from: [http://www.unpei.org/PDF/UG\\_ecosystems\\_rpt.pdf](http://www.unpei.org/PDF/UG_ecosystems_rpt.pdf).
- Jack, B.K., C. Kousky, and K. R. E. Sims (2008). Designing Payments for Ecosystem Services: Lessons from Previous Experience with Incentive-based Mechanisms. Research Articles, Economic Sciences Ecosystem Services Special Feature. *The National Academy of Sciences of the USA*. 105(28): 9465–9470.
- Jewitt, S. (1995). Voluntary and 'Official' Forest Protection Committees in Bihar: Solutions to India's Deforestation? *Journal of Biogeography*, 22 (6): 1003-1021.
- Jourdain, D., D.A. Tai, D.D. Quang, and S. Pandey (2009). Payments for Environmental Services in Upper Catchments of Vietnam: Will it Help the Poorest? *International Journal of the Commons*, 3 (1): 64-81.
- Kabenga, I. (2010). Personal Communication. Regional Project Manager, Nile Equatorial Lakes Subsidiary Action Program (NELSAP)/Kagera Transboundary Integrated Water Resource Management and Development Project. Kigali, Rwanda, 27 October 2010.
- Karousakis, K. (2010). Enhancing the Cost-Effectiveness of Payments for Ecosystem Services. Organization for Economic Co-operation and Development (OECD). Presentation at the Stakeholders' Consultation *From Payment of Environmental Services to Remuneration of Positive Externalities in the Agriculture and Food Sector*, Food and Agriculture Organisation of the United Nations, Rome, Italy, 27-28 September 2010.
- Katoomba Group (2006). Summary of Country-level PES Inventories Carried out in East and South Africa. East and Southern Africa Katoomba Group, Kampala, Uganda. Retrieved 26 October 2010 from: <http://www.katoombagroup.org/regions/africa/assessments.php>.
- Kipkoech, A. (2010). Assessing the Economic Value of Forest: Is it a Prerequisite for Payment for the Environmental Functions? Presentation at the International Conference on Payments for Ecosystem Services in Eastern and Central Africa, Nile Resort Hotel, Jinja, Uganda, 20-22 October 2010.
- Kosoy, N., and E. Corbera (2010). Payments for Ecosystem Services as Commodity Fetishism. *Ecological Economics*, 69: 1228–1236.
- Lager, B. (2011). Phone Interview and Communication via E-mail. Regional Programme Coordinator Vi Agroforestry. 03 December 2010 and February 2011.
- Lopa, D. (2008). Equitable Payments for Watershed Services (EPWS) in Tanzania: A CARE-WWF Programme. Presentation at the Capacity Building Workshop on Role of PES, White Sands Hotel, Dar es Salaam, Tanzania, and 4-6 February, 2008.
- Lopa, D. (2010). Phone Interview. Programme Manager EPWS Programme CARE Tanzania. 08 December 2010.
- Lopa, D. (2011). Communication via E-mail. Programme Manager EPWS Programme CARE Tanzania. February 2011.
- Maraseni, T.N., G. Cockfield and A. Apan (2002): Valuing Ecosystem Services from Forests: A Multidisciplinary Field-Based Approach. University of Natural Resources and Life Sciences, Vienna, Austria.
- Masiga, M. (2010). PES in East Africa. Consultant ENR Africa Associates Ltd. Presentation at the International Conference on Payments for Ecosystem Services in Eastern and Central Africa, Nile Resort Hotel, Jinja, Uganda, 20-22 October 2010.

- Masologo, D., G. Eustace, and B. Lager (2010). Communication via E-mail. Project Manager, Project Field Manager SCC-Vi Eastern Africa, Kagera Project, and Programme Director Vi Agroforestry. December 2010.
- Masozera, M. (2010). Personal communication. Director Wildlife Conservation Society (WCS), Kigali, Rwanda, 14 November 2010.
- McAfee, K., and E.N. Shapiro (2010). Payments for Ecosystem Services in Mexico: Nature, Neoliberalism, Social Movements, and the State. *Annals of the Association of American Geographers*, 100(3): 579–599.
- Millennium Ecosystem Assessment (2005). *Ecosystems and Human Well-being Synthesis*. Island Press: Washington, DC.
- MININFRA (2011). Hydropower in Rwanda. Rwanda Ministry of Infrastructure (MININFRA). Retrieved 05 February 2011, from: [http://mininfra.gov.rw/index.php?option=com\\_content&task=view&id=202&Itemid=341](http://mininfra.gov.rw/index.php?option=com_content&task=view&id=202&Itemid=341).
- MINITERE (2005). *Rapport du Projet de Gestion Nationale des Ressources en Eau. Composantes D: Etudes Techniques*. Ministère des Terres, de l'Environnement, des Forêts, de l'Eau et des Mines (MINITERE), Kigali, Rwanda.
- Miranda, M., I.T. Porras, and M. L. Moreno (2003). The Social Impacts of Payments for Environmental Services in Costa Rica. A Quantitative Field Survey and Analysis of the Virilla Watershed. International Institute for Environment and Development (IIED), London, UK.
- Muir, E. (2010). Communication via E-mail. Programme Manager Plan Vivo. November 2010.
- Mukuralinda, A. (2010). Personal Communication. World Agroforestry Centre (ICRAF) National Coordinator. Kigali, Rwanda, 25 October 2010.
- Mulisa, G. (2010). Personal Communication. Poverty and Environment Initiative (PEI) Consultant, Rwanda Environment Management Authority (REMA). Kigali, Rwanda, 18 October 2010.
- Myers, G. (2008). Land Tenure and Property Policies in East Africa. Senior Land Tenure and Property Rights Specialist, U.S. Agency for International Development. Retrieved 14 March 2011, from: <http://www.wilsoncenter.org/ondemand/index.cfm?fuseaction=home.play&mediaid=C178B8B7-B92F-CDF7-36D29545F8A4F1AB>.
- Nair, P.K.R. (2008). Agro-ecosystem Management in the 21st Century: It is Time for a Paradigm Shift. *Journal of Tropical Agriculture*, 46: 1-12.
- Nantongo, P. (2010). Phone Interview. Director Ecotrust. 18 November 2010.
- Ngoga, T. (2010). Personal Communication. Senior Community Conversation Officer, Rwanda Board of Development (RDB), Kigali, Rwanda, 02 December 2010.
- Niles, J. O., S. Brown, J. Pretty, A. S. Ball, and J. Fay (2002). Potential Carbon Mitigation and Income in Developing Countries from Changes in Use and Management of Agricultural and Forest Lands. *Philosophical Transactions of the Royal Society of London. Series A: Mathematical, Physical and Engineering Sciences*, 360: 1621-1639.
- Njenga, N., and J. Nyongesa (2010). Communication via E-mail. Project Assistant East Africa Regional Programme & Project Manager, World Wildlife Fund (WWF), Nairobi, Kenya. December 2010.
- Njenga, N. (2011). Communication via E-mail. Project Assistant East Africa Regional Programme, World Wildlife Fund (WWF), Nairobi, Kenya. February 2011.
- Noorwijk, van, M., and B. Leimona (2010). CES/COS/CIS Paradigms for Compensation and Rewards to Enhance Environmental Services. *Working Paper*, 100. World Agroforestry Centre (ICRAF). Bogor, Indonesia.
- North, D. C. (1994). Institutional Change: A Framework of Analysis. *Economic History* 9412001, EconWPA, revised 14 December 1994.
- Ntalindwa, J. (2010). Personal Communication. Swedish International Development Cooperation Agency (SIDA) Programme Officer Environmental and Natural Resources, Kigali, Rwanda, 09 December 2010.

