Orchestrating for Compatibility of Different Water Uses

2002 SIWI Seminar Results

The 2002 SIWI Seminar had its emphasis on how to balance human livelihood security and ecological security. The overriding goal was to seek some clarity on what exactly is meant by "land/water integration taking a catchment-based ecological approach," an approach promoted by both the Global Water Partnership and the Global Environment Facility following the 2nd World Water Forum in 2000.

Broad Variety of Cases

A whole set of real world problems were exemplified: from Sri Lanka (upstream settlement, downstream Ramsar site), India (aquaculture, shrimp farms, deforestation, salinity intrusion, effluents), equatorial lakes in Africa (water hyacinth abatement, how to sustain fisheries), Thukela Basin in South Africa (impacts from uphill and downhill vegetation changes, water reallocation), and Murray Basin, Australia (water diversion moratorium, restoration of environmental flow, salinity).

One highlighted element was environmental flows, and the need to limit water withdrawals from the river in order to benefit downstream aquatic ecosystems. In highly developed river systems, the flow may have been overcommitted, and environmental flows will have to be secured in order to restore a healthy river system. This may incorporate the need for substantial changes of the quantity of water remaining in the river. To restore key habitats downstream, already committed water may have to be returned to the river. This may involve water trading arrangements where water is bought back from irrigated farms upstream to be left in the river to increase the downstream uncommitted flow.

Another principal interest in these examples was streamflow-influencing activities, with reference to water consumptive forests and their role in runoff generation. Upstream deforestation in the Indian and Murray cases added water to the river, while upstream reforestation reduced streamflow. In the Thukela case, downstream clearing was a way to avoid consumptive water use by riparian trees, thus adding to the streamflow.

The pollution load with effects on aquatic ecosystems was also highlighted. Agricultural runoff generated a water hyacinth explosion in Lake Victoria. In the Indian case aquaculture had caused problems for local water supply and irrigation. There were also several examples of increased salinity, caused by either land use change or irrigation (Australia), and by management for shrimp production (India).

Coastal complexity was evident in several cases. An interesting situation was the downstream wetlands in Sri Lanka, originating from the development phase of a catchment, when river depletion had generated a highly valued brackish water ecosystem downstream, acknowledged as a Ramsar site. Through further water resources development upstream (reservoirs and flow control), additional inflow entered the area from upstream and threatened the wetlands. Another case was from India, where the coastal region at the downstream end of the river system was highly vulnerable to upstream activities. Upstream water use and land use change

together with various downstream activities all influenced the streamflow and the water quality. In addition, local deforestation had introduced vulnerability to flooding and cyclones, and groundwater pumping into the shrimp farm to maintain a desired salinity level had generated seawater intrusion into the aquifer and problems for the local water supply. Also, effluents from the aquaculture activities complicated nearby water supply and irrigation.

Conceptual Renewals

In balancing essential human activities and needs against ecological impacts, a couple of useful concepts were highlighted. One was the environmental flow concept which is already included in the new South African National Water Act, where it comes second in priority only to water for drinking water supply. Another concept was Australia's "healthy rivers," describing rivers where a balance had been reached between human activities and ecosystem security.

Fundamental hydroclimatic differences came into focus, especially the high evaporative demand in the tropics. The result is land use effects on river flow not earlier paid much attention to in the temperate zone, where the evaporative demand is low or moderate. Also, the extremely severe Australian salinity problems belong to this category of unexpected side effects of European-type human behavior. A warning was in fact issued for essential differences between Afrocentric and Eurocentric approaches.

Moving towards catchment hydrosolidarity calls for a better grip on catchment complexity. To this end, the International Water Management Institute (IWMI) has developed the hydronomic area concept by subdividing the catchment from a return flow perspective. The area is divided into different zones based on the fate of the return flow of water after use in view of the opportunities for water reuse downstream. Does the water spontaneously return to the river system? Does it have to be pumped to get back to the system, or does it go to the sea, unavailable for reuse? Is the area a stagnation zone or maybe an ecologically particularly sensitive location? Such questions it hopes to answer.

Final Remarks

The seminar made very clear that human security and ecological security may be partly incompatible goals in a catchment. A central task for coming decades is therefore to develop methods and strategies for finding a balance between them. The central question is what will be needed to protect especially valued local ecosystems and to find ways to protect ecosystem resilience to disturbances.

What was clear is that land, water and ecosystems will have to be managed in an integrated way. Since water is a common denominator for all three, its movement through the catchment links them internally. Therefore, integrated catchment management offers an opportunity for taking an integrated approach in trying to orchestrate for compatibility. ■