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IMPACTS OF LARGE DAMS

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The main question facing the developing countries of Asia, Africa and Latin America is not whether large dams have an important role to play in their economic and social development, but rather how best they can be planned, designed and constructed

Large dams, built to ensure water availability for domestic and agricultural purposes, have become very controversial, especially during the post-1985 period.

Proponents of large dams claim that they deliver numerous benefits which include increased and assured water availability for domestic and industrial purposes, increased agricultural production due to irrigation, protection from floods and droughts, generation of hydroelectric power, navigation and overall regional development which improve the standards of living of the population, including women and the underprivileged.

Opponents argue that dams contribute to major losses to the society, with social and environmental costs far exceeding economic benefits. They assert that dams accentuate unequal income distribution since benefits accrue mostly to the rich while the poor slide further down in the economic ladder. They claim that the main beneficiaries are construction companies, consulting engineers, corrupt politicians and government officials who promote such structures for personal gains.

The views of proponents and opponents have become more and more polarised in recent years, and neither have had any meaningful discussion to resolve the differences of opinion.

An important question that has to be asked is why in the 21st century, with major advances in knowledge, has it not been possible to answer the relatively simple question: what are the real costs and benefits of large dams to the society as a whole?

There are many reasons for this anomaly. However, the main cause is the way in which impacts (both positive and negative) are normally estimated. Governments and private sector companies have constructed hundreds of large dams all over the world in recent decades, often with the support of international organisations such as the World Bank or the Asian Development Bank. Before construction of any such dam can proceed, it is mandatory to analyse their social and environmental impacts. While thousands of such reports are available at present, it should be noted that such pre-construction reports are at best reasonable forecasts. Unfortunately, the number of large dams anywhere in the world where the social, economic and environmental benefits and costs that have been comprehensively and objectively assessed, even 10–15 years after their construction, is too few for the data to be meaningful.

The generalisations of the proponents and opponents are primarily made to justify their own firmly held dogmas and interests. In the cacophony of arguments, it is often forgotten that the

issues involved are complex and there are many intangible benefits and costs, and positions thus depend on the views and biases of the individual analysts. In addition, there is no single answer that could apply to all large dams all over the world, constructed or proposed, irrespective of their locations, sizes and local conditions.

It should also be recognised that the countries are at different stages of economic development and thus their needs for dams vary from one another. For example, an advanced country such as the United States has already developed its best and most economically viable dam sites, while most potential dams in sub-Saharan Africa (with the exception of South Africa) have yet to be constructed. Nepal has a similar amount of hydropower potential as the United States but it has developed only about 4 per cent of its potential. Thus, what may appear to be a good policy for dams in the United States at present may not be the best policy for dams in Nepal or countries of sub-Saharan Africa.

Rainfall distribution

An important issue consistently neglected in the debate is the distribution of annual rainfall in tropical and subtropical countries compared to those located in temperate zones. It is a curious anomaly of fate that developing countries are in



Image: COH CHAI HIN/AFP/Getty Images

In Zhangjiajie, Hunan, Chinese authorities took steps in 2005 to protect this species of salamander affected by damming.

the tropical and subtropical regions and developed countries are in temperate zones.

For example, if the average annual rainfall of Delhi and London are compared, one finds that they are very similar: 71 centimetres and 67 cm, respectively. In London, located in a temperate zone, the monthly average rainfall varies from a low of 35 millimetres in April to a high of 61 mm in October, which means that rainfall retained in the soil is reasonably uniform. In contrast, Delhi has only about 30 rainy days a year when daily rainfall is 2.5 mm or more, and the city receives nearly 90 per cent of its annual rainfall in about 80 hours (not consecutive). This skewed rainfall pattern can be observed in all the Asian monsoon countries. Due to this very high seasonality of rainfall, the most important requirement in such countries is how best to store such immense quantities of rainfall over very short periods, so that they can be used over the entire year, and also intra-annually with the objective of mitigating the impacts of prolonged droughts and floods.

Sadly, in developing countries such as India,

China or Pakistan, where the needs for storage are the highest, the amount of storage per person is very low (about 500 cubic metres/person in China, 200 m³/person in India and even less in Pakistan). In contrast, United States has over 5,000 m³ storage/person, which is 25 times that of India and 10 times that of China, even though because of rainfall patterns, countries such as India and China need significantly more storage than the United States. This essential fact has been completely missing in the current debates on large dams.

In order to contribute to a rational and objective debate on large dams, the Third World Centre for Water Management, the Lee Kuan Yew School of Public Policy, the Middle East Technical University and the International Water Resources Association have published a book to objectively and comprehensively assess the impacts of large dams from different parts of the world (*Impacts of Large Dams: A Global Assessment*, Cecilia Tortajada, Dogan Altinbilek and Asit K. Biswas, Springer, 2012, Berlin).

The main question facing the developing countries of Asia, Africa and Latin America is *not* whether large dams have an important role to play in their economic and social development, but rather how best they can be planned, designed and constructed wherever they are needed so that their performance in economic, social and environmental terms can be maximised and their adverse impacts, minimised. It is equally essential to ensure that those who may have to pay the costs for the construction of these structures (e.g. people who have to be resettled or whose livelihoods may be threatened) are made direct beneficiaries of these projects. There is simply no other policy alternative if the aspirations of the people in such countries have to be met. **GIA**

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