

## **Equitable Payments for Watershed Services (EPWS) programme** *Delivering Conservation and Poverty Reduction in Uluguru, Tanzania*

### **SUMMARY**

This programme aims at channelling economic incentives from the private sector to farmers to compensate for the environmental services provided through the adoption of Sustainable Land Management (SLM) practices in the Uluguru Mountains of Tanzania. It is implemented by Cooperative for Assistance and Relief Everywhere (CARE) International and World Wildlife Fund (WWF) in Tanzania.

The project focuses on the catchment of the Ruvu river- the source of 90 per cent of the water used by domestic and industrial users in Dar es Salaam, and where rapid expansion of farming to the steep slopes of the catchment has increased the silt load in the river and raised water treatment costs, especially in the last five years. Following feasibility studies (livelihoods and hydrology baseline assessments, policy and legal framework review and cost benefit analysis to show buyers how much more expensive it would be to arrange alternative water supply), the project identified justifiable business criteria and secured support from one of the main water users (Coca Cola), served by the city's water utility Dar es Salaam Water and Sewerage Corporation (DAWASCO) (Dosteus, in FAO-CARE, 2009).

### **MATURITY OF THE INITIATIVE**

*Pilot project 2008-2011.*

### **DRIVER**

NGO-driven: project started as part of the Equitable Payments for Watershed Services programme by WWF/CARE/International Institute for Environment and Development (IIED).

### **STAKEHOLDERS**

#### **Supply**

The EPWS programme is being piloted (2008-2011) in the south-east part of the Uluguru mountains, in the Kibungo sub-catchment<sup>7</sup>, focusing on the Mfizigo River which is one of the major tributaries of the Ruvu River. It involves activities in four villages (Kibungo, Lanzi, Nyingwa and Dimilo) and about 5000 farmers relying on agriculture as their subsistence activity. Farming systems are semi-intensive in both flat and mountainous areas, main crops being cereals (maize and rice), tubers (cassava) and fruits (banana and pineapple).

The pilot phase will involve 1,215 households which will receive support in changing the current agricultural practices and implementing SLM interventions over the total farmland area of 2,240 hectares. As of 2008, DAWASCO and the Coca-Cola Company had enrolled more than 450 farmers (Stanton et al., 2010). The reason Kibungo communities were selected as sellers of Water Services (WS) include: 1) they recognise the existence of a water problem, 2) they recognise the contribution of their activities to the problem; 3) they have shown willingness to change their land use practices; 4) they have legal entities which can sign contracts with buyers and receive payments (under local government).

#### **Demand**

The proposal is to target water users in Dar es Salaam, which includes include 80 per cent of Tanzanian industries and about four million inhabitants. CARE/WWF identified two buyers that showed the highest willingness and ability to pay for reduced water treatment costs as a result of SLM practices implementation: the public water utility DAWASCO (Dar es Salaam Water Supply and Sewerage Corporate) and the private company Coca Cola KL (Kwanza Limited) to which DAWASCO supplies water. DAWASCO currently spends nearly US\$2 million per year in water treatment costs due to increased sediment load in the Ruvu river. These costs are likely to



increase in the future as a result of the expected increase in frequency of high turbidity episodes, which could even cause temporary stoppages in water supply (CARE/WWF, 2007b, c).

CARE (2009) reported that the process of searching for new buyers is on-going as reaching buyers is very challenging. Between 2008-2009 the project continued to strengthen the relationship and commitment shown by Coca Cola K Ltd and DAWASCO. Moreover, the project has reached one more buyer, namely Tanzania Brewery Limited (TBL), which also indicated intent to subscribe to the EPWS initiatives implemented in Kibungo Juu.

### **Intermediary**

The contractual framework involves the aggregation of land-owners and disbursement of in-kind payments by village authorities. Since the land is public, farmers do not have land entitlements, while the village authorities manage the land on behalf of central government and are entitled to enter into such contracts and enforce the commitments taken up by individual farmers.