- Ntazinda, J. (2010). Personal Communication. Project Coordinator, Capacity Reinforcement of the Clean Development Mechanism, Rwanda. Kigali, Rwanda, 27 October 2010.
- Nturanyenabo, J. (2010). Personal Communication. Project Engineer, Gesellschaft für Technische Zusammenarbeit (GTZ), Kigali, Rwanda, 06 December 2010.
- Nystrom, H. J. (2010). Map East African Community. Nystrom Educational Division. Retrieved 20 January 2011, from:  
[http://www.google.com/search?hl=de&rlz=1C1SVEE\\_enDE411DE411&biw=1366&bih=624&site=search&tbm=isch&aq=f&aqi=&oq=&q=East%20African%20Community](http://www.google.com/search?hl=de&rlz=1C1SVEE_enDE411DE411&biw=1366&bih=624&site=search&tbm=isch&aq=f&aqi=&oq=&q=East%20African%20Community)
- Okurut, T. O. (2010). Policy and Institutional Framework for Transboundary Payment for Environment Services. *Lead Paper*. Presented on the International Conference on Payments for Ecosystem Services in Eastern and Central Africa, Nile Resort Hotel, Jinja, Uganda, 20 October 2010.
- Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge University Press: New York, USA.
- Ostrom, E. (2005). *Understanding Institutional Diversity*. Princeton University Press: Princeton, N.J.; Woodstock, USA.
- Owekisa, D. (2010). Personal Communication. Renewable Energy Advisor Netherlands Development Organization (SNV). Kigali, Rwanda. 30 November 2010.
- Pagiola, S. (2005). Assessing the Efficiency of Payments for Environmental Services Programs: A Framework for Analysis. *Working Paper*. World Bank, Washington, DC.
- Pagiola, S., A. Arcenas, G. Platais (2005). Can Payments for Environmental Services Help Reduce Poverty? An Exploration of the Issues and the Evidence to Date from Latin America. *World Development*, 33: 237–253.
- Pagiola, S., and G. Platais (2007). Payments for Environmental Services: From Theory to Practice. *Environment Strategy Notes*. The World Bank, Washington, D.C., USA.
- Pagiola, S. (2007). Guidelines for “Pro-Poor” Payments for Environmental Services. World Bank, Washington, USA. Retrieved 12 October 2010, from:  
<http://siteresources.worldbank.org/INTEEI/214574112740068165/21408120/ProPoorPES-2col.pdf>.
- Pagiola, S. (2008). Payments for Environmental Services in Costa Rica. *Ecological Economics*, 65(4): 712-724.
- Pallangyo, D.M. (2007). Environmental Law in Tanzania: How Far have we Gone? *Law Environment and Development Journal*, 3 (1): 28-39.
- Perez, C., C. Roncoli, C. Neely, and J.L. Steiner, (2007). Can Carbon Sequestration Markets Benefit Low-income Producers in Semi-arid Africa? Potentials and Challenges. *Agricultural Systems*, 94(1): 2-1.
- Place, F. (2009). Land Tenure and Agricultural Productivity in Africa: A Comparative Analysis of the Economics Literature and Recent Policy Strategies and Reforms. *World Development* 37(8): 1326–1336.
- PREM (2010). Market-Based Incentives for Sustainable Resource Management. Poverty Reduction and Environmental Management (PREM). Amsterdam, The Netherlands. Retrieved 30 October 2010, from:  
<http://www.prem-online.org/index.php?p=about&a=24#>.
- Ranganathan, J., C. Raudsepp- Hearne, N. Lucas, F. Irwin, M. Zurek, K. Bennett, N. Ash, P. West (2008). *Ecosystem Services: A Guide for Decision Makers*. World Resources Institute, Washington, DC.
- REMA (2009). Rwanda, State of Environment and Outlook Report 2009. Rwanda Environment Management Authority (REMA), Kigali, Rwanda.
- REMA (2010). A Review of Existing and Potential Environmental Fiscal Reforms and other Economic Instruments in Rwanda. Rwanda Environment Management Authority (REMA). Supported by Poverty and Environment Initiative (PEI). Kigali, Rwanda. Retrieved 03 December 2010, from: [http://rema.gov.rw/rema\\_doc/pei/EFR.pdf](http://rema.gov.rw/rema_doc/pei/EFR.pdf).
- REMA (2010a). Integrated Management of Critical Ecosystems (IMCE) Project. *Official Website*.

