

Institutional and policy requirements for payments for watershed services in Kenya

A case study of Sasumua watershed, Kenya



PHOTO: John K. Mwangi

Watershed ecosystem functions of sediment retention and flow regulation are getting degraded due to increasing population and demand for higher productivity per unit area of land. The traditional regulatory approaches to address this have not been successful and have led to restriction of upstream communities from effectively meeting their livelihood aspirations.

PRESA - Pro-poor Rewards for Environmental Services in Africa - is working at sites in Kenya, Tanzania, Uganda and Guinea to facilitate fair and effective agreements between stewards and beneficiaries of environmental services.

Contact:

World Agroforestry Centre
United Nations Avenue, Gigiri
P. O. Box 30677 - 00100 Nairobi,
Kenya
Tel: +254 20 7224000
Fax: +254 20 7224001
Email: presa@cgiar.org
<http://presa.worldagroforestry.org>

Payments for Environmental Services (PES) are an incentive-based conservation approach that can achieve sustainable watershed management through partnerships between water users and watershed stewards.

This approach can tap into new, private-sector-led financial streams, contributing to existing provisions for water resource management in Kenya. The country's environmental policies are generally supportive of PES but are inadequate, and are not fully implemented due to weaknesses in enforcement.

To some extent, PES for watershed services is already being practiced at government and parastatal institutional levels and is provided for in relevant Acts. Water utility companies and local water projects are required to pay US\$6.25 for every 1,000 cubic metres (m³) of water abstracted. This fee is intended for watershed conservation. Water abstractors

operating in highland forests are further required to pay an annual land rent of US\$312.50 per hectare and a pipeline way leave fee of US\$62.50 per kilometre to the Kenya Forest Service (KFS). The fee to KFS, in a way, acknowledges the stewardship of KFS over watershed services.

Existing policies in the Kenya water sector that allow community participation in water resource management through the Water Resource Users' Associations (WRUAs) are, however, not explicit on whether farmers should directly receive payments for improving watershed services. Small-scale farmers occupy a large proportion of watersheds and mechanisms to achieve good practices on their farms could go a long way in restoring watershed functions.

In this policy brief, we highlight policy and institutional gaps identified from action research in Sasumua, Kenya, which sought to

**SASUMUA & ADJACENT WATERSHEDS:
Land use/cover**

- Legend**
- Land use /cover
 - Agricultural
 - Build-up areas
 - Grassland
 - Moorlands
 - Natural Forest
 - Riverline Vegetation
 - Swampy areas
 - Water
 - Woodlots
 - Watershed boundary
 - Sasumua Dam
 - Roads
 - Rivers



explore how a PES mechanism can be used to construct upstream-downstream partnerships for improved watershed management.

The catchment management strategy for the Tana, Kenya's largest river, consists of the mechanisms likely to influence adoption of good land management practices by watershed stewards. PES fits well within this strategy.

The potential for payments for watershed services in Sasumua

The threat

The Sasumua reservoir supplies the Kenyan capital, Nairobi, with 20% of its water. The reservoir receives 67% of this water from the Sasumua sub-watershed, which is cultivated by low-resource, small-scale farmers. The remaining 33% comes from the Aberdare Mountain forest reserve (Kiburu and Chania sub-watersheds).

Before independence, Sasumua was subdivided into areas for cultivation, grazing, wetlands, drainage waterways, and the Aberdare forest reserve. After independence, all land was allocated to individual farmers except for the forest and a 55 hectare (ha) reserve around

Sasumua dam.

Nearly 75% of the watershed is intensively cultivated on parcels of land averaging 1.1 ha per household. This includes wetlands, drainage waterways and steep slopes. With short runoff movement distances from the farms to the reservoir inlet (less than 10 kilometres), little sediment deposition and natural filtration take place before the water gets into the reservoir. The flow from Sasumua sub-watershed occurs only during the rainy season and carries with it a heavy sediment load and other pollutants. The sediment yield at the reservoir inlet is estimated at 32,620 tons per year.

Costs resulting from poor land use

Each year, the Nairobi Water Company (NWC) spends an average of 15 million Kenya Shillings (US\$187,500) on alum - a coagulant used to clean water - in

addition to other chemicals. The water company also spends about US\$50,000 per year clearing silt and flushing the intake works. The flushed sediment and that produced during filter backwashing is discharged downstream, causing sedimentation at the Ng'ethu water treatment works also owned by NWC.

These costs could be reduced substantially if partnerships are developed with upstream land owners to invest in sustainable land management practices that curb sediment yield to the reservoir.

Potential impacts of sustainable land use practices

Can soil and water conservation practices improve watershed functions?

Using the Soil and Water Assessment Tool (SWAT) model, we generated evidence that land use changes implemented in the upper catchment can bring about positive changes in water quality but marginal changes in water quantity. Terraces were found to be the most effective at reducing sediments, with potential reductions of 85% from current levels. Grass filter strips, contour farming or grass waterways separately could reduce sediments by 40 - 50%.

