

Pro-poor Rewards for Environmental Services in Africa

2008 - 2011



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Back cover What next for PRESA?

Key concepts of PRESA

Rewards for environmental services are realistic, voluntary, and conditional mechanisms for rewarding ecosystem stewards for legitimate actions foregone, or positive actions undertaken, beyond social expectations.

Three characteristics of pro-poor rewards:

- They should not harm the poor.
- They should include the poor.
- Should be positively biased towards the poor.



PRESA
Pro-poor Rewards
for Environmental
Services in Africa

About PRESA

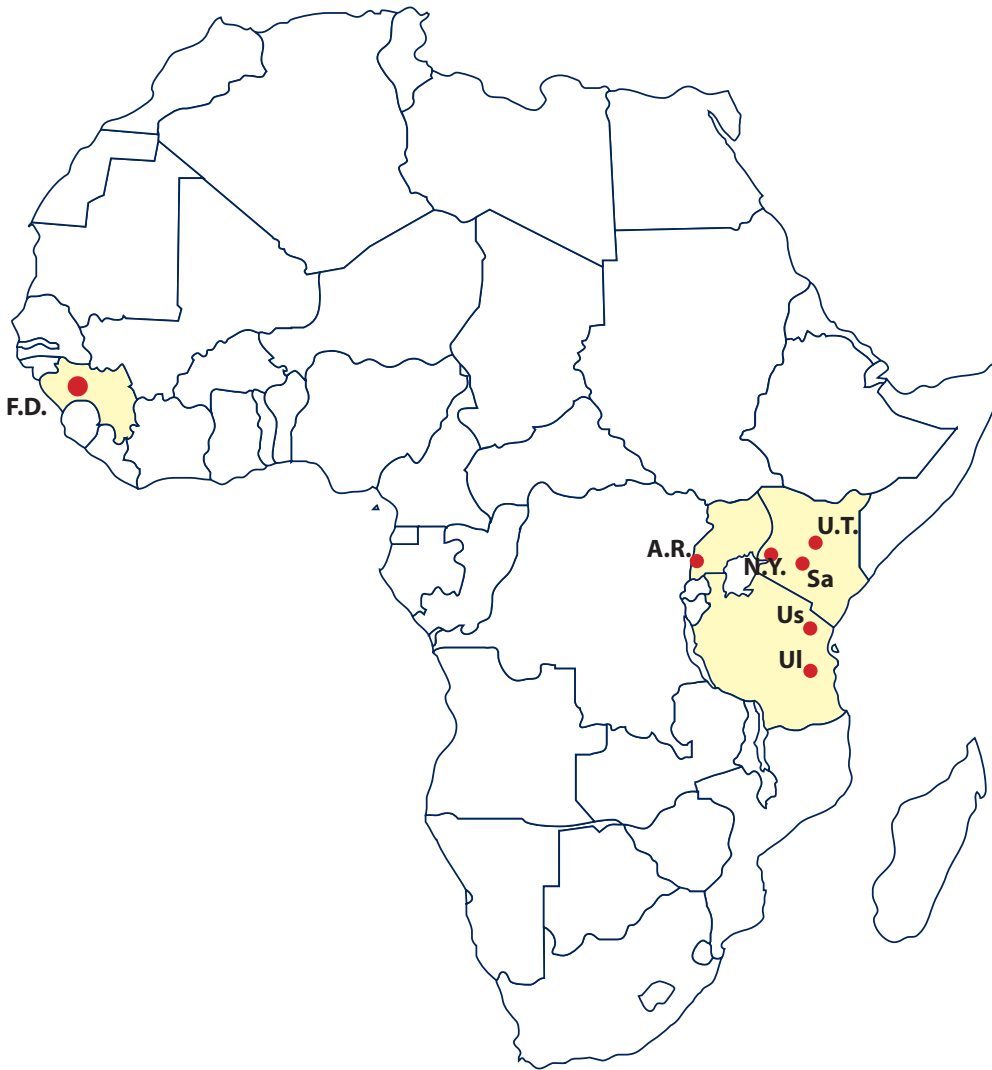
PRESA - Pro poor Rewards for Environmental Services in Africa - is a project run by the World Agroforestry Centre (ICRAF). PRESA aims at improving the livelihoods of smallholders living in the highlands of Eastern and Western Africa by enhancing fair and effective environmental service rewards.