- Rwanda Environment Management Authority (REMA), Kigali, Rwanda. Retrieved 02 November 2010, from:  
[http://www.rema.gov.rw/index.php?option=com\\_content&view=article&id=26&Itemid=38&lang=en](http://www.rema.gov.rw/index.php?option=com_content&view=article&id=26&Itemid=38&lang=en).
- REMA (2010b). Operationalisation of National Fund for Environment (FONERWA) in Rwanda. Rwanda Environment Management Authority (REMA). Supported by Poverty and Environment Initiative (PEI). Kigali, Rwanda.
- Ruhweza, A., B. Biryahwaho, and C. Kalanzi (2008). An Inventory of PES Schemes in Uganda. Part of the East and South Africa PES Review, East and Southern Africa Katoomba Group (E& SA KG). Retrieved 05 October 2010, from:  
<http://www.katoombagroup.org/regions/africa/assessments.php>.
- Sagashya, D.G. (2010). Communication via E-mail. Deputy Director General, National Land Centre (NLC), Kigali, Rwanda, December 2010.
- Sagoff, M. (2011) The Quantification and Valuation of Ecosystem Services. *Ecological Economics*, 70: 497-502.
- Sakuyama, T. (2005). Incentive Measures for Environmental Services from Agriculture. *Briefing Note*. Food and Agriculture Organization (FAO), Rome, Italy.
- Sánchez-Azofeifa, G. A., A. Pfaff, J. A. Robalino, and J. P. Boomhower (2007). Costa Rica's Payment for Environmental Services Program: Intention, Implementation, and Impact. *Conservation Biology*, 21: 1165–1173.
- Scurrah-Ehrhart, C. (2006). Tanzania Inventory of Payments for Ecosystem Services. Commissioned by Forest Trends and the Participatory Environmental Management (PEMA) Programme. Part of the East and South Africa PES Review, East and Southern Africa Katoomba Group (E& SA KG). Retrieved 05 October 2010, from:  
<http://www.katoombagroup.org/regions/africa/assessments.php>.
- Simpson, R., and R. A. Sedjo (1996). Paying for the Conservation of Endangered Ecosystems: A Comparison of Direct and Indirect Approaches. *Environment and Development Economics*, 1: 241–257.
- Sommerville, M. M., J. P.G. Jones, and E. J. Milner-Gulland (2009). A Revised Conceptual Framework for Payments for Environmental Services. *Ecology and Society* 14(2): 34.
- Sommerville, M., J. P.G. Jones, M. Rahajaharison, and E.J. Milner-Gulland (2010). The Role of Fairness and Benefit Distribution in Community-based Payment for Environmental Services Interventions: A Case Study from Menabe, Madagascar. *Ecological Economics* 69: 1262–1271.
- SAfMA (2005). Scholes, R.J. and R. Biggs (eds.). Council for Scientific and Industrial Research: Southern African Millennium Ecosystem Assessment (SAfMA), Pretoria, South Africa. Retrieved 01 November 2010 from:  
[http://www.maweb.org/documents\\_sga/SafMA\\_Regional\\_Report\\_-\\_final.pdf](http://www.maweb.org/documents_sga/SafMA_Regional_Report_-_final.pdf).
- Stiglitz, J. E., and C. E. Walsh (2002). *Principles of microeconomics* (3<sup>rd</sup> edition). Norton and Company: New York, USA.
- Suazo, J. (2010). Personal Communication. Project Manager SCC-Vi Eastern Africa RESAPP / Vi-LIFE Programme. Kigali, Rwanda, 29 November 2010.
- Swallow, B. M. Kallesoe, U. Iftikhar, M. van Noordwijk, C. Bracer, S. Scherr, K. V. Raju, S. Poats, A. Duraiappah, B. Ochieng, H. Mallee, and R. Rumley (2007). Compensation and Rewards for Environmental Services in the Developing World: Framing Pan-Tropical Analysis and Comparison. World Agroforestry Centre (ICRAF) *Working Paper*, 32. Nairobi, Kenya.
- Swallow, B. M., B. Leimona, T. Yatich, and S. J. Velarde (2010). The Conditions for Functional Mechanisms of Compensation and Reward for Environmental Services. *Ecology and Society*, 15(4): 6.
- Turner, R.K., I.J. Bateman, and W.N. Adger (2001). Ecological Economics and Coastal Zone Ecosystems' Values: An Overview. In: Turner, R.K., I.J. Bateman, and W.N. Adger (eds.). *Economics of Coastal and Water Resources: Valuing Environmental Functions*. Kluwer Academic Publishers: Dordrecht/Boston/London.
- UNEP and IISD (2005). Connecting Poverty and Ecosystem Services - A Series of Seven Country

