

### Valuing Water and its Ecological Services in Rural Landscapes: A Case Study from Nepal



Navraj Pradhan, Isabelle Providoli, Bimal Regmi, Gandhiv Kafle

#### Introduction

Nepal is recently facing an acute scarcity of water in both rural and urban areas, villages and cities and for domestic and agricultural purposes, particularly in the pre-monsoon months. With changing climatic conditions, perennial rivers and streams have reduced flows and at times can even dry up altogether. Payment for Watershed Services (PWS) related to catchment conservation can play an important role in allowing communities to adapt to these changing conditions. In the region, PWS-like mechanisms that either reflect public payment schemes or self-organised deals are the most common.

We review a case study from rural Nepal, which has emerged as a PES - PWS like scheme. In this study, a community water user association in the areas of Rupa Lake has cooperated voluntarily with upstream users to establish direct, indirect and in-kind rewards for the provision of improved water quality. The process has been developed through local, traditional mechanisms, even in the absence of official markets for the environmental services in question. Other than schemes involving payments only from water users, relatively few initiatives have been primarily demand-led or had water users as the main initiator (Porrás and Grieg-Gran 2007).

#### The Rupa Lake area

Rupa Lake is the third largest lake in Nepal (1.35 km<sup>2</sup>), situated in the mid-western part of the country at an altitude of about 600m asl. Its watershed area is 30 km<sup>2</sup>, which is fed by streams that descend from the mountain regions of the Annapurna Himalayan Range (Poudel and Buckles 2006). About 12 houses are scattered just above the Nyau Kuno and Kotre Kuno on the western side, whereas settlements are dense on the northern and north-western face of the catchment.

#### Problems and drivers of change

The areas around Rupa Lake were once rich in biodiversity, but the ecosystem in the region has deteriorated over the past few decades as a result of constant human encroachment into the watershed and forest resources, followed by conversion of forest into agricultural land and settlements. Only recently, with support from an NGO, LI-BIRD (Local Initiatives for Biodiversity Research and Development), have the influencing factors affecting the state of the lake been identified through consultation with the watershed communities.

From 1952 - 2005 it was noted that major floods and landslides had deposited large sediments in the lake and its surrounding wetlands, and heavy deforestation in the lower reaches of the watershed had resulted in their degradation. New private agricultural areas in the wetlands were developed, established forests cleared for permanent settlements and streams and rivers diverted to facilitate

farming. The waste from these farms, along with sedimentation, promoted the growth of harmful water plants (Poudel and Buckles 2006). These factors not only threatened the livelihoods of fishermen earning their living from the lake but also highlighted the changes in the topography of the landscape.

Realising that conservation of the forest and proper management of the land resources of the watershed are crucial for sustaining the lake and enhancing its productivity, the Rupa Lake Restoration and Fishery Cooperative was established in 2001. The Cooperative established a benefit sharing mechanism to provide incentives to communities and various upstream user groups to conserve the catchment. The co-operative members are beneficiaries from the services provided by upstream farmers: various CFUGs (Community Forestry User Groups) receive significant economic benefits from the lake, and these benefits are voluntarily shared with upstream communities to provide incentives for the protection of both the lake and its wetlands.

No monetary aid or funding has been received for the implementation of the benefit-sharing scheme and the establishment of the cooperative beyond that which is received via the "Rupa Lake Watershed Conservation Fund", established only with support from LI-BIRD and EGP (the Ecosystems Grants Programme of IUCN - Netherlands). LI-BIRD has provided knowledge sharing, technology transfer, and has built capacity and raised awareness in communities and the cooperative through activities such as trainings, exposure visits and interaction programmes; introduction of technologies in soil and water management (hedgerow technology, bio-fencing, green foot trail, bioengineering); conservation and management of wetland biodiversity (conservation blocks at lake shore, community biodiversity registration, habitat conservation of endangered species); value addition and market linkage of locally and economically profitable wetland species, and institutional strengthening (via a revolving fund and capacity building).

#### Voluntary payment mechanism

The objective of the benefit-sharing scheme is mainly to conserve Rupa Lake and its wetlands for increasing fish production and income generation. Conservation activities have focused on community biodiversity management, forest management, organic farming, promotion of zero tillage practices, agroforestry and bioengineering, leading to reduced sedimentation and pollution flowing into the lake and improving the quality and quantity of water.

