



Payment for Environmental Services pilot project in Lake Naivasha basin, Kenya – a viable mechanism for watershed services that delivers sustainable natural resource management and improved livelihoods

Thomas Chiramba, Silas Mogoi and Isabel Martinez (UNEP), Tim Jones (DJEnvironmental)

Type of tool: investments and fiscal measures for biodiversity protection

Issue: watersheds

Location: Kenya, Africa

Challenge and objectives

Lake Naivasha is located in the Kenyan portion of the Great Rift Valley and has been recognised as a ‘wetland of international importance’ under the Ramsar Convention on Wetlands. The project is being implemented in the Malewa River basin (a sub-catchment of Lake Naivasha basin) situated in the Rift Valley and Central Provinces of Kenya. The project has consisted of three phases, beginning in 2006 with the project initiation phase (scoping and feasibility studies including hydrological survey, cost-benefit analyses, livelihood analysis, business case analysis, legal policy framework analysis). The implementation phases commenced in 2008, while the project has now entered its third and final phase – scaling up. The catchment of Lake Naivasha covers an area of approximately 3,400 km² and ranges in altitude from approximately 1,900 m to about 3,900 m above sea level. The project area covers the Turasha-Kinja and Wanjohi Rivers. Both are major tributaries of the River Malewa, which contributes 80% of the water that flows into Lake Naivasha.

Economic activities around Lake Naivasha include small-scale and large-scale agriculture, horticulture, ranching, tourism, fishing and geothermal power production, and pastoralism. Over 50 square kilometres of land around the lake is under intensive, commercial horticulture and flower farming. These activities provide livelihoods for over 500,000 people living within the basin.

Significant environmental threats emanate from poor land-use practices within the watershed, unregulated and excessive water abstraction for domestic and agricultural/horticultural use, weak policy enforcement, and population pressure on natural resources, water pollution and climate change. These have resulted in degradation of ecosystem services, economic losses, worsening poverty and reduction of biodiversity.

The approach: how did PES help overcome barriers to dealing with the challenge?



The goal was to develop a viable financial 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.

Payment for Environmental Services (PES) is a market-based mechanism where land owners are rewarded by service beneficiaries. It is based on the premise that land owners undertake land use transformations that provide agreed ecosystem services. For these services, they are rewarded financially by the beneficiaries.

The role of intermediary institutions

WWF (WWF-Kenya) and CARE-Kenya are providing funding and coordination as intermediary institutions to develop Payment for Ecosystem Services – PES (the ecosystem service in this case being water) – as a market-based scheme for delivery of sustainable natural resource management and improved livelihoods.

Engaging partners

- Lake Naivasha Water Resource Users Association (downstream buyers)
- Lake Naivasha Growers Group (downstream buyers – the principal participant in the project among the buyers)
- Upper Turasha-Kinja Water Resource Users Associations (upstream sellers)
- Wanjohi Water Resource Users Associations (upstream sellers)
- Ministry of Agriculture
- Water Resources Management Authority
- Kenya Forest Services
- Provincial Administration

The partners therefore include ecosystem service ‘sellers/providers’ and ‘buyers/users’, as well as the principal national and local agencies involved in the regulation of these services.

Piloting and scale up



The project is designed to serve as a pilot and learning model for further expansion and replication.

Contractual benefit sharing

This linkage requires contractual agreements negotiated between the ecosystem stewards and ecosystem beneficiaries, making PES a unique benefit-sharing mechanism.

In this case, Lake Naivasha Water Resource Users Association (LANAWRUA – Lake Naivasha Growers Group currently being the major contributor to the Association) – on behalf of ecosystem service beneficiaries, notably the major floricultural/horticultural industry based around the lake – agreed to compensate small-scale landowners/farmers represented by the Upper Turasha-Kinja and Wanjohi Water Resource Users Associations (WRUAs) who forego some potential income to manage their land to provide good quality water to downstream users. The two WRUAs were provided with an initial financial incentive of USD 10,000, followed by a second payment of USD 10,000. The first incentive rewarded 470 farmers and second reward benefited 504 farmers.

