Bhoj Wetland watershed services, India

Authors: Sanjib Kumar Jha mainly based on Agarwal, C., Tiwari, S., Borgoyary, M., Acharya, A., Morrison, E. 2007

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Key Message: Effective monitoring methods and baseline studies impact the effectiveness of the incentive based schemes

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1. What is the problem?

The Bhoj Wetlands are facing twin problems of poor water quality and reduction in storage capacity due to siltation. The water quality is being affected by several factors such as inflow of sewage and solid waste from the urban areas and runoff from agriculture fields in the peri-urban/rural catchment (Agarwal, et, al, 2007). In recent years, several steps have been taken to control pollution from sewage and solid waste generated mainly in the urban areas. A Japanese Bank of International Co-operation (JBIC) project from 1995–2004 mitigated the main sources of urban water pollution by engineering interventions that provided wetland buffer zones (a major road and tree plantations) and diverted urban sewage through a new system of 85km of pipelines (Hope,et,al,2007). However, the problems related to agriculture runoff, on the other hand, have not been addressed substantially so far. Market-based approaches to ecosystems are not only about creating markets for all services, but careful selection and design of an appropriate instrument with the objective of fulfilling the needs of participants (Adhikari, 2009). However, before starting the scheme, it is important to identify the current state of land and also establish biophysical baselines, i.e establishing the relationship between biophysical variables such as precipitation, climate, evaporation, water infiltration and soil compaction etc.

2. Which approach was taken?

So a incentive based PES schemes (such as compensation) can encourage upstream providers to sustain watershed services by modifying land- and resource management activities that influence the quantity (both overall and seasonally) and quality of water downstream (Agarwal, et, al, 2007).In order to analyse the feasibility and applicability of incentive based PES schemes, baseline studies that assessed land use and management practices, watershed protection services, and livelihoods were commissioned to document pre-project conditions and to support facilitation. Incentive-based mechanisms (IBMs) for environmental services try to value the services provided by land and resource managers and the opportunity cost of providing them. The linkages between land-use practice and watershed protection services are important for any agreement, but difficult to ascertain in practice. Both expert views as well as local

hydrological monitoring can help build awareness of watershed services among stakeholders.

3. What ecosystem services are considered, and how?

The ecosystem services considered here is services being provided by wetlands. The Bhoj Wetlands around Bhopal city in MP are recognised as wetlands of international importance and are a Ramsar Site. They consist of two man-made reservoirs, the Upper Lake and the Lower Lake. Constructed in the 11th century by King Bhoj of Dhar, the Upper Lake was created by building an earthen dam across the Kolans River. It has a catchment area of 361square km and water spread of 31square km. Although it includes parts of the city, the catchment is predominantly rural. Created in 1794, the smaller Lower Lake has a catchment area of 9.6 square km and water spread of 1.29 square km. It receives water from the Upper Lake through seepage as well as from its mainly urban catchment area (Agarwal, et, al, 2007). The wetlands support a wide variety of flora and fauna. Over 160 species of birds and 14 rare macrophytes have been reported in the area.The Bhoj Wetlands are an important source of drinking water and recreation for the 1.8 million residents of Bhopal. The Upper Lake provides about 40% of the city's drinking water, about 29 million gallons per day. There are boating and water sports facilities on both lakes. Further, livelihoods of many people are directly linked to the wetlands (ibid).

4. What input was required?

In the implementation phase, facilitation teams interacted extensively with the local communities and other stakeholders to sensitise them to the concept of IBMs and to explore opportunities for establishing such mechanisms. There were two meetings at local level, two at state level, and six stakeholder-specific meetings; and two national-level learning group meetings were also held. The baseline study revealed a skewed pattern of ownership of cultivable land. Those people belonging to Scheduled castes and tribes had a negligible share of land ownership (6.7% and 0.6% respectively), whereas those belonging to Other Backward castes had a share of total land ownership (43.7%) that was almost the same as for those from the General Category (48.9%) and that too concentrated within a few households (Agarwal, et, al, 2007). Soil quality was reported to be average; and agriculture is chemical intensive in nature. High expenditure on agriculture inputs, mainly fertiliser and pesticides, was reported across the sample population. Although nitrates and phosphates are well within the permissible limit specified by the Bureau of Indian Standards (BIS) and are within drinking water standards (which set a limit of 45 mg/l for nitrates, for example), their concentrations of 1.5 to 2.5 mg/l and above support luxuriant growth of macrophytes and algal blooms (ibid).

For an effective monitoring, it was also realised that an intermediary was required. This could be a group of facilitators who would act as an intermediary body, engage with experts and practitioners, and who would coordinate the collection and transfer of the incentives to the suppliers upstream and also resolve conflict situations. A change in agricultural practices in upstream farms, from chemical to organic wetland-friendly practices, was identified as a cost-effective and sustainable solution after a detailed analysis. However there were limitations which includes the lack of capacity and at times awareness (there are some farmers in the catchment who do practice 'organic' agriculture), reducing landholding size which in turn

reduces the economic viability of agriculture as a livelihood option, increasing costs of hiring labour, rapidly changing land use patterns in the rural catchment due to the proximity to an important urban centre, lack of ready markets for organic products that should provide higher returns to the farmers, intensive promotion and marketing of chemical fertilisers and pesticides by private companies in the area.

5. What was the policy uptake and what were the conditions for this effort to influence public management?

The study did not lead to any policy uptake, however it clearly demonstrated that how effective monitoring can help improve the effectiveness of incentive based PES schemes.

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References

Agarwal,C.Tiwari,S. Borgoyary,M. Acharya,A. Morrison,E.,2007 Fair deals for watershed services in India,IIED

Hope,R. A. Porras, I. Borgoyary,M. Miranda,M. Agarwal,C. Tiwari ,S. and Amezaga, J.M.,2007, Negotiating watershed services IIED

Bhim Adhikari, B.2009, Market-Based Approaches to Environmental Management: A Review of Lessons from Payment for Environmental Services in Asia, Asian Development Bank