



Photo Credit: IWMI



Issue 5 - 2010

Rapid desktop assessments of environmental flows

Environmental flows

More than 60% of the world's rivers are fragmented by hydrological alterations, with the result that aquatic ecosystems have become severely degraded. The ensuing environmental damage has prompted scientists to seek ways of incorporating demands for water from nature into river management plans.

IWMI's research in this area has led to several milestones. IWMI scientists pioneered the first-ever assessment of environmental flow requirements of rivers around the world; developed a Global Environmental Flow calculator, which enables rapid, desktop assessments of environmental flows anywhere in the world; and published reports which provided the first-ever crude estimates of environmental flows for all major Indian rivers, and a method for environmental flow calculation elsewhere in India.





Photo Credit: IWMI

Planning for large-scale hydrological alterations must take into account environmental flow needs.

Calculating environmental flows

The term 'environmental flow,' is used to define the amount of water required by a river to sustain its ecosystem. Estimating environmental flows is complex. Unlike other demands, where you can simply measure the amount of water required to grow a given amount of corn or rice, or generate a certain amount of energy, calculating environmental flows requires careful modelling of the natural ecosystem. It is not about the 'minimum' amount of water you need to have in the dry season but maintaining the river's natural rhythm of flow all year-round.

The world's rivers can be placed into six environmental management classes, ranging from unmodified' to 'critically modified.' The higher up the list a river is the greater the amount of water required to maintain or restore ecosystem functions. IWMI scientists pioneered the first-ever assessment of environmental flow requirements of rivers around the world and established that these requirements ranged from 20 to 50% of a river's mean annual flow. Subsequently, IWMI scientists developed a Global Environmental Flow Calculator, a software package that enables rapid, desktop assessments anywhere in the world.

In an effort to stimulate debate about environmental flows in India, IWMI scientists published the report, An Assessment of Environmental Flow Requirements of Indian River Basins, in 2006. The report gave the first ever crude estimates of environmental flows for all major Indian rivers, provided a rapid environmental flow assessment method and recommended the development of a longer-term environmental flow research

program in India. Subsequently, IWMI's environmental flow methodology was used by a high-level group formed by the Government of India to calculate environmental flow requirements for the Bhagirathi River, a source of the Ganges, in response to a proposal for several controversial dam projects.

In 2008, IWMI joined forces with WWF India for a three-year project entitled, For a Living Ganga. Using a detailed multidisciplinary approach, the project aims to estimate environmental flow requirements for the Upper Ganga, which is undergoing rapid development.

IWMI's research was widely published and reproduced in influential and popular sources including the Human Development Report in 2006, and a National Geographic issue in 2010. IWMI products are also used by many organizations around the world, including environmental protection agencies, consulting companies and research organizations. IWMI's research targets countries yet unexposed to environmental flow concepts, but are concerned with the status of their water resources. IWMI's physical presence in many such countries helps promote this concept.

Donors and collaborators

IWMI collaborated with World Resources Institute (WRI); University of Kassel, Germany; WWF-India; UNESCO-IHE Institute for Water Education; Sri Paramakalyani Centre for Environmental Sciences, Manonmaniam Sundaranar University, Alwarkurichi, Tamil Nadu, India; and the School of Environmental Sciences, Mahatma Gandhi University, Kottayam, Kerala, India, in the research. Financial support was provided by IWMI core funds, the CGIAR Challenge Program on Water and Food (CPWF) and the Comprehensive Assessment of Water Management in Agriculture.

For more information

IWMI reports:

An assessment of environmental flow requirements of Indian river basins.

www.iwmi.org/Publications/IWMI_Research_Reports/PDF/PUB107/RR107.aspx

Developing procedures for assessment of ecological status of Indian river basins in the context of environmental water requirements.

www.iwmi.org/Publications/IWMI_Research_Reports/PDF/PUB114/RR114.aspx

Hydrological and environmental issues of interbasin water transfers in India: A case of the Krishna River Basin.

www.iwmi.org/Publications/IWMI_Research_Reports/PDF/PUB120/RR120.aspx

Taking into account environmental water requirements in global-scale water resources assessments.

www.iwmi.org/Assessment/FILES/pdf/publications/ResearchReports/CARR2.pdf