

# Paying for Environmental Services in an Andean Watershed: Encouraging Outcomes from Conservation Agriculture



## HIGHLIGHTS

- ✓ Ex-ante assessment showed that conservation agriculture practices reduced lake sediment levels by half
- ✓ In potato-based systems, conservation tillage increased organic matter and carbon contents in the soil. After two years, carbon concentration was 29% higher than under conventional tillage practices, with the carbon stock 31% higher
- ✓ Farmers' income increased. So far, 100% of the first-round loans have been recovered
- ✓ From 2006 to 2009 over 180 hectares were brought under conservation agriculture

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## Outcome Stories

From the ecologically fragile high Andean alpine lands, known as paramos, to the valley bottoms, water users are as different as the environment is varied. In water management, win-win situations for different users are rare. Most of the farmers located on the steeper lands are poor. Actions and decisions of individual farmers have diminished water quality in the region. There is a need to share water, and beyond water sharing, to recognise the value of water. Compensating farmers for environmental services may persuade them to adopt more sustainable farming practices, while providing an additional source of income.

Lake Fuquene in Colombia is at the center of an environmental controversy.

The watershed is changing and concerns are mounting over the health and biodiversity of the lake, which is a provider of environmental services, such as tourism, urban water supplies and flood control. Crop production and cattle raising in the Fuquene watershed have degraded the ecosystem. Crop production spans areas from the paramo



upstream, down to the lake level. Reclamation of land for cattle raising has reduced the lake area. Runoff from crop production and cattle manure pollutes the lake, resulting in a population explosion of algae and plankton, causing eutrophication. These organisms deplete oxygen in the water, adversely affecting water quality, as well as other aquatic life.

In an attempt to decrease nutrient and sediment flows into the lake, local partners promoted a transition from traditional practices to conservation agriculture (CA). CA practices promote permanent soil cover, minimum tillage and crop rotation with green manures. These practices control erosion, increase water percolation, increase soil water storage capacity, improve soil organic matter content, and increase crop quality and yield. However, even after wide promotion, adoption of CA practices remained limited. Farmers blamed this on a lack of financial resources for initial investment, as well as a lack of technical knowledge.

Many farmers were also producing on rented land. Because the land was not theirs, they had no interest in improving it.

#### **Producers manage their own money**

Adoption of CA practices finally picked up with the promotion of a scheme for payment for environmental services (PES). Partners set up a revolving fund program managed by farmers' associations. The fund provided smallholder farmers with credit to make an initial investment in conservation agriculture. Interest rates could remain low because management was in local hands. Farmers owning less than two hectares of land got a preferential interest rate of 0.9% per annum. To obtain credit, a farmer had to present an approved land-use plan. Ninety-seven percent of the farmers getting credit kept to the agreed plan. So far, 100% of the first-round of loans have been recovered. From 2006 to 2009, more than 180 hectares of land were brought under conservation agriculture.

There is a clear difference between schemes of payments for environmental services to enable the conservation of natural ecosystems, versus payments for environmental services to increase income and improve the well-being of rural populations. The latter objective requires broader analysis to understand all of the socio-economic benefits derived from land-use and land-management changes at different scales, from farm, to watershed, to society in general.

Watersheds with the highest potential to deliver environmental services are not necessarily occupied by the poorest people. Many people in Andean watersheds do not own lands and therefore cannot capture the economic benefits derived from agricultural activities and compensation for environmental services. When a type of land-use is identified as being appropriate for improving the provision of environmental services, but opportunity costs are high, other types of incentives, such as soft loans, are needed to stimulate change. In Colombia, conservation agriculture had positive impacts on soil characteristics by improving stream flow regulation and reducing

sediments, while increasing farmer income. The increased accessibility of cheap loans for smallholder farmers proved to be an effective mechanism to promote practices that reduced sediment yields and increased carbon sequestration (Quintero 2009). Long-term investment in perpetual payment for environmental services (PES) schemes is often affected by unfavorable macro-economic changes, because public investment is invariably diverted to more immediate priorities. The Colombian experience demonstrates, however, that in the short-term PES can serve as a valuable and effective entry-point for conservation agriculture.

#### Reference

Estrada, R.D., Quintero, M., Moreno, A., and H.M. Ranvborg. 2009. *Payment for environmental services as a mechanism for promoting rural development in the upper watersheds of the tropics*. CPWF Project Report PN22. Colombo, Sri Lanka: CGIAR Challenge Program on Water and Food. [http://mahider.ilri.org/bitstream/handle/10568/3907/PN22\\_CONDESAN\\_Project%20Report\\_Oct09\\_final.pdf?sequence=1](http://mahider.ilri.org/bitstream/handle/10568/3907/PN22_CONDESAN_Project%20Report_Oct09_final.pdf?sequence=1)

#### Project Partners

International Center for Tropical Agriculture (CIAT)  
Consortium for the Sustainable Development of the Andean Ecoregion (CONDESAN)  
GIZ  
Danish Institute for International Studies (DIIS)

#### About CPWF Outcome Stories

The CPWF Outcome Stories document changes in knowledge, attitudes and practices that have emerged through CPWF-funded research. Outcomes occur when research outputs foster engagement processes that result in changes in practice or changes in behavior. These stories capture outcomes at a specific point in time; outcomes may have evolved since the completion of these projects.

Andes • Ganges • Limpopo • Mekong • Nile • Volta

#### About CPWF

The CGIAR Challenge Program on Water and Food was launched in 2002, with the aim to increase the resilience of social and ecological systems through better water management for food production (crops, fisheries and livestock). We do this through an innovative research and development approach that brings together a broad range of scientists, development specialists, policy makers and communities, in six river basins, to address the challenges of food security, poverty and water scarcity.

The CPWF is part of the CGIAR Research Program on Water, Land and Ecosystems. WLE combines the resources of 11 CGIAR centers and numerous international, regional and national partners to provide an integrated approach to natural resource management research. The program goal is to reduce poverty and improve food security through the development of agriculture within nature. This program is led by the International Water Management Institute (IWMI).

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