*Aerial view of the Aberdares Conservation Area. (Photo: Christian Lambrechts)*

# Pay as you use

## Could payment for environmental services help to conserve the Aberdares ecosystem?

**By JORAM K. KAGOMBE**

People get ecosystem services (ES) or goods and services from ecosystems. These can be direct or indirect. They include provisioning services such as food, fuel wood, fodder, natural resource products and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, regulation; and supporting services such as nutrient cycling and biodiversity that maintain the conditions for life on earth (Biggs *et al.*). Ecosystem values are measures of how important ecosystem services are to people – what they are worth.

Payment for environmental services (PES) is a voluntary transaction where a well defined environmental service (often a land use providing this service) is bought by one or more service buyer(s) from one or more service provide(s) if the provider(s) continuously secure the provision of that service. Buyers are the users or institutions acting on behalf of the users of these services.

PES programmes where the actual user is the buyer are more efficient because the actors with most information on the value of the service are directly involved and have clear incentive in ensuring the service functions well. Sellers/providers of ES are those who are in a position to secure the delivery of ES. Sellers are land managers who are paid for specific land use practices that generate the desired ES. An important component of a PES scheme is that the targeted service is threatened.

PES is most promising where the providers are poor while the buyers are well-off. For PES to work, the ecosystem service should be perceived to be of high value, compared to other alternative land uses.

The value of ecosystem services can be measured by estimating what people are willing to pay, or the cost of the actions they are willing to take, to avoid the adverse effects that would occur if these services were lost, or to replace the lost services.

For example, wetlands often provide protection from floodwaters. The amount that people pay to avoid flood damage in areas similar to those protected by the wetlands can be used to estimate willingness to pay for the flood protection services of the wetland. Methods used for measurement are the cost of damage avoided, replacement cost, and substitute cost methods.

However, many ecosystem services are not traded in markets, and are not closely related to any marketed goods. Thus, people cannot "reveal" what they are willing to pay for the services through their market purchases or actions. In such cases, surveys are used to ask people what they are willing to pay, based on a hypothetical scenario. Alternatively, people can be asked to make trade-offs among different alternatives, from which their willingness to pay can be estimated. Survey methods include contingent valuation and contingent choice methods.

Some economic activities that involve natural resources are carried out in an unbalanced manner, resulting in the reduction of the quantity or quality of the flow of environmental services. Economic activities that respect nature's biological properties and ecological cycles can increase the availability of these services and thereby generate benefits for society as a whole.

### The case of the Aberdares Forest range

The Aberdares forest, located in Central Kenya, is one of the five water towers in the country. It has high biodiversity value to Kenyans and the international community. The Aberdares National Park is a major tourist attraction, mainly because of the wildlife found there. Plantations in the forest supply timber and other construction materials to the ever expanding population.

The forest is surrounded by a high population whose main occupation is tea farming. The tea belt is directly supported by the forest as the forest provides ideal climatic conditions for tea farming. The Aberdares forest provides water for domestic use, irrigation, industrial use in factories, fish farming, and generation of hydro-electric power.

The Aberdares forest forms part of the upper catchments of the Tana River, Kenya's largest river, as well as the Athi, Ewaso Nyiro (North), and Malewa rivers. It is also the main catchment for the Sasumua and Ndakaini dams, which provide most of the drinking water to Nairobi. The forest serves the Tana Water Service Board, which has seven water service providers (WSPs) and the Athi Water Board, which has 12 WSPs including those providing water to Nairobi and Thika.

Water destined for Nairobi is stored in Ndakaini and Sasumua dams, and then piped to Nairobi and other towns after purification. There has been a fluctuation in water supply that has resulted in water rationing in the recent past. Although it is claimed that a dry weather spell is the main reason for reduced water levels, unsustainable conservation efforts have contributed greatly to the current situation.

Forests in water catchment areas have been degraded, farmers have cultivated on river banks, leading to runoff and soil erosion.

The effect of unsustainable conservation efforts have been felt by consumers downstream and those in towns. This calls for concerted efforts to conserve the forest and neighbouring farmlands. The communities around the forest are active in forest conservation and have organised community forest associations and water resource users associations.

## Fencing of Aberdare forest

Conservation of the Aberdares forest has been enhanced greatly after the completion of the electric fencing project supported by Rhino Ark and other development partners. The 392.5-km fence, constructed between 1989 and 2009, has contributed to a reduction in human-wildlife conflict and enhanced the value of both the ecosystem and farms in the neighbourhood.

## Payment for ecosystem service as an incentive to conservation

The Aberdares forest has a high conservation value to the country and the international community.

In spite of the high value of the forest, few consumers link the conservation efforts to the ecosystem service they use like the water consumed in the household. A case study in Ndakaini dam showed that the neighbouring community views the dam as a liability as they get few benefits from it. The main service provider, Nairobi Water and Sewerage Company, is restrained in providing incentives by the laws governing the water provision.

PES would be a form of compensation for those who preserve or conserve resources, ecosystems and environmental services. Such compensation could take a range of forms, such as:

- Direct transfer of financial resources
- Support in obtaining credit
- Tax and fee exemptions
- Preference in obtaining public services
- Access to technology and technical training
- Subsidies to products.

PES can take the form of local mechanisms where the consumers of the service contribute to its conservation through user pay principle; and regional/international where developed countries, the main producers of green gas, contribute to conservation in third world countries using methods like carbon markets.

In both mechanisms, a clear institutional structure should be worked out to ensure the incentives reach the target producer. The main challenge to effecting this is lack of clear legislation that supports PES and carbon trading.

*Tea farming showing effects of frost in January 2012*
*(Photo: KEFRI)*

*Ndakaini dam and surrounding tea farms*
*(Photo: KEFRI)*

In addition, ecosystems are often undervalued, resulting in low resource allocation.

## The way forward

The Aberdares forest is a crucial resource to the country that should be conserved for perpetuity. PES offers an opportunity for enhanced benefits to the community within the conservation area. This, coupled with government commitment to plough back the resources to conservation areas can improve the range of incentives.

To achieve this, a legislative and institutional framework should be developed that would support payment for ecosystem services and allow benefit flow stream from the carbon markets. The policy should address poverty mitigation measures through enhanced benefit flow to the producers of ES.

The government should lead the other stakeholders in developing financing mechanism for the ecosystem by exploring both the local and international options. PES provides a viable local mechanism while carbon trading is viable as international financing mechanisms. Pilot PES schemes should be started that will enhance understanding of how it works before scaling out to the other parts of the cpountry.

Kenya stands to gain from the experiences of countries in Asia and South America where PES has taken off successfully. Payment for environmental services remains a viable long-term option for conservation of the Aberdares range for continued provision of ecosystem goods and services.

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