Pilot site selection

Initial hydrological studies identified five degradation hot-spots. Two PES pilot sites were identified by considering a range of relevant factors for the Wanjohi and Turasha sub-basins. Both pilot sites were regarded as highly degraded and of critical importance for biodiversity conservation. The Soil Water Assessment Tool (SWAT) model was applied to predict the impact of land-management practices on water over long periods of time. Other important elements of the selection process were livelihood assessment, cost-benefit analysis, marking and mapping of hot-spot farms (see below) and completion of an Environmental Impact Assessment. Potential buyers identified downstream were: Nakuru Rural Water and Sewerage Company, Naivasha Water and Sewerage Company, commercial horticultural growers (LNGG), Kengen geothermal electricity generation plant, Kenya Wildlife Service, the tourism industry in Naivasha and the Lake Naivasha Riparian Association.

Community sensitisation

Intensive awareness and sensitisation were conducted on-farm, in grass-roots meetings, seminars, workshops, field days, and public meetings (barazas) to enhance understanding and buy-in by the community and all stakeholders.

Hot-spot farm selection



Hot-spot farms were selected from target areas (i.e. areas of the two sub-basins where water quality/quantity problems had been identified) where initial sensitisation work on the concept, operation and benefits of PES had been conducted. From a technical viewpoint the farms selected as ‘hot spot farms’ were those on steep slopes where no soil/water conservation measures were already in place. To enhance buy-in from farmers, members of the Water Resource Users’ Associations and opinion leaders guided the selection of target farms. All 565 farms in the selected pilot areas were mapped and marked.

Land management changes aimed at improving downstream water quality and quantity

- Rehabilitation and maintenance of riparian zones
- Establishment of grass strips/terraces to reduce runoff and erosion on steep slopes
- Reduced use of fertilizers and pesticides e.g. through integrated crop/pest management, use of new/improved crop varieties
- Agroforestry/tree planting – planting native trees and high-yielding fruit trees and cover crops for improved farm productivity, reduced runoff/erosion and increased biodiversity
- Training for livelihoods enhancement – training provided to farmers by Ministry of Agriculture and Horticultural Crops Development Authority on issues such as: (a) soil and water conservation techniques to boost farm productivity; (b) use of improved fodder storage techniques; and (c) use of new/higher-value crops such as improved potato varieties, tree tomatoes and apples.

Assessment and monitoring

Four river gauges were installed. On-farm monitoring and training in good agricultural practices aimed to ensure that the correct practices are being followed; on-farm follow up has been intensified on all farms.

Evaluation: economic, social and environmental benefits

- **Land management changes.** These were implemented at all participating sites.
- **Water quality.** Farmers along the target tributaries are reporting positive changes in water clarity though there is not yet empirical evidence for this (hydrological data collection is on-going).



- **Livelihood improvement.** Napier grass (*Pennisetum purpureum*), cock's foot (*Dactylis glomerata*) and Elmba Rhodes grass (*Chloris gayana*) used for conservation have increased fodder supply resulting in increased milk production and reduced pressure on forests from grazing. Planting of fruit trees and use of higher quality material for potato planting bring in additional income.
- **Soil and water conservation.** The structures introduced in the farms have dramatically reduced soil erosion and surface water run-off. Soil fertility has been enhanced by on-farm planting of appropriate trees.
- **Forest cover.** Apart from napier grass, the project focuses on planting trees on farm and along riparian areas. This has increased tree cover in the pilot areas with anticipated timber and non-timber products in future.
- **Buyer's continued support.** The project has continued to receive overwhelming support from Lake Naivasha Water Resources Users Association (mainly through LNGG).