PRESA activities are designed in the form of action research and practical experience to directly influence and engage key stakeholders in active learning on payments or rewards for environmental services. This approach is aimed at catalysing policy support and private sector participation in environmental service agreements.

PRESA began in 2008 and is implemented in collaboration with national partners, research institutions, universities and non-governmental organizations in four countries, namely: Guinea, Kenya, Tanzania and Uganda. Through these links, PRESA is **generating and sharing evidence to support payments for ecosystem services (PES) in Africa** and beyond. We are building a community of practice across Africa to share lessons, tools and experience, advise local stakeholders and provide training.

PRESA's work has been funded by the International Fund for Agricultural Development (IFAD), supplemented by the Ministry for Foreign Affairs of Finland, the World Bank, the European Union, the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP).

PRESA sites



Key characteristics of PRESA sites

- Sa** **Sasumua**
Expansion of commercial agriculture, proximity to urban centres and siltation of a major water supply reservoir.

- U.T.** **Upper Tana**
Expansion of commercial agriculture, proximity to urban centres and siltation of hydro-electric dams.

- N.Y.** **Nyando and Yala basins**
Intensive farming in the upper catchment and high poverty rates in the lower basin all contributing to pollution of Lake Victoria.

- A.R.** **Albertine Rift**
Poor communities, high rates of deforestation and degradation of rivers.

- Us** **Usambara Mountains**
Loss of forest cover to expanding subsistence agriculture with adverse impacts on biodiversity.

- Ul** **Uluguru Mountains**
Loss of forest cover leading to loss of water quality at the Ruvu River, which supplies Dar es Salaam with fresh water.

- F.D.** **Fouta Djallon highlands**
Land degradation threatening water quality and biodiversity.

Sasumua, Kenya

Sasumua dam is located at the southern ridges of Kenya's Aberdare Mountains. It provides the capital, Nairobi, with 20% of its fresh water needs. However, economic activities around the dam's catchment are causing sedimentation and contamination by water pollutants.

The Sasumua dam catchment covers approximately 107 square kilometres, of which 50% is under cultivation. The catchment has a high population which is growing at 3.5% annually. The average farm size is 2.86 acres.

Polluted runoff from small towns and farms results in high turbidity, high bacterial count and high water treatment costs.

The major pollutants are biological and soil materials from agricultural fields, coliform bacteria from human and animal waste, and heavy metal ions from roads and garages. In some spots, the concentrations of heavy metals are close to World Health Organization limits.

PRESA is working in partnership with the Jomo Kenyatta University of Agriculture and Technology (JKUAT) and the Macaulay Land Use Research Institute.

Environmental service
Watershed services

Potential provider of environmental services
Owners of agricultural land in about 50% of watershed.

Potential buyer

- Nairobi City Water & Sewerage Company
- Private sector companies as part of corporate social responsibility



PHOTO: Mwangi Gatheya

Designing equitable payments for watershed services at the Sasumua watershed

PRESA delineated the Sasumua watershed and identified hotspot areas responsible for most of the sedimentation.

We projected that the annual costs of water purification will rise upto US\$178,560 over the next ten years if farming practices continue as they are.

This problem can be solved by developing partnerships with land owners to implement sustainable land management practices such as terraces,

contour farming, grass filter strips and grass waterways.

What would these partnerships look like?

For instance, implementing a grassed waterway approximately 20 kilometres long and 3 metres wide can reduce soil sedimentation by 20%. This can save \$23,000 a year in water purification costs.

Nairobi water users are willing to pay an increased tariff. This

looks like a simple business case. However:

- the interest of water users is on water quantity, not quality.
- Nairobi City Water and Sewerage Company, the prime beneficiary, does not have authority to increase water tariffs.
- the water company is already contributing to a watershed management fund under the Water Resources Management Authority (WRMA).

To harmonise the positions of land owners and potential beneficiaries of watershed services, PRESA convened a meeting of Sasumua stakeholders during which there was agreement to pilot a rewards-based approach for watershed management under WRMA.

