EPWS begins with the identification of a water problem (quantity and/or quality) downstream.
this problem has significant financial impact for water users (domestic, industrial, commercial).
causes of the problem are located upstream as a consequence of unsustainable land use
(subsistence agriculture) by poor farmers who degrade the ecosystem.

EPWS proposes a business case whereby farmers (service sellers)change land use patterns from subsistence to sustainable agriculture restoring the service provision capacity of the ecosystem.
Downstream water users (service buyers) enjoy a regular flow of quality water for which the pay the farmers upstream.
payments are estimated following a cost-benefit analysis for both buyers and sellers.

Equitable payments for watershed services: financing conservation and development in Tanzania

Overview

The **Equitable Payments for Watershed Services (EPWS)** currently under implementation in the Eastern Usambaras Mountains of Tanzania (Zigi river watershed)is 1 of 5 programmes operating as part of the Global EPWS initiative managed by WWF-NL. The Global Pilot programme was designed to test an approach which articulated ecosystem restoration/conservation with improved livelihood among excluded farming communities. Sites were selected in Africa (Tanzania), Latin America (Guatemala and Peru) and Asia (Indonesia and China).

The central premise of the project is to establish an equitable payment mechanism between buyers and sellers of the watershed. Equitability is A EPWS key dimension. It is engulfed in the notion that poverty is but a symptom of a larger problem of social and economic exclusion by which significant sections of the world's population are denied access to the exercise of their basic human rights. "Equitable" translates into recognizing the voice of the less heard (those excluded by reasons of gender or ethnicity). It also means making room in the negotiations between buyers and sellers of watershed services for the recognition of cultural values rooted in the traditions of rural communitie.

The programme is co-financed by WWF-NL and TANGA-UWASA , a local water utility company and principal buyer of watershed services. WWF-TZ manages the project in close coordination with buyers and sellers. The total budget for EPWS is EUR 398, 000, with EUR 150,000 allocated for Phase I (Baseline) and the remainder EUR 245,000 being the estimated cost for Phase II (land use change) EPWS Mountains focuses on the Zigi river basin. The programme is expected to run until end 2015.

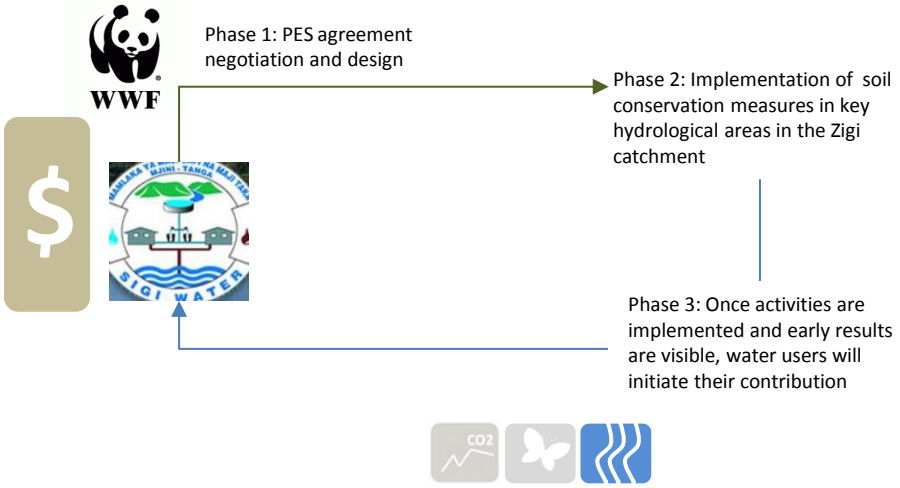

Figure 1: schematic diagram of the key roles

Negotiation

A phased approach allows for gradual appropriation of the conservation mechanism by local stakeholders, thus contributing to the sustainability of the programme.

Alternative valuation methodology redefining transaction and opportunity costs relevant to a PES mechanism which also addresses issues of social and economic exclusion.

Financial contribution from potential buyers before receiving services. Secures commitment and involvement.

The actual payments for services delivered will take place at Phase III following the successful completion of land uses changes and a proper valuation of the services.

Background

EPWS is a phased project with three phases implemented consecutively: Phase I (baseline studies produced data on: water management issues; trends in land use; quantified rainfall and stream flow; erosion hot spots identified and target catchments for piloting EPWS impacts of land use change and best management practices (BMPs) on water and sediment yield evaluated. Phase II entails implementation of Land use changes in selected hot spots as per the hydrologic study recommendations. The EPWS programme design includes a third Phase whereby local stakeholders take over both the management and the financing of the hydrological service delivery. It is the final test of the programme's sustainability measured by the degree of local ownership of the programme's resources both technical and financial. Buyers and sellers agree to maintain land use changes introduced during Phase II and introduce adjustments -if required- to assure the continuity of service delivery. The financial viability of the programme is assured and provide the basis for a long term agreement between buyers and sellers.