- Scoping Studies; Focus: Rwanda. United Nations Environment Programme (UNEP), Nairobi, Kenya and International Institute for Sustainable Development (IISD), Winnipeg, Canada.
- UNEP, IUCN and CBD (2006). *Developing International Payments for Ecosystem Services: A Technical Discussion*. United Nations Environment Programme (UNEP), International Union for the Conservation of Nature (IUCN), and the Convention on Biodiversity (CBD), Geneva, Switzerland.
- UNEP (2008). Ecosystem Management Programme. Workshop on Ecosystem –Approach in Eastern Africa. Presentation of the United Nations Environment Programme (UNEP). 27 October 2008, Nairobi, Kenya. Retrieved 03 February 2011, from: <http://www.unep.org/NairobiConvention/docs/UNEP%20EMP%20brief%20for%20Coastal%20and%20Ocean-Ole.pdf>.
- UNEP-UNCTAD (2010). Organic Agriculture: Opportunities for Promoting Trade, Protecting the Environment and Reducing Poverty - Case Studies from East Africa. United Nations Environment Programme (UNEP), Nairobi, Kenya.
- Uwimana, I. (2010). Personal Communication. Project Manager Clinton Hunter Development Initiative (CHDI). Kigali, Rwanda, 29 November 2010.
- Vallee, D. (2010). Personal Communication. Management Officer Land and Water Division (NRL), Food and Agricultural Organisation, FAO. Rome, Italy, 02 October 2010.
- Vi Agorforestry (2008). Carbon Finance Document for Land-use, Land-use Change and Forestry (LULUCF) Projects. Vi Agorforestry. Stockholm, Sweden.
- Vi Agroforestry (2010). Emiti Nibwo Bulora “Trees Sustain Life”. Project Design Document. Plan Vivo. Retrieved 15 October 2010, from: [http://www.planvivo.org/?page\\_id=2418](http://www.planvivo.org/?page_id=2418).
- Vignola, R., B. Locatelli, and C. Martinez (2009). Ecosystem-based Adaptation to Climate Change: What Role for Policy-makers, Society and Scientists? *Mitigation and Adaptation Strategies for Global Change*, 14: 691-696.
- Walliman, N. (2006) *Social Research Methods*. Sage Publications: London, UK.
- WCS (2010). National Workshop on Payment for Environment Services (PES). Wildlife Conservation Society (WCS). *Draft Report*. December 17-18, 2010 Musanze, Rwanda.
- WFP (2010). Rwanda P4P Country Programme Profile. World Food Programme (WFP), Rome, Italy. Retrieved 25 March 2011, from: [http://docustore.wfp.org/stellent/groups/procuweb\\_content/documents/reports/wfp226784.pdf](http://docustore.wfp.org/stellent/groups/procuweb_content/documents/reports/wfp226784.pdf).
- Williams, C. (2011). Communication via Email. Vice President Clean Air Action Corporation. February 2011.
- World Bank Group (2010). Rwanda Country Data Profile. Retrieved 18 March 2011, from: [http://ddp-ext.worldbank.org/ext/ddpreports/ViewSharedReport?&CF=&REPORT\\_ID=9147&REQUEST\\_TYPE=VIEWADVANCED](http://ddp-ext.worldbank.org/ext/ddpreports/ViewSharedReport?&CF=&REPORT_ID=9147&REQUEST_TYPE=VIEWADVANCED).
- Wunder, S. (2005). *Payments for Environmental Services: Some Nuts and Bolts. Occasional Paper*, 42. Center for International Forestry Research (CIFOR). Bogor, Indonesia.
- Wunder, S. (2007). The Efficiency of Payments for Environmental Services in Tropical Conservation. *Conservation Biology*, 21: 48-58.
- Wunder, S., S. Engel, and S. Pagiolo (2008). Taking stock: A Comparative Analysis of Payments for Environmental Services Programs in Developed and Developing Countries. *Ecological Economics*, 65: 834-852.
- Wunder, S. (2010). Communication via Email. Principal Scientist, Forests and Livelihoods, Centre for International Forestry (CIFOR). November 2010.
- Wunder, S. and J. Boerner (2010). Changing Land-use in Forestry and Agriculture through Payments for Environmental Services. Chapter accepted for Yu Hung-Hong et al. (eds.). *The Environment, Climate Change, and Land Policies*. Lincoln Institute: Cambridge (MA) (forthcoming).
- Zukowska, K. (2010). Communication via Email. Project Manager Africa Ecosystem Restoration Association (ERA). November 2010.

## Appendix

### Appendix I: Activity Plan Internship

Date/Location	Objective	Involved Actors
09/27-28/2010, Rome, Italy	PES/RPE Stakeholder consultation: Important insights on PES design, current gaps in terminology, important design principles; objective of PES central	Representatives from FAO, OECD, ICRAF, CIFOR, CIRAD, IUCN, WFP, UNDP, IFAD
09/30/2010, Rome	Seminar on PES in Tanzania – Presentation of Care-WWF project Uluguru Mountians	FAO representatives, Mr. L. Dosteus (Care Tanzania)
10/01/2010, Rome	Background information on necessary assessment and pre-evaluative and preoperational processes; PES potential in SLM context	Mrs. D. Vallee (NRL)
10/04/2010, Rome	Briefing on Kagera TAMP and expected outcome of study	Mrs. S. Bunning (NRL)
10/06/2010, Rome	Issue of land tenure and conflict over resource access	Mr. P. Groppo (NRL) technical officer
10/06/2010, Rome	Introduction to Carbon Ex Ante Evaluation	Ms. M. Tinlot (TCSP) agronomy/agricultural sciences
10/07/2010, Rome	Labelling and certification schemes	Ms. E. Vandecandelaere (NRL)
10/15/2010, Kigali, Rwanda	PES in Rwanda	Mr. M. Masozera – Wildlife Conservation Society (WCS) Rwanda
10/16/2010, Kigali	PES in Rwanda	Mr. Mashinga – national coordinator of Kagera TAMP
10/18/2010, Kigali	Environmental Fiscal Reform, Rwanda	Mr. A. Mulisa (REMA)
10/18/2010, Kigali	Bamboo and agro-forestry, Rwanda	Mr. N. Johnson (Bamboo Society & head of REGNOF)
10/18/2010, Kigali	NELSAP	Ms F. Kayigamba (Environmental officer NELSAP)
10/20-22/2010, Jinja, Uganda	International Conference PES, Jinja, Uganda	Conversations with PRESA, WCS, UNDP, Plan Vivo, ECOTRUST, VIRED, UNEP, WWF&CARE, University representatives
10/25/2010, Kigali	PES and agroforestry/bamboo/coffee in Rwanda	Dr. A. Mukuralinda (ICRAF national manager Rwanda)
10/27/2010, Kigali	NELSAP – Kagera project and possibilities for PES	Mr. I. Kabenga (regional project manager - NELSAP/Kagera Transboundary Integrated Water Resource Management and Development Project)
10/27/2010, Kigali	CDM and carbon projects – REMA	Mr J. Ntanzinda (Project coordinator - REMA)
27/10/2010, Kigali	Protected Area Biodiversity Conservation Project (PAB) – REMA	Mr. R. Mpayana (Project coordinator PAB, REMA)
10/27/2010, Kigali	Climate change mitigation (REMA)	Mr. A. Mutawesi (consultant REMA on second national communication on climate change under UNFCCC)
10/27/2010, Kigali	Integrated Management for Critical Ecosystems (IMCE – REMA)	Mr. J. Claude Nkeramihigo (Environmental Officer)
10/29/2010, Kigali	Sustainable Land management and Carbon projects of UNDP	Dr. J. Musemakweri (UNDP Head of Environment & Energy Unite)
11/02/2010, Western Province, Rwanda	Fieldtrip Karongi LWH project	Mr. G. Branca and Ms. M. Tinlot
11/04/2010, Kigali	Carbon and CDM projects Rwanda	Ms. Courtney Blogett, currently focal point for Rwanda Development Board (RDB), before REMA DNA
11/04/2010, Kigali	Akagera National Park and revenue sharing	Mr. K. Humphrey (RDB, Head of Tourism and Conservation Department)
11/05/2010, Northern Province, Rwanda	Fieldtrip Northern Province farmers corporative	Mr. G. Branca and Ms. M. Tinlot
11/08/2010, Kigali	CDM project RECO/RWASCO	Mr. V. Mugiraneza (DG RECO)
11/10/2010, Kigali	PES involvement USAID and introducing Kagera TAMP	Ms.Mpambara (rural development specialist) and J Foltz (Economic growth officer)
11/12/2010, Kigali	Rwanda bamboo policy framework	INBAR Policy Workshop C. Hoogendoorn (Director General INBAR)
11/15/2010, Kigali	PES Rwanda, role of WCS	Mr. M. Masozera (Director WCS) and Charles Karangwa (Sustainable Finance Manager)

