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Book review

ICOLD Bulletin 149: Role of Dams in the Development and Management of River Basins

ICOLD, Paris, France, 2014, €56·00, 160 pp.

International Commission on Large Dams (ICOLD) Bulletin 149 (2014) provides a general review of the benefits and impacts of dam development on river basin management and is presented in six chapters. It will be of particular interest to those seeking a broad overview of the processes and challenges faced in considering whether dam development is the most appropriate tool in addressing particular human needs. A number of examples from around the world are provided, which highlight the challenge of mitigating the impacts of dam development.

The introduction cites the words of Nelson Mandela

> The problem is not the dams.
> It is the hunger.
> It is the thirst.
> It is the darkness in the township.
> It is the township and rural huts without running water, light or sanitation.
> It is the time wasted in gathering water by hand.
> There is a real pressing need for power in every sense of the word.

The bulletin states that ICOLD is developing 'an overview and analysis of the environmental impacts caused by the construction and operation of large dams'. An in-depth analysis is therefore not provided in this bulletin.

The stated objective of the report is to explain the role of dams in the development of river basins, recognising that dams are simply a tool for the management of water resources. The report states that at least 45 000 large dams have been constructed to meet water or energy needs and yet more than 1·2 billion people remain without safe access to drinking water. It also states that the true benefits and costs of dam development are often unclear as the social and environmental costs are not always fully accounted for. The vital role of river basins is stressed, recognising that integrated river basin planning and management is a very diverse process involving a wide range of economic, ecological and social goals.

Chapter 2 provides an analysis of the role of dams in river basins and their contribution in satisfying human needs. The difficulties in quantifying the role are explained in comparing different alternatives to produce the same effectiveness in meeting a need (e.g. 1 m^3 of water or 1 kWh of energy). It is noted that ICOLD hopes to release an independent bulletin on the models available worldwide for use in integrated river basin management, accepting that none can provide a perfectly holistic model to predict an expected 'human development index' (the UN metric for assessment of the social and economic development level of countries). To illustrate the 'empirical approach' to development, an interesting example is provided of Spanish dam development. Six generations of dam development in Spain are described covering local water supply, local electric power, irrigation, regional power supply, flood control and environmental mitigation (groundwater recharge). Sections on water supply, hydropower, irrigation, flood control, navigation and ecological mitigation provide numerous examples and statistics relating to various roles of dam development around the world.

The effects of dam development are covered in the third chapter. It references ten earlier ICOLD bulletins that directly relate to environmental matters from socio-economic impacts to sediment transport and aquatic life. No attempt is made to replicate material from these bulletins but this chapter provides a good overview of the main social and environmental issues commonly associated with dam construction.

Chapter 4 defines the sustainable development of river basins as 'development with acceptable effects on the physical, social, economic and natural environment, which do not compromise the use of the water resources for future generations'. In discussing the function of rivers, the bulletin makes the important point that river basins cross international boundaries and specific policies covering management and development are required. It argues that through the application of principles of sustainability whereby objectives are balanced to avoid the dominance of a single objective and respecting the ecosystem, future generations will not be faced with difficult or impossible challenges of restoration. The chapter concludes by noting that we are all stakeholders in the environmental health of our planet.

The decision-making process of dam projects is covered in Chapter 5. A 'total decision-making process' is recommended whereby there is a discussion of the alternatives to building dams and their associated social, environmental and economic consequences, undertaken in an open and participatory framework. The difficulty of evaluating social costs is recognised and examples are provided together with guidelines for undertaking cost–benefit analyses. The need to monitor the consequences of dam construction after completion is also recommended to enable evaluation of whether the goals of the project have been reached, to learn from past experience and to provide data to inform future decision making. This should cover the hydrological, environmental, social, economic and political impacts.

Chapter 6 concludes the bulletin by stating that mankind faces a number of challenges to its own survival and that dams represent one of a number of tools in managing river basins to the benefit of man. The challenge faced is to balance increasing water and energy demands with the inevitable adverse impacts associated with dam construction. It is stated that ICOLD might consider developing sustainability guidelines and assessment tools to assist in project planning, implementation and operation.

The bulletin will be of interest to anyone seeking a broader appreciation of the impacts of dam development and the challenges faced by governments around the world in meeting water and energy demands.

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