Lessons learnt

- Sustainable provision of ecosystem services can be achieved through:
 - changes in land-use practices
 - incentives to farmers that are both equitable and targeted at maintaining or enhancing livelihoods
- Strong stakeholder partnership leads to more successful implementation
- Necessary preconditions include:
 - availability of baseline hydrological data
 - establishment of a strong business case
 - building of trust and commitment among stakeholders
 - establishing a market mechanism – that stakeholders are easily able to engage with – for the selling and buying of ecosystem services



- Appropriate and adequate capacity building of ecosystem service providers and beneficiaries strengthens implementation of PES projects

Present challenges and future plans

Present challenges

- **Very high demand for change.** The pilot farmers' on-farm benefits have triggered very high demand for change in the region. More than 300 additional farmers have joined the projects stretching the project resources.
- **Unpredictable weather pattern.** Climate change has disrupted the seasons resulting in adverse effects within the pilot area. Prolonged drought destroyed most of the conservation plants. This was followed by heavy rainfall and soil erosion.
- **Degraded public lands.** Non-point source sedimentation from degraded public land may threaten efforts to prove a business case for PES through water quality monitoring since such sedimentation may obscure the hydrological benefits arising from land-management improvements on the targeted hot-spot farms.
- **Complex land ownership.** There is much dynamic of land ownership in the pilot area due to inheritance, subdivision and use changes. These threaten the main pillar of the project, namely farm ownership.
- **Low buy-in from buyers.** Like other PES schemes around the world, especially those relating to watershed services, securing commitment from direct beneficiaries of those services is a challenge; especially in a situation where they are already paying a statutory water fee to the regulating body and therefore payment for PES appears as if it is a "double" payment.

Future plans

- **Up-scale the scheme internally and externally.** Significant long-term improvements at a sub-basin or whole-basin scale will only be achieved if all (or at least a large majority) of service providers are undertaking sustainable land- / water- use practices. This in turns implies the participation of a majority of water users to fund the provision of environmental services. Internally more sellers/ farmers will be engaged and already there is high demand from farmers who are not currently implementing the scheme. Externally, three other WRUAs will be considered for inclusion in the PES scheme following the results of feasibility studies.



- **Engage more buyers and sellers.** Consultative meetings will be organised to discuss with potential buyers their participation in the scheme. The selling point will be the opportunity to improve their business through investment in PES scheme, notably through reducing the cost of water treatment. It is anticipated that with improvement in quality, increased quantity will also be available to support business growth. Ecosystem service sellers will be mobilised through community sensitisation meetings involving the provincial administration. The selling point for them of PES will be the opportunity for improved livelihoods.
- **Link to Reducing Emissions from Deforestation and Degradation (REDD).** Through the PES scheme SMART approaches are/will be promoted to reduce emissions. For instance by promoting alternative renewable fuel sources (e.g. biogas, woodlots) and energy-efficient stoves, these will reduce pressure on forest ecosystems. Payment for watershed services will be combined with a carbon finance scheme to generate multiple benefits.
- **Institutionalise PES in the policy framework.** Relevant policymakers will be engaged through dialogue and advocacy with the goal of PES schemes being integrated into natural resource management policies. The Water Resource Management Authority –WRMA is already engaged in the current project.
- **Link the pilot farmers to markets.** This will be done through facilitation of farmers to form producer and marketing groups. This will increase their bargaining power, market competitiveness, reduce transaction costs and therefore increase return on investment.

Conclusion

This case study demonstrates clearly how economic incentives for both ecosystem service buyers and sellers can be used to achieve significant land- and water-management improvements.

This is a pilot project, still at a relatively early stage of implementation and it is still too early to be able to quantify the gains in water quality/quantity or livelihood improvements achieved as a result of these management changes. However, the overall approach is one that can serve as a model for elsewhere in Africa and other developing country contexts, where conservation of soil, water and biodiversity must be seen to be delivering tangible livelihood benefits.