### **Facilitator**

WWF/CARE. An Intermediary Group (IG) has been created involving members from key sectors with a stake in forestry and water resources, particularly the Ministry of Water through the Directorate of Water Resources and the Wami-Ruvu Basin Water Office in Morogoro, local communities, private companies as well as civil society organisations. This body will oversee the programme implementation, mobilize farmers, identify the institutions devoted to collecting and distributing the payments to farmers, and lead the scaling up and replication of the scheme into other watersheds across Tanzania (e.g. the East Usambara Watershed where the Sigi River supplies water to the city of Tanga).

## **MARKET DESIGN**

### **Service**

*Reduction of soil erosion, and improvement of water quality.*

### **Commodity**

*Improved management for soil and water conservation. Activities include terraces (kilaka, fanya juu), afforestation and reforestation, pineapple contour strips, agroforestry and grass strips and riparian restoration or sugar cane strips or tree planting in riparian areas (7.5m either side of rivers). The goal of these measures is to reduce soil erosion and overall land degradation, thus enhancing downstream water quality and averting worse conditions in the future. It is also expected that such practices will boost crop productivity as a consequence of gains in soil conservation and improved fertility and increase farm incomes. (CARE/WWF, 2008).*

### **Payment Mechanism**

In-kind payments (vouchers that participants are free to use as they wish), have been provided to the farmers who have already implemented some of the practices (as payment for work done), and have been calibrated to compensate for the costs associated with implementation and maintenance of SLM practices.

### **Terms of Payment**

## Funds Involved

DAWASCO has agreed to contribute US\$100,000 over the period of four years to the EPWS programme and Coca Cola KL has agreed to make a contribution of US\$200,000 over the same period, as an initial form of payment which should help farmers to overcome the costs of the adoption of the SLM measures (CARE/WWF, 2007b,e).

## ANALYSIS OF COSTS AND BENEFITS

### Economic

The costs of implementing are presented in the table below:

*Costs of implementing SLM practices in the Kibungo sub-catchment over the 4-year pilot (Branca et al, 2009).*

	Implementatio n area (ha)	Establishmen t costs Yr1 (US\$/ha)	Maintenanc e costs (Yr1-4) (US\$/ha)	Opportunit y cost (Yr 1-4) Us\$/ha	Total cost by Yr 4 (US\$/ha )	Trial total cost (US\$/HA )
Afforestation, reforestation	300	87	76	756	3415	1024500
Kilaka terraces (with Agroforestry and grass strips)	100	334	192	1058	5334	533400
Pineapple contours (with agroforestry and grass strips)	940	58	116	176	1226	1151970
Fanya juu terraces (with grass strips)	600	320	38	44	648	388800
Riparian restoration, sugar cane planting, tree planting	300	8	40	58	400	120000
Average implementatio n costs	-	137	83	242	1437	-
Total	2240	-	-	-	-	3 218 670

*Costs avoided:* reduction in sediment load in Ruvu River, resulting from the implementation of SLM practices in the Uluguru area, could reduce DAWASCO's treatment costs by 10 per cent (i.e. US\$200,000 per year). It also has been estimated that by 2018 DAWASCO could reduce total costs – both reduced costs and the saving of costs which would otherwise be incurred – by more than US\$400,000 per year (Branca et al., 2009).

### Environmental

**Problem and Baseline.** Degradation in the watershed from poor agricultural soil management has resulted in high sediment loads in water courses, with subsequent reduction in water flows, increase in water turbidity and overall decline in water quality. Hydrological analysis undertaken over the 1992-2003 period indicates that water turbidity in the Ruvu River increased at an average of five NTU eight per year, with overall turbidity values concentrating in the range of 100-200 NTU towards the end of the decade. Projections in the hydrological analysis suggest turbidity levels will increase by 1.5- 3 per cent annually, over the next 20 years, with more frequent episodes of high turbidity above 300 NTU. Considering that the standard for drinking



water is normally set at one NTU (although values up to five NTU are usually considered safe), and that water of 10 NTU and above can interfere with or damage treatment filters and result in intake closures at drinking-water facilities (USGS 2003), any public or private company using water from the Ruvu River can incur considerable water treatment costs (Branca et al., 2009).