Next steps

PRESA will seek to generate lessons from activities at Sasumua

PES makes business sense

Benefits to the Nairobi Water Company

Sediment yield reduction	20%
Annual savings on the costs of alum	2 million Kenya Shillings (US\$ 23,113)

Costs to the 500 households involved

Establishment costs (KSh)

Labour	500,000
Grass	1,000,000
Sub total	1,500,000 (US\$17,335)

Recurrent cost:

Lease: 15 acres x Kshs15,000 (annual lease rate per acre)	225,000
Maintenance and opportunity costs	58,000
Sub total	283,000 (US\$3,271)

Total costs to 500 households	1,783,000 (US\$20,636)
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YEAR 1:	ESTABLISHMENT + RECURRENT COSTS = Kshs 1,783,000 (US\$20,636)
YEAR 2 ONWARDS:	RECURRENT COSTS = Kshs 283,000 (US\$ 3,271)

Scheduled publications

- Ensuring reliable water supply through partnerships with ecosystem stewards: A case study of Sasumua watershed, Kenya
- Journal article based on the results of a willingness-to-pay survey of Nairobi water consumers.
- PhD thesis: Development of a Rewards For Environmental Services (RES) scheme to mitigate soil erosion and pollution loading in Sasumua watershed, Kenya

Upper Tana River, Kenya

Tana River, Kenya's largest river, plays a vital role in the country's economy.

The Tana begins in the central Kenya highlands, flowing 800 kilometres to the Indian Ocean. The Tana River basin is divided into two distinct ecosystems. The Upper Tana basin, in the central part of Kenya, receives more rainfall and is the source of most of the water. Then there is the lower, drier and flatter Lower Tana which is completely dependent on the river's water.

Tana River is used to produce hydroelectricity and it supplies irrigation water to some of the largest public schemes in Kenya. However, the reservoirs in the middle part of the river are threatened by sediments generated from the intensively farmed areas in the upper Tana catchment.

Ecosystem degradation has resulted in unpredictable flows of water amidst rising demand. The degradation is caused by deforestation, and the expansion of commercial and subsistence farming activities especially in the upper catchment area.

PRESA focuses on the Upper Tana, where ecosystem degradation has the highest impact on the river's life-supporting functions.

Environmental service
Watershed services

Potential provider of environmental services
Owners of agricultural land and farmers in the upper and middle catchment areas.

Potential buyers

- The Kenya Electricity Generating Company (KenGen)
- Municipal water providers
- Irrigation projects



PHOTO: Minka Makenia

Caring for Kenya's largest river

In the upper Tana catchment, PRESA focused on the Kapingazi River - a tributary of the Tana - to generate knowledge on the potential of payments for environmental services.

The Kapingazi catchment area is 61.2 square kilometres. The cropping pattern is stratified, with a tea zone in the upper part, especially around Kiriri, a transition zone at Kairuri where both coffee and tea are dominant, and a coffee zone in the lower catchment.

Some farmers are receiving premium prices for coffee and tea from eco-certification programmes by UTZ and Rainforest Alliance. Soil and water conservation practices, including tree planting, are part of the certification requirements.

We found that the Kapingazi River carries a high sediment load during the wet season due to soil erosion from exposed farming areas before crop vegetation cover is sufficient. Other bare spots include roads,

footpaths, homesteads, market centres and other public areas. The flow of the river during the dry season is becoming unreliable.

The factors driving land use change are: population increase, need for income diversification, fluctuation in prices of cash crops, climate

The Kapingazi River carries a high sediment load due to soil erosion from exposed farming areas ...

variability and displacement of people due to political violence.

PRESA is working with the Mount Kenya East Pilot Project for Natural Resource management (MKEPP), the Green Water Credits project of the World Soil Information Centre (ISRIC) and the Jomo Kenyatta University of Agriculture and Technology to explore a rewards-based approach to address degradation at the upper Tana

catchment.

Farmers' capacity to estimate opportunity costs is limited. Although our surveys show that land owners are willing to accept US\$93 a year to adopt improved land use practices, models indicate that the more realistic figure should have been US\$232 per hectare per year.

Another important finding was that people already involved with MKEPP were willing to get into contracts for relatively lower pay, possibly because of other benefits such as free training.

Next steps

1. Developing a technology targeting tool with Green Water Credits.
2. An analysis of local by-laws and institutions that may constrain environmental service rewards.
3. Roundtable discussions with private sector buyers, including the direct beneficiaries of environmental services.

Scheduled publications

- 1). A technology targeting tool.
- 2). A technical advisory note.
- 3). Journal article(s) on willingness to accept and the drivers of land use change in Kapingazi.

Nyando and Yala basins, Kenya

The Nyando and Yala rivers are located in western Kenya, and both flow from the Mau forest complex into the Winam Gulf of Lake Victoria.