EPWS is a joint effort by the Consortium WWF-CARE. These two organizations began deliberations since 2006 with the aim of addressing the development/conservation dilemma. In the case of Tanzania (East Usambaras) Zigi River is the principal source of water for the City of Tanga supplying over 90% of the required water. The quantity and quality of water in the River Basin has been deteriorating over time. There is an increase in sediment loading into the Zigi River resulting in an increase in turbidity levels attributed to higher rates of reduction in vegetation cover. The report (2007 by CARE/WWF) revealed that natural forests in the East Usambaras were reduced from 9.962ha (85%) in 1955 to 6,066ha (52% of total forest) in 1995 while the area under cultivation increased from 1090ha (9%) to 5448ha (46%) within the same time frame. The unsustainable land uses upstream has an impact on the water reservoir downstream as its storage capacity has been gradually decreasing due to siltation caused by erosion and landslides. Unsustainable land use includes: conversion of natural forest to agricultural land, crops within 25 meters of riparian zone and illegal mining.

The rationale for investment in Environmental Services

The Mabayani reservoir (managed by TANGA UWASA) was surveyed in 2010, by depth sounding at 15 different points within the reservoir. Analysis has shown that the average depth of the reservoir has decreased by 3.3 m from 8.7 m at the time of filling the dam to 5.4 m at the time of the study (about 38% decrease). The reservoir capacity has decreased from 8 million m^3 at the time of construction to 5.9 million m^3 at the time of carrying out the study (25% decrease) This is a concern by Tanga UWSA that activities going on in the upstream catchment areas bring in sediments.

EPWS offers a potential lifeline for Tanga UWASA at this critical time. Hydrological studies [1] demonstrate that land use activities in upstream communities are major contributors to the sedimentation and related water problems that UWASA experiences and which require increased amounts of chemical treatment: from about 150,000USD/year in 2005 to nearly 300,000USD/year in 2010[2].

These studies further suggest that change in land use activities by these communities will lead to a reduction in sedimentation and improvement in water quality [1].In other words, by encouraging upstream communities to change their land use to activities that are more favourable for water production, the downstream users would experience a significant benefit. The EPWS concept therefore is setting up a long-term contract between downstream users (the buyers) and upstream communities (the sellers), a mechanism can be established to deliver sustainable improvements in water quality that provide benefits to both buyers and sellers.

[1]Florence H Mahay – Hydrologist Wami/Ruvu Basin Water Office P.O.Box 826 Morogoro , Tanzania November, 2010

[2] Business Case for Tanga Uwasa. Final Draft James Penny, Darwin Consulting UK. March 2012

The PES agreement

The **ecosystem service** provided by upstream farmers to TANGA UWASA is water quality. Service delivery – a condition for service payments- is assessed by monitoring changes in levels of sedimentation in the reservoir from the time when the baseline information was collected to the time when land use changes are completed. Monitoring is a highly participatory endeavour. The communities with technical guidance and support from project managers, undertake activities as specified in monitoring protocols prepared specifically for EPWS. These changes are recorded and provide the basis for the valuation of service.

A **business agreement** has been drafted and accepted by both parties: TANGA UWASA - water utility corporation and the Conservation Farmers Union (UWAMAKIZI). WWF Tanzania and the PBWB (Pangani Water Basin) proposes that Tanga UWASA commits to a pilot programme in which Tanga UWASA (service buyers) contracts to make payments to the 'sellers' in five hot spot communities in the upper Sigi catchment and particularly along the Kihuhwi river (which was found to be having more sediment load) for an initial period of four years.

Seller: Is the Conservation Farmers Union. UWAMAKIZI or " Umoja Wa Wajulima Wahifadhi Mazingira Kipuhwi-Zigi, as the executor of land use changes designed so as to facilitate the delivery of hydrological services as required by the Buyer. This category includes selected members of Kimbo, Shembekeza, Kwaisaka, Mashewa, and Bombani villages duly represented by the EPWS Coordinating Group. Number of sellers might be increased according to programme development. The sellers agree carry out such land use changes [3] as are recommended by the project baseline studies following consultation with the Buyer and included in the Work Plan.

Buyers: Are the recipients of hydrological services. At present only Tanga UWASA has signed the MoU and aditional buyers will be included as the programme progresses - see table 1. Tanga UWASA has commitment to the annual budget of the PWS Programme to be disbursed in a gradual escalating manner: 12,500USD by June 2013, 25,000 USD in 2014, 70,000 USD in 2015 and 85,000 USD in 2016. These financial allocations are voluntary contributions by TANGA UWASA as counterpart to money place by WWF.