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11/18/2010	Skype conversation: Trees for Global Benefits project Uganda	Mrs. P.Nantongo (Director ECOTRUST)
11/19/2010, Kigali	Workshop agroforestry and carbon potential Rwanda	ICRAF/WCS
11/22/2010, Kigali	Domestic Biogas project	Mr.G. Hendriksen (consultant Ministry for Infrastructure, (MINFRA) Rwanda)
11/23/2010, Kigali	IFAD projects in Rwanda	Ms S. Ntukanyagwe
11/24/2010, Kigali	International Gorilla Conservation Programme	Ms.M. Grey (Information Management Officer)
11/24/2010, Kigali	Vi Agroforestry Project Kagera – Tanzania	Mrs.V. Nakajumo (Field officer SSC-Vi)
11/25/2010, Kabale, Uganda	Field trip & conversation with TIST project team	Mr.A. Baanyanga (Project Manager TIST Uganda)
11/25/2010, Kabale, Uganda	Bwindi Mgahinga Conservation Trust	Ms. C. J. Bwiza (programme manager)
11/29/2010, Kigali	Clinton Foundation carbon project	Mr. I. Uwimana (project manager Clinton-Hunter Foundation)
11/29/2010, Kigali	Vi Agroforestry Life project (Rwanda)	Mr. J. Suazo (Project Manager SCC-Vi Eastern Africa RESAPP / Vi-LIFE Programme)
11/30/2010, Kigali	SNV domestic biogas project, Rwanda	Mr. D. Owekisa (Renewable Energy Advisor)
11/30/2010, Kigali	UNECA activities	Mrs. D. Bregante (Economic Affairs Officer)
12/02/2010, Kigali	RDB revenue sharing and community based natural resource management	Mr. T. Ngoga (Senior community conservation officer)
12/02/2010, Kigali	CARE Rwanda	Mr. G. Daconto (Regional programme coordinator)
12/03/2010	Skype call: Vi Agroforestry PES project Kenya	Mr. B Lager (Regional programme coordinator)
12/06/2010, Kigali	WCS: PES scheme in Nyungwe & Akagera Park	Mr. M Masozera (Director WCS)
12/06/2010, Kigali	GTZ hydropower project	Mr. J. Nturanyenabo (GTZ Project Engineer)
12/07/2010, Butare, Rwanda	ReDirect PES project Nyungwe project	Mrs. N. Gross-Camp (Senior Research Associate, University of East Anglia, International Development DEA)
12/08/2010	Phone interview: EPWS Tanzania	Mr. D. Lopa (Programme Manager EPWS Programme)
12/08/2010, Kigali	Organic products – Rwanda Bureau of Standards	Mr P. Ntiyamira (Deputy Director General)
12/09/2010, Kigali	SIDA (Sw) Rwanda	Mr. J. Ntalindwa (Programme Officer Environmental and Natural Resources)
12/09/2010, Kigali	Climate and Development Knowledge Network (CDKN) - Rwandan Climate Change and Low Carbon Development Project	Ms. Jill Dyszynski (Research Assistant, Adaptation) &Mr. Mathew Warnest (Research Assistant Land-use, water and agriculture)

Appendix II: Overview Interviewed Actors

Interviewed Actor	Organisation/Position	Objective	Location & Date
Baanyanga, A.	Project Manager TIST Uganda	TIST project, Uganda	Kabale, Uganda, 11/25/2010
Bwiza, C. J.	Programme Manager Bwindi Mghanga Conservation Trust	BMCT & PES	Kabale, Uganda, 11/25/2010
Dismas, B.	Director of Forestry Field Programme Unit, National Forest Authority (NAFA)	NAFA & reforestation projects, community based management programmes, National Forest definition & policy	Kigali, Rwanda, 12/10/2010
Dyszynski, J.	Climate and Development Knowledge Network (CDKN), Research Assistant Climate Change Adaptation	CDKN & PES potential in Rwanda	Kigali, Rwanda, 12/09/2010
Ellis, M.	Focal point PES, CARE international	CARE scoping study PES in East Africa	Communication via Email, 12/2010
Foltz, J.	Economic growth officer USAID, Rwanda	USAID projects & PES support with WCS	Kigali, Rwanda, 11/10/2010
Grosso, P.	Technical officer, NRL division, FAO	Role of property rights in PES	Rome, Italy, 10/06/2010
Gross-Camp, N.	Senior Research Associate, University of East Anglia, International Development DEA	ReDirect project & PES in Rwanda	Butare, Rwanda, 12/07/2010 & Communication via Email, 02/2011
Havemann, B.	Manager Akagera Management Company	PES in national parks	Communication via Email, 12/2010
Kabenga, I.	Regional project manager, Nile Equatorial Lakes Subsidiary Action Program (NELSAP)/Kagera Transboundary Integrated Water Resource Management and Development Project	NELSAP & PES & hydropower projects	Kigali, Rwanda, 10/27/2010
Lager, B.	Regional programme coordinator Vi Agroforestry	Vi carbon projects Kenya & Tanzania	Phone interview, 12/03/2010 & Communication via Email, 02/2011
Lopa, D.	Programme Manager EPWS Programme CARE Tanzania	EPWS Tanzania, policy developments Tanzania	Phone interview, 12/08/2010 & Communication via Email, 01/2011
Masologo, D., G. Eustace, and B. Lager	Project Manager, project field manager SCC-Vi Eastern Africa, Kagera Project and Programme Director Vi Agroforestry	Vi Agroforestry project, Tanzania	Communication on via Email, 12/2010 & 01/2011
Masozera, M.	Director Wildlife Conversation Society (WCS)	WCS Project, Rwanda, National PES WG	Kigali, Rwanda, 11/14/2010
Mulisa, G.	Poverty and Environment Initiative (PEI) Consultant, Rwanda Environment Management Authority (REMA)	Environmental Fiscal Reform & PEI	Kigali, Rwanda, 10/18/2010.
Mukuralinda, A.	World Agroforestry Centre (ICRAF) National Coordinator, Rwanda	Potential of agroforestry & carbon projects	Kigali, Rwanda, 10/25/2010
Muir, E.	Programme Manager Plan Vivo	Role & structure of Plan Vivo carbon projects	Communication via Email, 11/2010
Ngoga, T.	Senior Community Conversation Officer, Rwanda, Board of Development (RDB)	Revenue sharing programme & national park management	Kigali, Rwanda, 12/02/2010
Nantongo, P.	Director Ecotrust, Uganda	TGB project & potential of PES in Uganda	Phone interview, 11/18/2010
Njenga, N. and J. Nyongesa	Project Assistant East Africa Regional Programme & Project Manager, WWF	Naivasha PES project	Communication via Email, 11/2010 & 01/2011
Ntazinda, J.	Project coordinator, Capacity reinforcement of the Clean Development Mechanism, REMA	Carbon and CDM projects Rwanda	Kigali, Rwanda, 10/27/2010
Ntalindwa, J.	SIDA, Programme Officer Environmental and Natural Resources	Involvement SIDA with PES	Kigali, Rwanda, 12/09/2010
Nturanyenabo, J.	Project Engineer, Gesellschaft für Technische Zusammenarbeit (GTZ)	Hydropower project GTZ	Kigali, Rwanda, 12/06/2010
Sagashya, D.G.	Deputy Director General, National Land Centre (NLC), Rwanda	Land registration Rwanda	Communication via Email, 12/2010
Suazo, J.	Project Manager SCC-Vi Eastern Africa RESAPP / Vi-LIFE Programme	Vi Agroforestry projects, Rwanda	Kigali, Rwanda, 11/29/2010