The Nyando river basin covers 3,587 square kilometres while the Yala river basin covers 3,111 square kilometres. The basins vary in altitude from about 3,000 meters above sea level at their headwaters to 1,184 meters where they drain into Lake Victoria.

The Nyando basin contains some of the most severe problems of environmental degradation and deepening poverty found anywhere in Kenya. The river is a major contributor of sediment and phosphorus to Lake Victoria.

The Yala is one of the main Kenyan rivers draining into Lake Victoria and, like the Nyando, is affected by environmental degradation.

Accelerated soil erosion and nutrient runoff from the two river basins have induced a rapid rise in nutrient levels in Lake Victoria. This has led to changes in the lake ecology and rapid growth of aquatic weeds dominated by the water hyacinth, with adverse effects on fishing and lake transport. With the lake supporting over 30 million people in East Africa, interventions that mitigate soil erosion and pollution in affected river basins are needed.

The PRESA project joined a broad range of stakeholders focusing on the Nyando and Yala river basins.

Environmental service
Watershed services.

Potential provider of environmental services
Owners of agricultural land in both the upper and lower catchment areas.

Potential buyer
The public sector



PHOTO: Peter Mwangi

Setting the stage for a publicly funded ecosystem restoration programme at the Nyando and Yala River Basins

Severe environmental degradation at the Nyando and Yala River basins has drawn the concern of stakeholders.

Through a scoping study with the United Nations Environment Programme (UNEP), PRESA analysed trade-offs for generating environmental services as well as the policies and legislation likely to affect the design and implementation of rewards for those services.

With regards to establishing a payments or rewards for environmental services approach, the Nyando and Yala basins are unique in that both upstream and downstream communities are poor small-scale farmers.

Both upstream and downstream communities are poor small-scale farmers.

PRESA, therefore, directed its efforts into already ongoing processes by initiating the formation of a stakeholders' consortium with the objective of making a case for publicly-funded payments for environmental services.

The consortium includes the Lake Victoria Basin Commission, Lake Victoria Institute for Research and Development (VIREN), Maseno University, Moi University, World Neighbours, government agencies, the Kenya Agricultural Research Institute, parliamentarians and community-based organizations.

The consortium is setting in

place mechanisms for piloting this work.

At Kakamega, a study on the willingness of land owners to access environmental service payments is ongoing.

Next steps

1. Negotiation for the public funding of a payments for environmental services scheme, with the consortium acting as a boundary organization.
2. With funding from the United Nations Development Programme (UNDP), produce an atlas of environmental services for the Nyando and Yala basins by synthesizing information accumulated from different projects.

Scheduled publications

Contribute to a technical advisory note on developing a case for ecosystem service rewards.

The Albertine Rift refers to a branch of the Great Rift Valley that lies in western Uganda, along the border with the Democratic Republic of the Congo (DRC).

The Albertine Rift is classified as an endemic bird area by Birdlife International, as a biodiversity hotspot by Conservation International, and as a priority eco region by the Worldwide Fund for Nature. In addition, the mountains of the Albertine Rift are a World Heritage Site, its forests are a large carbon sink, and important source of water for homes, farms and hydro-power production.

Increasing population and high poverty rates are exerting pressure on forest resources resulting in overall degradation of ecological processes.

Payments or rewards for environmental services have been piloted in this region, mainly focusing on carbon. To supplement these initiatives, PRESA focused on water degradation issues.

Environmental service

- Carbon
- Watershed services

Potential provider of environmental services

Local communities around sensitive ecosystems.

Potential buyers

- Hydro electric power producers
- Industries, such as tea and tobacco companies
- Tour operators
- Carbon offset buyers



PHOTO: Vanessa Mwendu

Alternative incentives for watershed management in the Albertine Rift

PRESA partnered with two organizations, Ecotrust Uganda and Nature Harness Initiatives (NAHI), to explore a wide range of incentive options for watershed management, not limited to upstream-downstream linkages alone.

In partnership with Ecotrust Uganda, through the Plan Vivo approach, 17 farmers are eligible for carbon payments (sequestering 5,735.88 tons of carbon dioxide) from trees established to enhance the River Mubuku watershed.

Other incentives being explored to supplement upstream-downstream

rewards include forest-based enterprises, ecolabelled handicrafts and engaging private sector companies for corporate social responsibility (CSR).

Discussions were initiated with potential buyers for these alternative incentives. The potential buyers include the British American Tobacco company (BAT), McLeod Russel Uganda Limited and the Kisiizi mini hydro-electric dam.