The payment mechanism is voluntary; there is no contract or agreement made between the buyers (the Cooperative) and sellers (upstream users). Direct payments are made by the Cooperative on an annual basis to different user groups such as CFUGs, schools and communities who request funding for specific watershed management activities. Rewards or indirect payments are also made by the Cooperative in kind by providing seedlings and gabion boxes.

The payments made involve:

- NRs 4000<sup>1</sup> annually to each of 19 forest users group in the watershed, based on an agreement between the community forestry users group (CFUGs) and the cooperative.

<sup>1</sup> Note: The exchange rate for 1.00 US Dollar, is equal to Nepali Rupee. 76.60 ; according to the rate fixed by Nepal Rastra Bank on October 2009.



Rupa Lake by Bimal Regmi

- NRs 4000-5000 to 19 schools around the wetland and watershed areas of Rupa Lake to conduct awareness raising and environmental education activities for the students.
- Scholarships of NRs 400 given to 200 students annually.
- Scholarship of NRs 250 per student given to 52 students from the displaced communities, particularly the fishermen who used to depend on traditional fishing living around the lake, wetland and watershed areas.
- Funding to different Community Development Groups in Hansapur and Majhthana VDCs for the conservation and management of natural resources in the watershed areas. The funds have been utilised by farmers and poorer sections of the community to initiate conservation oriented activities for income generation including plantation, bee keeping, forage/fodder plantation for livestock improvement, broom grass cultivation, organic farming and coffee production. Around 5000 households have directly benefitted from this scheme.

Other indirect payments made to the upper watershed communities after the formation of the cooperatives include:

- Provision of 100 gabion boxes for landslide control.
- Provision of more than 15,000 seedlings of broom grass, napier, oranges etc.

#### Impact of these activities

Investment in upstream and downstream conservation and ecosystem management has helped in maintaining species population and their habitat, and has also protected marsh/swamp ecosystems and water flow. A qualitative assessment of these parameters<sup>2</sup> clearly shows that steps have been undertaken to revive local water sources such as springs and wells, whilst increasing availability of wild foods and non-timber forest products in the forest and surrounding areas. Communities have revealed that there are now visible and invisible benefits of environmental services such as an

increase in foods and fibre, enhanced species population, regained natural beauty and improved local micro climate. Today, members of the co-operative also receive significant economic benefits from the lake. The daily catchment is about 100 kg of fish, fetching a market price of 145 NRs per kg.

#### Conclusion and lessons learned

When the beneficiaries are local mountain people, the Rupa Lake case study demonstrates that benefit sharing and co-investment can be effective and manageable payment instruments. The establishment of the benefit sharing mechanism by the cooperative has been instrumental in raising awareness within the community about the importance of proper land management practices and conservation of forests. More than 50% of the communities in the area have now adopted practices such as agro-forestry, organic farming, high value crop cultivation, the building of check dams and the use of bioengineering for flood and landslide control. Additionally, the communities have been receiving incentives for the adoption of alternative income generating activities including bee-keeping and goat-rearing.

Although about 5000 households have been directly benefitting, little is yet known about the impact of funds on their socio-economical status. The incentives these households receive are far lower than what it really demands for conserving the watershed. The establishment of cooperatives has provided employment to a few fishermen, but more research needs to be undertaken to ascertain the direct and more general implications for livelihoods and socio-economic conditions within the wider community. A further study focusing on these issues would provide valuable insight into the real social impact of the scheme and conservation initiatives.

Valuation of wetland services, rapid hydrological assessment and community awareness on PES are possible entry points for initiating incentive based mechanisms within a local institutional framework. This has not been the process in

<sup>2</sup> This is based on field observation and interactions conducted by LI-BIRD with different community groups

Rupa Lake and its wetlands. However, through a system of shared benefits, it has clearly been possible to apply conservation measures in scattered form and in small areas within the whole watershed. In this sense the measures undertaken complement voluntary PES initiatives, as there is already recognition in linking upland and lowland activities and valuating services at a very local level.

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Navraj Pradhan ([npradhan@icimod.org](mailto:npradhan@icimod.org)) and Isabelle Providoli ([iprovidoli@icimod.org](mailto:iprovidoli@icimod.org)) are working with the Environmental Change and Ecosystem Services Division at ICIMOD. Gandhiv Kafle is affiliated with LI-BIRD. Bimal Regmi is an Independent Researcher.