Results (by 2008, reported in Lopa):

- Substantial conversion of vegetation cover from closed forest and woodland to farmlands, settlements, mining activities and marginal lands – steep slopes, stream banks etc.
- Increased runoff and poor water storage capacity in the catchment.
- A predominance of declining flows in the dry season in both catchments.
- Increasing sediment loading in the river leading, increase in costs of treatments and production in industries.

Up to mid July 2009 about 450 farmers have adopted improved land use practices and others are still joining the process of improving their land use practices. The improvement includes application of manure to improve soil fertility which was lost due to soil erosion in the Ulugurus. These farmers expect to increase their yield by more than 80 per cent (CARE, 2009).

## Social

Since the implementation has begun, a total of 10 training sessions on tree nursery preparations and planting (including agroforestry and reforestation) and excavations of terraces (fanya juu/chini and bench terraces) have been conducted to facilitate farmers to apply and improve their land use practices. Four demonstration plots have been established and about 450 farmers have signed up for Payment for Environmental Services (PES) schemes and started practicing improved land management techniques in their farms. These techniques include agroforestry, reforestation, fanya juu and bench terraces. Progress is encouraging, however the adoption process is slower given the delayed startup of field implementation for year one. Adoption rate is expected to increase significantly in year two of planting (CARE, 2009).

## LEGISLATION

No information available.

## MONITORING

Hydrological monitoring stations will be strategically located within the Kibungo subcatchment for Mfizigo River, in order to measure and monitor hydrological changes in terms of reduced sedimentation and turbidity. Also, farmlands will be mapped through GPS systems and monitored to document adoption of the technologies applied by farmers. If the scheme does deliver less turbid water at the sub-catchment level after the four-year trial period, the programme will likely be scaled up.

## MAIN CONSTRAINTS

A comment from a water user on the main obstacles to implementing PES include:

- the company is making regular contributions to environmental bodies, but it is unclear whether these funds are being invested in watershed management;
- there is no established policy framework for setting up institutions to oversee implementation of PES (environmental legislation only mentions voluntary schemes, but insists on negotiated and mandatory compliance);
- there is little legal or legislative provision to enter into payment arrangements (insecurity of investment);
- there is poor understanding of PES at the governance level;
- within the water utility itself, the governing body does not include any representative from the watershed governing bodies.



## MAIN POLICY LESSONS

Lessons reported from CARE (2009) REPORT OF ACTIVITIES:

- 1) **Training women along with men in various initiatives to ensure gender balance** for communities participating in the EPWS programme. Empowering women is critical since they are often the most vulnerable group in the society, hence the possibility of accessing rights due to them is often diminished. However, once they are sensitized to participate in the process, they become quite active and capable of taking on major responsibilities. This has been evidenced within the EPWS scheme. Initially, women were trained on policies, governance, and gender mainstreaming and in conflict resolution. Later, the farmers' groups that were formed to implement the various recommended technologies did actually engage both women and men. Given the increased confidence as a result of this exposure, we have realized that women have been able to take on some critical roles in their groups. For example, in each village there is a group of contact persons who have been identified during classroom and practical trainings in all villages. These contact persons will undergo various training to become local extension experts. Indeed, 6 women have been selected as contact persons at this early stage of sensitization.
- 2) **Introduction of a new technology is possible, however caution is required** to ensure that there is sufficient understanding and awareness created in the community on the significance of new interventions and of the need to secure their participation upfront. Indeed, strategic entry points should be identified and utilized. One key strategy this programme applied was to start with those community members who were willing to try to adopt the technology. This is because these community members (the farmers) have specific reasons to reject the technologies being advocated. For example the EPWS scheme recommended use of fanya juu and bench terraces, as part of major techniques recommended for soil and water conservation on the site.. Historically, those who have tried to introduce these techniques have faced serious difficulties in implementation. The history indicates that during the colonial period one person, the late John Mahenge, was shot dead by colonial leaders due to his resistance to construct them. This incident created a benchmark for people to completely reject the intervention for several decades from the 1950s. However, with effective awareness-raising and lobbying in local communities (farmers), people have changed their mindsets. Bench terraces have smoothly been adopted and applied by farmers within the project area at Kibungo Juu; this is because the project has managed to clear out all their doubts thus producing high levels of cooperation in implementing these technologies; the adoption rate of these technologies has been even higher than expected.
- 3) **It is easier to influence policy decisions for new interventions once a successful evidence-based model has been created and linked to advocacy packages.** The EPWS programme had started without a clear statutory framework supporting its existence. However, the logical introduction of the programme guided by a feasibility assessment, adaptive management and advocacy, has successfully managed to influence high level policy decisions whereby a new Water Act No. 11 of 2009 has categorically mentioned water-PES as one mechanism for collecting revenues to support the stewards of environmental services to sustain catchment flows. Along the same lines, policy meetings have agreed that regulations supporting this new legislation will be developed based on the lessons and experiences from the EPWS program.