## PES in East Africa

Uwimana, I.	Project Manager Clinton Hunter Development Initiative (CHDI)	CHDI project Eastern Province, Rwanda	Kigali, Rwanda, 11/29/2010
Vallee, D.	Management Officer Land and Water Division (NRL), Food and Agricultural Organisation (FAO)	Resources, Development and PES	Rome, Italy, 10/02/2010
Williams, C.	Vice President Clean Air Action Corporation	TIST project, Uganda	Communication via Email, 11/2010 & 01/2011
Wunder, S.	Principal Scientist, Forests and Livelihoods, Centre for International Forestry (CIFOR)	The role of PES	Personal communication, Rome, Italy, 09/28/2010 & Communication via Email, 11/2010
Zukowska, K.	Project Manager Africa Ecosystem Restoration Association	ERA carbon project in Burundi and Rwanda	Communication via Email, 11/2010

### Appendix III: Questionnaire for PES Case Studies

#### Background Data on PES Projects

Existing documentations that can be provided

- Annual report ( )
- Base line study ( )
- Impact assessment ( )
- Feasibility study ( )

Where is the Project located?

- Name of village and/or province/sector/zone
  - Average size of landholdings
- How much area is involved in agreed deal (hectares)?
- Scale of intervention

How was the scheme initiated?

- By whom (active actors)
- Facilitator (past & current)
- In case of carbon projects: third party certifier
- Objective of the scheme

Date deal agreed & duration

- Date contract or agreement signed.

Who is the Buyer?

- Name(s) of both key contact people and government agencies, companies, etc.
- Are they paying directly or through an institution?

Who is the Seller?

- Both name(s) of people and/or community organizations
- how many

Is the deal

- A governmental payment? ( )
- A private deal? ( )
- Open trading? ( )

Financial aspects

- Up-front costs/investments made
  - Major donors/financial sources
- Cost distribution (who bears which costs)
- Opportunity costs of farmers
- Does the scheme produce revenues to cover operational costs? (financial sustainability)

Structure of agreement

- Number of payments / frequency  
*How often are participants paid/number of instalments? Once a year, in an irregular pattern,...?*
- Group payments or individual farmers?
- Amount - & how was the level of payments established?  
*Is there a fixed rate that participants receive?*
- How do Payments flow from the Buyer to the seller?  
*Which structures are used for the transfer of the money? Local banks, direct payment through field staff, etc.*
- Condition the payments are dependent on (action based or performance based (increase of ES))
- How are potential participants informed about the project?
- How are participants selected?
- Monitoring  
*How is monitoring organized? Peer reviews, external consultants, field staff...?*
- Verification
- Capacity building efforts up front

- On-going trainings in the project
- Information sharing structures
- Dispute settlement in case of non-compliance

### Impact of the PES

- ES service in focus
  - Carbon sequestration
  - Biodiversity
  - Watershed management
  - Bundling
- Type, volume, flow, measurement  
*Any base line assessment?/actual increase measured?*
  - In case of carbon methodology used to measure carbon sequestration
  - Actual effects/performance already visible?
- What conservation management practices required?  
*(promoted land-use to increase/conserves ES)*  
Is it mainly:
  - Use-modification ( )
  - Use-restricting ( )
- Would the measures be adopted without the PES scheme?
- Other Co-effects observed/ socio-economic impact (please specify)  
E.g.
  - Livelihood expansion ( )
  - Impact on land tenure ( )
  - Institutional strengthening on community level ( )
  - Capacity building ( )
  - Indicators used
- Do the measures benefit participants without PES?
- Does the scheme support the poorer groups?
- Foreseen significant obstacles?
- Risk of leakage (undermining efforts)?

### Key institutions involved into the scheme

- All institutions involved (including intermediaries) and briefly explain roles
  - Donors
  - Governmental agencies
  - NGOs
  - Community institutions
- Level of administration

### Legal frameworks/policies supporting the PES scheme

- Important policies applied in developing the scheme
- Existing legislation supportive to PES/used in the scheme
- Priority areas of government
- Land tenure and ES user rights at the initiation of the project
  - Recognition of customary tenure rights?