The potential for REDD incentives for watershed management was also explored by facilitating management planning for privately-owned

forest patches as part of a larger REDD project to be implemented by the National Environment Management Authority (NEMA) of Uganda.

Next steps

1. Work with NAHI to assess the opportunity costs of establishing agroforestry systems at Wambabya.
2. Work with Ecotrust Uganda to build PRESA experiences into ongoing government processes, including REDD+ readiness development.

Scheduled publications

- 1). Drafts of conceptual frameworks for carbon in Wambabya riverine forests system and watershed management in Rushebeya-Kanyabaha wetland landscape are being finalized for sharing.
- 2). The activities in Uganda will contribute to a technical advisory note (TAN) on payments for environmental services.

Uluguru Mountains, Tanzania

The Uluguru Mountains of eastern Tanzania receive an average rainfall of 2,000 millimetres which feeds the many small rivers and streams that join to form the main Ruvu River. This river is the main source of water for 3 million people in Tanzania's largest city, Dar es Salaam.

Pressure from farming and unsustainable exploitation of natural resources has significantly reduced forest cover. This has negatively affected the quantity and quality of water in the rivers flowing out of the Uluguru, including the River Ruvu.

Environmental service

- Watershed services
- Carbon (REDD)

Potential provider of environmental services

Upstream smallholder farmers

Potential buyers

- Dar es Salaam Water and Sewerage Company (Dawasco)

Usambara Mountains, Tanzania

The Usambara Mountains are located in the north eastern corner of Tanzania and are part of the highly bio-diverse Eastern Arc Mountains.

Environmental services

- Watershed services
- Carbon sequestration

Potential provider of environmental services

- Communities
- The government (as custodian of most reserved forest)

Potential buyers

- Irrigation schemes
- Hydro-electric power producers
- International carbon payment schemes
- Conservation organizations



PHOTO: Vanessa Mead

Testing the feasibility of rewards for environmental services at the Uluguru and Usambara mountains

Uluguru Mountains

In recent years, several conservation projects have attempted to restore the natural resource base of the Uluguru Mountains. This includes the piloting of payments for watershed services by CARE Tanzania.

PRESA aimed at providing technical support to the Equitable Payments for Watershed Services (EPWS) programme, run by the Worldwide Fund for Nature (WWF) and CARE Tanzania. The support is in the form of advice on appropriate farming practices and geographic targeting. EPWS was working in Kibungo Juu sub-catchment.

PRESA assessed land use and land degradation and developed watershed service risk maps. A prototype payment mechanism was established based on findings determining how much farmers are willing to accept for carbon sequestration from planting trees for watershed management.

Contracts were developed with 200 households for planting 20,000 tree seedlings of *Khaya anthothea* (an indigenous timber tree), *Tectona grandis* (teak) and *Faidherbia albida* (an indigenous tree that improves

soil fertility and provides firewood).

In exchange, farmers are receiving 300 Tanzania Shillings (US\$0.20) a year for each surviving seedling.

A year after establishing these mechanisms, farmers are expressing willingness to continue managing the trees even when payments stop completely. The training they got on tree planting, the free seedlings they received and the expected additional benefits from tree products are enough to satisfy farmers' payment demands.

What started off as a conditional, commoditized payment mechanism has evolved into a co-investment type with less emphasis on conditionality.

Next steps

1. Document lessons learnt and produce a policy brief on the potential of the rewards for environmental services approach in watershed management.
2. Engage in dialogue with institutions on the ground to build the PRESA experience into ongoing rewards for environmental service activities.

Usambara Mountains

Deforestation and unsustainable land use practices at the Usambara Mountains pose a threat to the future provision of environmental services.

The direct adverse impacts can be seen in reduced agricultural production, and lower water quantities for local and regional water supply. Hydro-electric power generation has also been affected.

At the West Usambaras, the PRESA project is working with researchers from ICRAF and those from the Selian Agricultural Research Institute (SARI) to explore how to address this degradation by linking upland farming communities with urban water utilities, hydro-power generators and downstream agricultural producers.

PRESA is currently studying the feasibility of reducing emissions from deforestation and degradation (REDD) at the East Usambaras, with a focus on land use trade-offs, benefit sharing and delineation of sub-national REDD interventions.

Scheduled publications

- 1). Publication on LEK – Local Ecological Knowledge.
- 2). An analysis of the legal provisions for PES in Tanzania with focus on the Usambaras.
- 3). Policy brief on the potential and the constraints of implementing PES at the Uluguru Mountains.