Partners:
Muheza district council provides the office to EPWS project without demanding house rent, electricity and water bill.
The District Council through agriculture department and forestry department have committed to provide specific technical assistance in three districts: Muheza, Mkinga and Tanga Municipal Council.
There was also support from community development department in which their efforts enable project to form UWAMAKIZI the Farmers union.
Pangani Water Basin are set to support the project in providing relevant training to farmers and taking the leading role of measuring the impact of the proposed land use interventions. They have assisted in identifying suitable site for hydrological monitoring station.

Monitoring: A crucial part in the "land use change" component of Phase II is the systematic gathering and analysis of information that allows for the assessment of progress on the various aspects of the programme's intervention. Particularly, with regard to the core hydrological problem and to livelihood conditions among poor farming communities. Consequently, Programme managers at all participating sites have produced Monitoring Protocols to check progress over time on levels of sedimentation, erosion control and, soil filtering capacity as key indicators of the core hydrological problem. At the same time a Livelihood Monitoring Protocol has been designed to measure changes in the social and economic status of participating farmers in order to assess changes in poverty indicator such as levels of employment, income, soil productivity and gender equity.

Ownership

Table 1. Selected top users of water in Tanga City as abstracted from Zigi and supplied by the Tanga UWSA (May 2009 water consumption (m3)

Tanga Cement Company	32,870
Tanzania Harbours Authority (THA)	9,051
Afritex Limited -Textile	4,932
PEE PEE Tanzania-bags production	1,838
Arthi River Mining Co.	1,701
Sohanpal Metal Works	1,534

[3] Terrace farming, strip-cropping, agroforestry, Fanya juu terrace farming, Riparian zone restoration, Orchard fruits, Woodlot establishment

Lessons learned

EPWS has contributed to understand the importance of conceptual frameworks developed outside the premises of the market economy. Conservation and development are included in the programme as points in a continuum rather than opposites in a dichotomy. Another point deserving mention is the importance of setting up pilot tests before actually launching the PWS mechanism. It permits a more complete assessment of the mechanisms as such before it is applied in a given watershed. Equally important is the appreciation of significantly different timing for conservation goals to be achieved as compared to social and economic objectives. The former take more time to become a measurable reality while the latter can show results (income improvements) in a shorter period of time.

For a long time conventional conservation approaches have been applied in conserving ecosystems in Tanzania and East Usambara in particular. However, it has been quite difficult putting economic value on environmental services and hence establishing viable business cases for potential buyers and sellers. Addressing this problem calls for an approach where both the stewards and users of environmental services have an obligation towards management of the watershed and also benefit by so doing. To do this WWF introduces EPWS as a system that addresses issues related to watershed degradation while improving the livelihood of pariticipating poor farmers upstream. Land use changes are expected to restore the service provision capacity of the watershed and thus benefiting water users downstream.

The likelihood of being successful in the East Usambaras and the Zigi River is reasonably high because the East Usambara watershed is relatively small with less complexity in terms of project implementation. More importantly most of the key stakeholders are already aware of the initiative and have bought in into it. Based on the hydrology and livelihoods studies, WWF Tanzania believes that positive improvements in water quality can be demonstrated within two to three years which, if correct, open up the possibility to scale up the project to cover the whole catchment.

Phase II will be totally financed by voluntary financial contributions (WWF and TANGA UWASA) Farmers contribute with land and labour. Once the value of the service is determined and form and size of payments are agreed upon by buyers and sellers, the latter will receive payments.

Contact
Julio C. Tresierra Ph.D.
Global Coordinator, Equitable Payments for Watershed Services
WWF-NL www.panda.org
jtresierra@wwf.nl
+31 30 693 7333
+31 654 251 769

Tanga Urban Water Supply & Sewerage Authority Facebook page
https://www.facebook.com/pages/Tanga-Urban-Water-Supply-and-Sewerage-Authority/134501009997522

Contacts

Remuneration of Positive Externalities (RPE) / Payments for Environmental Services (PES) in the Agriculture and Food Sectors
A project of FAO Natural Resources Management and Environment Department, 2012-2015
Project website: http://www.fao.org/nr/aboutnr/environmental-services/en/

Food and Agriculture Organization of the United Nations
Viale delle Terme di Caracalla
00153 Rome, Italy
www.fao.org

Dr. Philipp Aerni
FAO-NRD/ETH Zurich
Philipp.Aerni@fao.org

Bernardete Neves
FAO-NRD
Bernardete.Neves@fao.org

Stéphane Jost
FAO-NRD
Stephane.Jost@fao.org

Project implemented with the support of

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich
www.ethz.ch

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Federal Office for Agriculture FOAG
www.blw.admin.ch