### Current Status/ plans for expansion

*In operation, in planning phase, etc., and whether payments made*

### Special circumstances of the project

*(e.g. PES as part of a larger natural resource management project)*

## Appendix IV: Conference Programme, Jinja-Uganda

Source: ECOTRUST, 2010

INTERNATIONAL CONFERENCE ON PAYMENTS FOR ECOSYSTEM SERVICES IN EASTERN AND CENTRAL AFRICA REGION, 20<sup>th</sup>- 21<sup>st</sup> October 2010, NILE RESORT HOTEL, JINJA, UGANDA

### CONFERENCE PROGRAM

TUESDAY 19<sup>TH</sup> OCTOBER 2010

ARRIVAL AND REGISTRATION OF PARTICIPANTS

WEDNESDAY 20<sup>TH</sup> OCTOBER 2010

7.30-9.00 REGISTRATION

#### SESSION 1 OPENING CEREMONY

Session Chair: Prof. Ruhigwa Baguma Araali

Master of Ceremony: Polycarp Mwima Lead Rapporteur: Dr Edward Mwavu, Makerere University

9.00-9.10 Welcoming remarks by the local organizing committee: Dr. Adano W. Roba, PI Methods of VAC Project

9.10-9.20 Remarks by ASARECA: ASARECA Executive Director

9.20-9.30 Remarks by UNDP, Alice Rhuweza

9.30-9.50 Remarks by Dr. Aryamanya Mugisha, Director, National Environmental Management Authority, Uganda

9.50-10.10 Remarks by Prof. Richard Mibei, The Vice Chancellor, Moi University

10.10-10.30 Official opening address by Maria Mutagamba, The Minister of Water, Environment and Natural Resources, Government of Uganda

10:30-11:00 Group photograph & Health break

#### SESSION 2 SETTING THE SCENE: Payment for Environmental Services for Africa

Chair: Prof. JB Okeyo-Owuor Rapporteur: Dr Sarah Nachuha, IUIU

11:00-11:30

Keynote paper: PES as a tool for natural environmental resource management in developing countries Elaine Muir, Plan Vivo, UK

11.30-11.45 Respondent 1: PES in Eastern and Central Africa, its potential for income generation and environmental conservation, Eugene Muramira, NEMA, Uganda

11.45-12.00 Respondent 2: Peter Raburu, School of natural resources, Moi university

12.00-12.15 Respondent 3: Prof. Mondjalis Poto, INERA, DRC

12.15-12.45 Discussions

12.45-12.50 Announcements – Anna Agasha

12.50-2.00 LUNCH BREAK

#### SESSION 3 Approaches for valuation of Environment services

Chair: Biryahwaho Byamukama Rapporteur: George Wanakina, Makerere University

2.00-2.30 Lead Paper: Mark Odhiambo School of Business and Economics, Moi University

2.30-2.45 Assessing the economic value of forest: Is it a prerequisite for payment for the environmental functions?

Anderson Kipkoech

12.45-3.00 Valuing watershed services in Mt. Elgon and Albertine Rift landscapes. Adano Roba

3.00-3.15 Analysis of factors influencing implementation of the concept of payment for environmental services for forest conservation; the case of Mt. Elgon forest Sharon Chelagat

3.15-3.30 Valuation of protected areas in Uganda: case study of Murchison Falls Conservation Complex. Francis Mwaura

3.45-4.00 Difficulties and limitations of PES schemes in watersheds. Comparative study of impact of socio-cultural perceptions on valuation of Mt. Kenya and Mt. Elgon forest ecosystem. Humprey Omondi

4.00-4.15 Discussions

4-15-4.45 Health Break

#### SESSION 4 The potential for forest-based carbon sequestration and REDD+ through PES markets

Chair: Odipo Osano Rapporteur: John W. Wafula, NEMA, Kenya

4.45-5.15 Lead Paper: Dr. Sara Namirembe, Policy Analysts, ICRAF

5.15- 5.30 Current status of PES in Albertine Rift landscape of DR Congo. Blandine Nsombo

5.30-5.45 Potential of Smallholder Tree Farmers in Africa's Arid and Semi Arid Lands (ASALs) Participating in Carbon Trade. James B. Kung'u

5.45-6.00 Soil carbon sequestration review in Ethiopia for climate mitigation. Abebe Shiferaw

6.00-6.15 Valuing Carbon sequestration services in Mt. Elgon and Albertine rift landscapes. Elizabeth Okwuosa

6.15-6.45 Discussions and identification of lessons learnt

6.45-6.50 Announcements. Stella Matere

7.00-9.00 Conference Dinner

THURSDAY 21<sup>ST</sup> OCTOBER 2010

#### SESSION 5 PES and social welfare enhancement at community level

Chair: Prof. W. K. Yabann Rapporteur: John Maniafu, Kenya Forestry Service

8.00-8.30 Lead Paper: Patwa-Shah Wahida, UNEP, Nairobi

8.30-8.45 PES and land management. Bernard Foahom,

8.45-9.00 Assessment of Mt Elgon Rural peoples' ability to participate in Carbon sequestration through their farming systems. Stella Matere

9.00-9.15 Can Payment for Environmental Services (PES) for Non Timber Forest Products (NTFPs) Activities Enhance the Rural Economic Development and Forest Conservation in Kordofan Region, Sudan? Maymoona Ahmed Aisa

9.15-9.30 Resource Identification and Quantification for Valuation for Payment for Ecosystem Services (PES): The Case of Eastern Mt. Elgon Ecosystem. Benjamin N Mwasi

9.30-9.45 The Potentials for Payment for Environmental Services: A case study of Moiben River Ecosystem in Cherangany Hills, Kenya. David Lagat

9.45-10.00 Discussions

10.00-10.30 HEALTH BREAK

### SESSION 6

#### Parallel I

##### Challenges in management of transboundary resources, Policy and institutional perspectives

**Chair:** Salome Guchu **Rapporteur:** Aggrey Rwetsiba

**10.30-11.00 Lead paper:** Tom Okurut, Executive Secretary, East African commission

**11.00-11.15** Status, benefits, challenges and approaches for management of trans-boundary Mt. Elgon and Albertine Rift Landscapes . **Prof Okeyo-Owuor JB**

**11.15-11.30** Payment for Water Services as Basis for Natural Resource Management: Experience from Pangani Basin, Tanzania. **Makarius C.S. Lalika**

**11.30-11.45** Management Options of Yala Papyrus Swamp for Sustainable Development and Biodiversity Conservation.

**Lucy W. Wanjohi**

**11.45-12.00** Policy, legal and institutional framework are long overdue to compensate users for conservation and maintenance of services of forest ecosystems in Mozambique. **Isilda Nhantumbo**

