

Compendium on Water and Ecosystems¹

Integrated Water Resources Management (IWRM), which has been inspired by the four Dublin Principles promulgated in 1992, has been promoted globally in order to manage water resources in a sustainable way. The first Dublin principle identifies fresh water as a finite and vulnerable resource, essential to sustain life, development and the environment. This implies that water is an integral part of an ecosystem and is a finite resource. The total quantity of available water in its various forms at different stages of the hydrological cycle is fixed and thus, cannot be altered.

Water besides being vital for basic survival, also supports ecosystems. In a sustainable system the amount of water needed for river and ground water systems to maintain themselves and their ecological functions, uses and benefit to people is termed as the “environmental flow”. These environmental flows must be seen within the context of applying IWRM in catchments and river basins as the basic unit. Environmental flows will only ensure a healthy river if they are part of a broader package of measures, such as soil protection, pollution prevention, and protection and restoration of habitats.

Anthropogenic activities could affect the “environmental flow” and productivity of water resources. They reduce the availability and quality of water by excessively tapping ground water, polluting ground as well as surface water and changing land use through deforestation, irrigated agriculture and urbanization. If water is stored or abstracted in large quantities in the upper part of a basin by either a dam or barrage constructed across the natural river course and prevents the water flow to the lower parts, there will be serious consequences on the ecosystems and people's livelihoods at the downstream though the total quantity of water passing through the basin hydrological cycle on long term average is the same, as before the construction. Therefore water movement in space and time in a river basin manipulated by humans is a very important aspect of managing ecosystems for sustainable development. This should not be decided by the party that benefits from such a manipulation and ideally involve all those who will be affected. The impacts on water quality due to human intervention have also become an integral issue due to intensive agriculture, industrialization and urbanization.

When decisions on water development projects are taken, proper assessment including benefits provided by the ecosystem services have to be accounted for. Environmental valuation through extended cost-benefit analysis has become an essential tool to take informed decision on water development projects.

A large section of population in South Asia also depends on services provided by the ecosystems for their livelihoods. Any impacts which deteriorate such services will have a direct impact on their well being and livelihoods. Therefore, linkages between ecosystem services, livelihood and development are important in determining strategies for sustainable management of ecosystems through participation of local groups.

In the absence of property rights, there are no “owners” of environment and the impacts are not immediate and direct. This basic fact led to the existence of poor institutional mechanisms especially in the developing world. Environment has been a victim of poverty and little has been achieved on the ground with regard to environmental governance irrespective of intervention of international agencies.

The present compendium is a collection of readings addressing the above mentioned concerns. The compendium adopts the format of the Staff Training in Water and Ecosystem co-organised by SaciWATERs and National Institute of Ecology in Kathmandu, Nepal from November 26-December 3, 2007. A brief account on the staff training is provided in the next section.

Resource material provided in the compendium is categorised into seven sections, (I) Ecosystem Based Approaches to Water Resources Management; (II) Environmental Flow and Ecosystem Services; (III) Application of Hydro-Ecology & Eco-Hydrology approaches in Integrated Water Resources Management (IV) Water Pollution and Ecosystem Monitoring (V) Ecological Economics for Water Resources Management (VI) Water-Agriculture-Food-Ecosystem Linkages (VII) Ecosystem Based Management and Stakeholder Participation. An overview of the readings along-with references is provided in Chapter III 'Resource Material in a Nutshell'.

¹ This introduction is based on the concept note was prepared for the Staff Training in Water and Ecosystem, co-organised by SaciWATERs and National Institute of Ecology in Kathmandu, Nepal from November 26- December 3, 2007.

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