PHOTO: Amina Marela

Fouta Djallon, Guinea

The Fouta Djallon Highlands consist of mountainous landscapes in Guinea that extend into Sierra Leone, Guinea-Bissau, Senegal, Mali, Côte d'Ivoire and Liberia. The highlands support a rich variety of natural ecosystems and are the source of major rivers in West Africa, notably the Gambia, Niger and Senegal.

There is, however, widespread ecosystem degradation due to economic activities such as logging and clearing land for farming. This could be due to policy gaps and weak policy enforcement, especially regarding trans-boundary or cross-sectoral natural resource management, as found out from previous ICRAF work in Guinea and Sierra Leone by the Landscape Management for Improved Livelihoods (LAMIL) project.

Environmental service

- Water quality and quantity for industrial use and community consumption.
- Biodiversity conservation.

Potential provider of environmental services

- Coyah community
- Balayan Souroumba co-management committee

Potential buyers

- Guinea Water company
- Mining companies for biodiversity offset schemes.

Demonstrating the rewards approach to policy makers and the private sector

Policymakers and private sector stakeholders in Fouta Djallon countries are interested in the potential for a rewards-based scheme to address natural resource degradation.

Building on this interest, PRESA formed a partnership with the *Centre d'Etude et de Recherche en Environnement (CÉRE)* at the Conakry University.

A prototype scheme for watershed service payments is getting established in the Coyah site to demonstrate

to the Coyah bottling company how a reward for environmental services scheme might be implemented. The company is interested in buying watershed services from communities.

In addition, another prototype scheme is being set up at Balayan Souroumba for biodiversity payments based on critical chimpanzee habitat maps. The work at Balayan Souroumba is supported with funds from the United Nations Development Programme.

Next steps

1. Establish prototype payment mechanisms for biodiversity and water.
2. Document lessons.
3. Dialogue with the Coyah water bottling company, mining companies and policy makers.
4. A readiness study (policy, legal and institutional frameworks) for rewards for environmental services in Guinea and Cameroon.

Scheduled publications

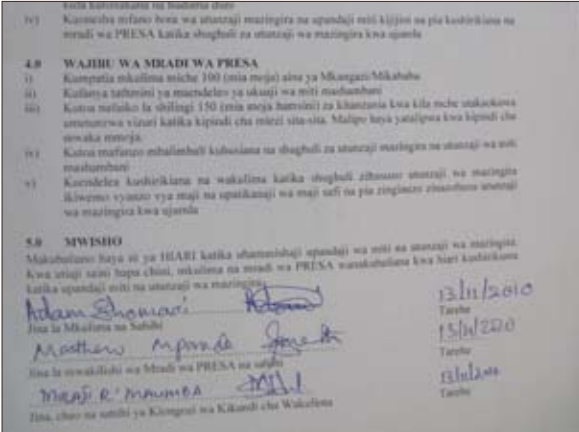
- 1). *Analyse des options pour la compensation des services environnementaux de la forêt classée de Pisseli - Mamou* (Msc Thesis).
- 2). Opportunities and challenges for an effective rewards for environmental services approach.



The PRESA team in Guinea during a survey at Balayan Souroumba, in the Fouta Djallon highlands.



A technician from the Jomo Kenyatta University of Agriculture and Technology (JKUAT) takes samples from a stream in the Sasumua catchment area.



One of the contracts signed with farmers at the Uluguru Mountains in Tanzania.



A view of the Usambaras, showing a homestead under construction in the foreground.



At left, a tea farmer at Kenya's Upper Tana catchment responds to interview questions by a researcher working for PRESA.



A woman fetching water from a tributary of the Nyando River, in Kenya. Note the presence of sediments in the river.



A community meeting called by Ecotrust Uganda at the Albertine Rift.



The PRESA team and site partners at a training workshop in March 2010.



PRESA partners



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Site partners



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Our donors

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What next for PRESA?

- We are developing tools for projects that are implementing rewards for environmental services.
- Action on the ground is required alongside continued investigation of the feasibility and effectiveness of interventions, relationships between stakeholders and optimum scale.
- Greater engagement with policy makers.
- Publications to disseminate tools and lessons learnt from our sites.
- Widening the PRESA community of practice to include more researchers, private sector linkages, policy makers, non-governmental organizations and other implementing partners.
- Prototype testing of water and biodiversity payments.



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