**12.00-12.15** PES and social welfare enhancement at community level. **Charles Karangwa**

**12.15-12.45** Discussions

**12.45-1.00** Announcements – **Elizabeth Okwousa**

**1.00-2.00 LUNCH BREAK**

### SESSION 6

#### Parallel II

##### Institutional and policy requirement necessary for implementing PES, A synthesis.

**Chair:** Prof. Ruhigwa Baguma Araali **Rapporteur:** Humphrey Omondi

**10.30-11.00 Lead paper:** Onesmus Mugenyi, Advocates coalition for development & environment-ACODE - Uganda

**11.00-11.15** Policy and institutional frameworks regarding Payments for environmental services in Mt Elgon and Albertine Rift . **Biryahwaho Byamukama**

**11.15-11.30** Financing forest environmental services in mount elgon region: watershed services protection. **Joel Sumukwo**

**11.30-11.45** Socioeconomic potential for carbon trade for tree farmers in Bushenyi, South West Uganda. **Grace Kabatangare**

**11.45-12.00** Payment for Environmental Services (PES): A mechanism for Adopting the Agroforestry Farming system among Gum Arabic Producers in Sudan. **Hanan M. Elhadi**

**12.00-12.15** Supporting Programme in NRM in ECA: **ASARECA, Mogaka H.**

**12.15-12.45** Discussions

**12.45-1.00** Announcements – **Annah Agasha**

**1.00-2.00 LUNCH BREAK**

### SESSION 7 Private sector implementation of PES schemes across productive ecosystem landscapes

**Chair:** Dr. Anani Bruce **Rapporteur:** Michael Makokha

**2.00-2.20 Lead paper:** Pauline Natongo Kalunda, Ecotrust, Uganda

**2.20-2.40** Demonstration of how PES works, the Case study in Ulugulu Mountains, Tanzania. **Deo Lopa (CARE TZ )**

**2.40-3.00** Payment for Environmental Services-PES and the Natural Resource Management: Case of Naivasha Landscape.

**Josephat Nyongesa**

**3.00-3.20** Case studies on PES. **Kathleen Fitzgerald**

**3.20-3.40** Discussions

**3.40-4.00 HEALTH BREAK**

**4.00-4.20** Learning alliances platforms for strengthen science-policy interactions in PES – **Prof Okeyo**

**4.20-5.10** Identifying key issues emerging from the conference - **Gerald**

**5.10-5.30** Identification of a way forward towards implementation of PES- **Alice Rhuweza-UNDP**

**5.30-6.00** Forum discussion

### SESSION 8 Closing ceremony

**Chair:** Adano W. Roba **Rapporteur:** Polycarp Mwima

**6.00-6.10** Vote of thanks- Anderson

**6.10-6.30** Closing remarks

**7.00 – 8.00 Conference dinner**

### FRIDAY 22<sup>ND</sup> OCTOBER 2010

**7.00-12.00 Site tour (Mabira central Forest reserve))**

**12.00 Departures**

## Appendix V: Key Factors Influencing the Success of PES

**Source:** Based on Bracer et al., 2008; Pagiola & Platais, 2007; Katoomba Group, 2006; Swallow et al., 2008 Lopa, 2010; IFAD, 2010; and Vallee, 2010

### *Factors influencing/necessary for the success of PES*

Summary key factors of the principal legal, technical and investment settings for PES in literature:

#### *Legal criteria*

- PES coherent with national legislation
- PES ideally should become embedded in the national legislation and institutional framework
- Secure land tenure
- Creation of institutional and legal framework ensuring all stakeholders participate
- Adequate legal and regulating framework

#### *Institutional criteria*

- Establishing efficient structures and institutions based on trust enabling participation
- Independent intermediaries play a crucial role in connecting buyers and sellers, provide a mechanism for reward transfer and the monitoring of schemes
- The organization of farmers/ES providers into groups to increase their influence, capacity building and to reduce transaction costs
- Facilitating and administrative bodies
- Financial intermediaries and brokers
- Certification bodies
- National registries for ES

#### *Technical criteria*

- Demand for ES as well as the sufficient capacity to provide them are two initial aspects that need to be assessed in designing a PES scheme
- ES in question is financially valuable for at least one involved actors
- Identification of necessary and best NRM methods and livelihood improvement activities
- Incentives suitable to ensure ES provision as e.g. direct payments or rewards have to be assessed as well as rewards for adopted land-use change not only outcome
- Technical assessments and evaluation of likely effects of PES and land-use change also to identify key areas and households that should be participating from the beginning
- Establish independent monitoring schemes by trusted intermediaries
- Small-scale schemes are easier managed and can be targeted to benefit poor people

#### *Investment criteria*

- Capacity building and education to first create awareness on the value of ES and to support the development of structures and capable institutions to support PES schemes. Capacity building on the side of ES providers is thereby especially important in order to create a more levelled space for negotiations between receivers and providers.
- Up-front costs have to be covered e.g. by facilitators, government or donors, especially in case of pro-poor schemes.

## Appendix VI: Land Tenure Regularisation - Rwanda

Source: Sagashya, 2010

### The nine steps of Land Tenure Regularisation (LTR), Rwanda

- 1) Notification of areas for an LTR Programme
- 2) Local information dissemination-public meetings and sensitisation,
- 3) Appointment and training of Land Committees and Para-Surveyors
- 4) Demarcation of land, marking of boundaries on an image of photograph
- 5) Adjudication; recording of personal details, issuing a claims receipt, recording objections and corrections simultaneous with demarcation
- 6) Publication of adjudication record and compilation of a parcel index map
- 7) Objections and corrections period finalising the record and disputant lists
- 8) Mediation period for disputes.
- 9) Registration and Titling – preparation and issuance of Documents.

## Appendix VII: National Actors Involved in PES Development/Projects

Nation	Authority
Kenya	National Environment Management Authority (NEMA); Kenya Wildlife Service (KFS); Water Resource Management Authority (WRMA)
Uganda	National Environment Management Authority (NEMA); National Forestry Authority (NFA); Uganda Wildlife Authority (UWA)
Tanzania	Ministry of Water and Livestock Development (MoWLD); Ministry of Natural Resources, Environment and Tourism (MNRT)
Rwanda	Rwanda Environmental Management Authority (REMA); Rwanda Development Board (RDB); National Forest Authority (NAFA)