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## REFERENCES

Bond, I., 2008. Payments for Ecosystem Services in East and Southern Africa: assessing prospects and pathways forward, in: Group, E.S.A.K. (Ed.), Scoping of Potential Payment for Ecosystem Service Sites. The Katoomba Group.

Branca, G., Lipper, L., Neves, N., Lopa, D., Mwanjoka, I., 2009. New tools for old problems: can Payments for Watershed Services support sustainable agricultural development in Africa?, ESA Working Paper. FAO: Agricultural Development Economics Division, Rome.

CARE/WWF. 2007a. Hydrologic and Land Use/Cover Change Analysis for The Ruvu River (Uluguru) And Sigi River (East Usambara) Watersheds. EPWS Phase I-Making the Business Case. CARE International in Tanzania and World Wide Fund for Nature in Tanzania. Dar es Salaam. Available at <http://www.fao.org/es/esa/pesal/pesmaterials1.html>

CARE/WWF. 2007b. CARE Tanzania proposal to DAWASCO: Equitable Payments for Watershed Services. EPWS Phase I-Making the Business Case. CARE International in Tanzania and World Wide Fund for Nature in Tanzania. Dar es Salaam. Available at <http://www.fao.org/es/esa/pesal/pesmaterials1.html>

CARE/WWF. 2007c. Upstream Business case/Sellers'Cost-Benefit Analysis. EPWS, Phase I Making the Business Case. CARE International in Tanzania and World Wide Fund for Nature in Tanzania. Dar es Salaam. Available at <http://www.fao.org/es/esa/pesal/pesmaterials1.html>

CARE/WWF. 2007d. Equitable Payments for Watershed Services- feasibility study methodology "A Business Case Approach", by D. Lopa and M. Ellis-Jones, prepared for the Capacity-Building Workshop on The Role of Payments for Environmental Services (PES), February 2008. Dar es Salaam. CARE International in Tanzania and World Wide Fund for Nature in Tanzania. Available at <http://www.fao.org/es/esa/pesal/pesmaterials1.html>

CARE/WWF. 2007e. Proposal to Coca Cola Kwanza Limited (CCKL): Equitable Payments for Watershed Services (EWPS). EPWS Phase I- Making the Business Case. CARE International in Tanzania and World Wide Fund for Nature in Tanzania. Dar es Salaam. Available at <http://www.fao.org/es/esa/pesal/pesmaterials1.html>

CARE/WWF. 2008. Household survey conducted in Kibungo sub-catchments. EPWS Phase II. CARE International in Tanzania and World Wide Fund for Nature in Tanzania. Dar es Salaam. Available at <http://www.fao.org/es/esa/pesal/pesmaterials1.html>

CARE, 2009. CEPF final project completion report, Improving Rewards for Environmental Stewards in Equitable Payment for Watershed Service Scheme. CARE International, WWF.

Lopa, D. 2008. Overview & Lessons sharing: Equitable Payments for Watershed Services . (EPWS) in Tanzania. A CARE--WWF Programme. Presented at Capacity Building Workshop on Role of PES, White Sands Hotel, Dar es Salaam, Tanzania. 4th - 6th February 2008. [http://www.fao.org/es/esa/pesal/attachments/5\\_Dosteus\\_day1.pdf](http://www.fao.org/es/esa/pesal/attachments/5_Dosteus_day1.pdf)

Stanton, T., Echavarria, M., Hamilton, K., Ott, C., 2010. State of watershed payments: an emerging marketplace. Ecosystem Marketplace.

## LINKS

No information available.



Watershed  
Markets