The potential for these conservation measures to increase dry weather flows was however less than 15%.

By identifying the geographical zones crucial for sediment retention and water production, the SWAT model provided data on locations where interventions could have the greatest impact. Thus, similar to the legal requirement for

Table 1: Simulated water balance components using terraces.

Scenario	Surface runoff (mm)	Lateral flow (mm)	Base flow (mm)	water yield (mm)	Sediment yield tons/year
Base line	193	184	304	680	32.62x10 ³
With terraces	151	190	335	674	4.93x10 ³
Change	-21.8%	+3.3%	+10.2%	-0.9%	85%

NWC to pay a fee to Kenya Forest Service for watershed services, provisions should be made for upland communities to be compensated for land use changes that generate and improve watershed services.

Which soil and water conservation practices do farmers prefer?

A cost-benefit analysis showed that establishing terraces and 10-metre grass strips costs US\$560 and US\$315 respectively in the first year. In subsequent years, low-level, regular maintenance is required. The cost of implementing grass filter strips, excluding transaction and opportunity costs of farmers, was estimated at US\$312.5 per hectare in the first year, with reductions in subsequent years.

Although upland farmers stand to directly benefit from these measures through improved crop yields and availability of livestock feed, the costs of establishing and maintenance are too high. Farmers' acceptance rate for terraces, which were the most effective in sediment reduction, but expensive to establish and maintain was only 45% compared to 58% acceptance of grass strips.

Willingness to accept

About 91% of smallholder farmers interviewed at the Sasumua watershed showed willingness to accept payments to establish and maintain the recommended sustainable land management practices on their land, especially grass strips.

Average, willingness to accept (WTA) was US\$ 938 per hectare per year. Households with higher incomes and higher level of education asked for comparatively higher payments. Households headed by women tended to ask for lower payment.

Potential buyer of watershed services

The direct beneficiary of watershed services in Sasumua likely to benefit from adoption of sustainable land management practices in the upper catchment areas is the Nairobi Water Company (NWC). The company stands to benefit from reduced expenditure on water treatment chemicals (alum, soda ash and chlorine currently estimated at US\$300,000 annually), reduced frequency of

unclogging blocked intakes and a longer economic life for the Sasumua reservoir.

Some of these avoided costs could be used to pay farmers to conserve the watershed. However, the company already pays multiple levies, including 20% of proceeds from sales of water to Athi Water Services Board which owns the dam and associated infrastructure, 9% to the Nairobi City Council, its main shareholder, and annual abstraction fees of US\$144,000 to the Water Resources Management Authority (WRMA). Although PES is not necessarily an extra levy and may result in substantial cost reduction in water treatment, the company can only implement PES if this is clearly stipulated in policy.

Willingness to pay

A survey among water consumers in Nairobi indicated that over 40% were willing to pay an extra US\$1.25 above their monthly water bill to finance conservation of the Sasumua watershed. The challenge is that the authority to increase water tariffs does not rest with the Nairobi Water Company, but with the Water Services Regulatory Board (WASREB).

Current institutional set up for water resource management

Administration of water catchment management in Kenya involves four major players: the Ministry of Water and Irrigation, Water resources management authority (WRMA), Water resource User Associations (WRUAs) and the Water Services Trust Fund (WSTF).

The Ministry of Water and Irrigation formulates water sector policies. WRMA is mandated to supervise all watershed management activities. WRMA collects water abstraction fees to meet its operational costs, and provides occasional assistance to the WRUAs. The WRUAs are legally registered community associations charged with the responsibility of watershed management.

The Water Services Trust Fund is a centralised national institution financed by the Kenya government through direct budgetary allocation. However, most WSTF money comes from development partners and other sources. It is a pro-

poor public fund designated to finance water and sanitation to marginalised groups. It finances capacity building of WRUAs to develop sub-catchment management plans. WRUAs can then use the plans to access further funding from WSTF for watershed management activities, which are supervised by WRMA. However, the ability of the fund to achieve integrated watershed management is limited because:

- a). The existing process for community land owners to access these funds via WRUAs is long and cumbersome.
- b). No mechanism exists to use this fund to persuade or influence farmers into adopting sustainable land management practices on private land.

PES could be used to overcome these hurdles, but WSTF cannot be a 'buyer' because getting into PES and paying farmers would take WSTF into the private realm, which is outside its mandate. Subcontracting the WRUAs to implement PES would be like a subsidy scheme, which would increase management costs. Furthermore, if WSTF is to pay landowners for watershed services, it has to implement this across all watersheds in the country.

Summation

This study generated evidence that sustainable land use practices can deliver quantifiable watershed environmental services. The study identified preferred practices, their potential costs and impacts on watershed service. It established that water consumers were willing to pay and land owners already organised in WRUAs, are willing to accept payments to collectively generate watershed services.

Strong opportunity exists for payments for watershed management, but who will be the buyer to ensure sustainable financing of the scheme? The WSTF cannot be used to finance PES within the current policy and institutional framework. Nairobi Water Company, the direct beneficiary, is also hindered by institutional barriers - a situation that may be common to other potential PES buyers across the country.

