

WG 1: Dams, irrigation and diversions

Preamble

Dam practices and the factors driving their construction vary within and between countries. Very few (if any) large dams are being planned in the North America and Europe. In Asia, the large and growing population combined with highly seasonal rainfall and need for economic development is driving the construction of dams. The needs and perceived benefits of dams in Asia are such that construction would certainly continue and thus there would be consequent influence on the global water system. Although opposition to dams due to perceived adverse impacts is also growing, inability to beneficially regulate rivers has led to excessive extraction of groundwater and associated problems.

In many regions, the local impacts of dams are well understood but the long-term, long-distance and cumulative impacts of dams are less appreciated partly because these have received limited attention. The term *cumulative impacts* includes two distinct outcomes:

- Life-cycle impacts describe the direct and indirect impacts of dams within the drainage basin and on receiving coastal waters, and
- Continental-scale impacts refer to the impacts of a group of dams on the regional/ global hydrologic cycle.

The effect of dams and their nature or construction and/or operation features are different in Asia than elsewhere in the world. Further, the cumulative impacts of dams in Asia are apparently higher than in other regions. In this connection, four overarching relevant issues are:

- Dams within a single country (or region) may be built for different reasons, can have different operation, local climate, socioeconomic conditions, and so on. Hence their impacts are likely to be different.
- The cumulative effect of large dams across Asia in terms of resettlement of people, submergence, sedimentation, nutrient storage/transport, evapotranspiration, local and regional biodiversity, etc. may be far in excess of impacts in other regions.
- The cumulative impacts of dams in Asia, superimposed on ongoing changes in land use /land cover and other landscape processes, have important implications on subsurface water, evapotranspiration, coastal ecosystems, and other aspects of the water cycle.
- There is a need to develop or transfer methods for assessing environmental consequences of dams (relates to capacity building) and to develop/transfer practices relating to dam-operation procedures that will minimize adverse impacts.

Benefits of dams to governments were widely known. Dam builders are also aware that dams could have negative effects but the overall view in Asia is that the benefits outweigh adverse impacts provided attention was paid to mitigate undesirable effects of construction and operation. Environmental impact assessments carried in past were rather short relative to the life of the dam. It is likely that long-term consequences of dams might not have been detected. In any case, these are not always well documented.

Purpose

Holistic case studies are needed to understand the cumulative impact of dams on hydrology, ecology, evapotranspiration, food production, industrial and socio-economic development, nutrient transport, biodiversity, coastal zones, and so on. Studies of impact of dams integrate hydrology, ecology, social science, economics, and governance. Thus, they provide a unifying theme to study the global water system and an opportunity to bring together disparate research groups.

The purpose of this working group is to identify and help in initiating studies on effects of dams, irrigation and long-distance transfers of (real) water in Asia on the local and global water system. A range of activities might be taken up: some with short-term (2-3 years) completion, and others with longer activity periods (up to 15 years). Potential studies will fall under activities 1.1, 1.4, 4.1, and 5.2 in the *Science Framework and Implementation Activities* of GWSP. This report has identified thematic working groups as a part of management structure of GWSP.

Other Tasks

Two other tasks that have been identified by the WG are creation of database on dams and organization of a workshop.

Creation of Database on Dams

There is a need for an Asian database on planned and existing dams indicating location, purpose, size and other features, submergence, operating practices, benefits etc., and information on their impacts (if available). Creation of database is important for two reasons. This inventory will help identify the need and focus areas of studies that should be taken up to predict the individual or combined effects of different dams. Secondly, it may be possible to derive generalizations or predictions of dam effects from knowledge of their characteristics.

Workshop

In the GWSP-Asia meeting at Kyoto in Aug. 2005, it was also proposed to organize a workshop on the theme of this WG. The first goal of the workshop would be to summarize existing state of knowledge on current cumulate impacts of dams in Asia. The second goal would be to set and launch a research agenda for dams in Asia: what opportunities exist and where, invite and formulate proposals for addressing them, and suggest how they could be best implemented.

Since GWSP is primarily concerned with regional-scale issues, these would have priority at the workshop. The workshop participants would be mainly national representatives plus some experts to lead discussion on cross-cutting issues.