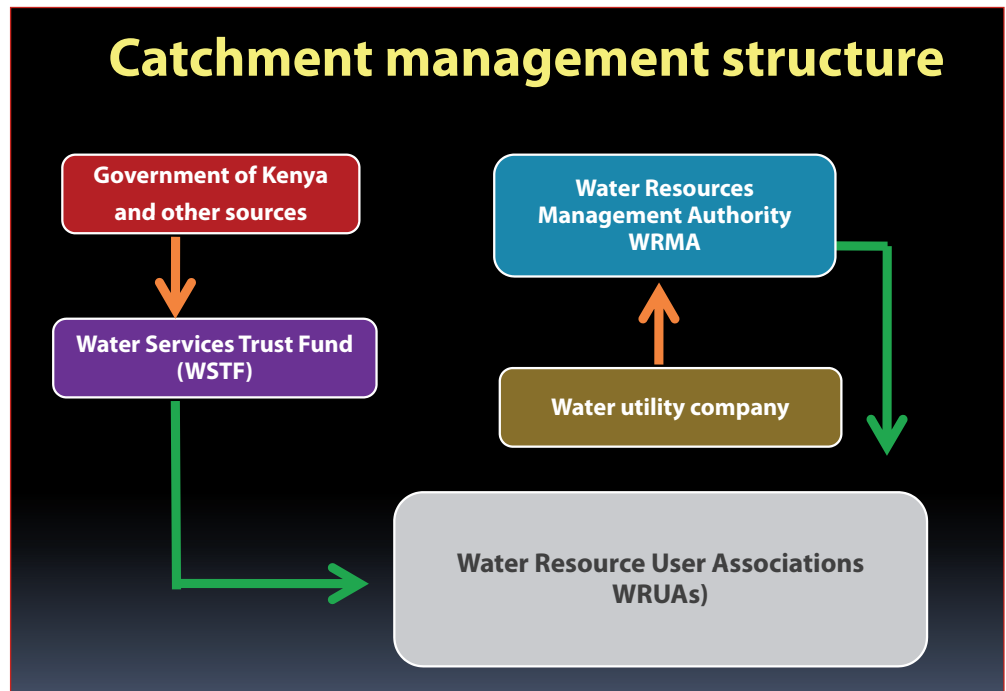
The Pro-poor Rewards for Environmental Services in Africa (PRESA) programme is implemented by the World Agroforestry Centre, with funding from the International Fund for Agricultural Development (IFAD), supplemented by the Government of Finland, the European Union, the World Bank, the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP).

This policy brief has been prepared as an output for the Pro-poor Rewards for Environmental Services in Africa (PRESA) project and has not been peer reviewed. Any opinions stated herein are those of the authors and do not necessarily reflect the policies or opinions of the funders.

© 2011, World Agroforestry Centre (ICRAF). All rights reserved. To obtain permission to reprint, contact PRESA :

P.O. BOX 30677 – 00100
Nairobi, Kenya
Tel: +254 20 722 4000
Email: presa@cgiar.org

Catchment management structure



Recommended policy and institutional changes for watershed PES

1. WSTF can play a key role in supporting watershed PES especially in areas where there is no private sector buyer. However, in order for WSTF to do this, its current mandate in the Water Act, 2002 needs to be expanded to enable subcontracting of WRUAs to implement PES via a subsidy scheme.
2. In order for PES to be implemented formally rather than on an *ad hoc* basis, it needs to be explicitly stated in natural resource management policies and legal frameworks. Utility companies often operate as monopolies and their participation can only be ensured through regulatory requirements.
3. The policy should be amended to allow a portion of revenue collected to be retained for use within the area it is collected. This revenue could be used by the WRUAs to finance PES.
4. Build the capacity of the corporate world to understand the business potential of investing in natural resource management via PES.

References

- Arnold, J.G.; Srinivasan, R.; Muttiah, R.S.; Williams, J.R. 1998. Large area hydrologic modelling and assessment Part I: model development. *Journal of the American Water Resources Association* 34 (1), 73-89.
- Echevarría, M. 2002. Water User Associations in the Cauca valley: A voluntary mechanism to promote upstream-downstream cooperation in the protection of rural watersheds. Land –water linkages in rural watersheds case study series. Rome Italy: Food and Agriculture Organisation (FAO)
- Pagiola, S. 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 (2): 237-253
- United Nations Economic Commission for Europe. 2006. Payments for Ecosystem services in integrated Water Resources Management. Economic and Social Council, ECE/MAT/2006/5. 11th September 2006.

Contributors

John K. Mwangi, John M. Gathenya, Sara Namirembe and Hosea Mwangi (Eds). *Institutional and policy requirements for payments for watershed services in Kenya - a case study of Sasumua watershed, Kenya*. PRESA policy brief No. 2

Design and layout: Godfrey K. Mwaloma

<http://presa.worldagroforestry.org>

