

DAMS AND DEVELOPMENT REVISITED

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ABSTRACT

Environmental activists in industrialized countries and their associates in developing countries have generated considerable controversy of late regarding dams. They targeted the World Bank in their own country and it set up a so-called World Commission on Dams (WCD). The report of the WCD has generated further controversies. The subject of dams and development is analyzed scientifically.

1 INTRODUCTION

There has been considerable controversy of late regarding dams. The so called World Commission on Dams (WCD) report, entitled Dams and Development, was meant to provide a scientific basis for the development of dams. Instead, it has created further controversy on the matter. The subject is, therefore, overviewed and analyzed to contribute to scientific undertaking of development of dams.

2 BACKGROUND

Dams have been built since time immemorial to store and modify the temporal variability of water. An era of constructing large dams started in industrialized countries in early twentieth century and several dams were constructed to manage their water resources as they embarked on their development. This phase of activity has now been almost completed in these countries. Construction of dams was undertaken in the developing countries as they attained their Independence in the mid- twentieth century. Development of water resources is at the top of their agenda in view of the socio-economic-environmental conditions and dams constitute an integral and important part of this task. China and India lead in the area, having built around 57% of the world's large dams and with many more to be undertaken (WCD 200).

Over the past thirty years, “the alliance of the northern activist groups (environmental and human rights groups) with NGOs and affected group's associations in the South, has resulted in a more vigorous and more coordinated opposition to dams worldwide.... World Bank became a priority target of dam critics, as it is often the first and largest financier of large dams”. (WCD 2000 p.19). As a result a Workshop was organized by the World Bank and the World Conservation Union (IUCN) in Gland, Switzerland in 1997 on the subject, which “set in motion the process that led to the formation of WCD...As defined by the Gland workshop, the Commission's two objectives were to: (1) Review the development effectiveness of large dams and assess the alternatives for water resources and energy development. (2) Develop internationally acceptable criteria, guidelines and standards where appropriate, for the planners, design, appraisal, construction, operation, monitoring and decommissioning of dams.” (WCD p28).

3 WCD REPORT

The report has been prepared in two parts: first global review of large dams and second by way of prescription under the title “The Way Forward”. In the review section performance of selected dams, some large and some not so large has been evaluated in technical, financial, economic, environmental and social terms. This is referred to as the knowledge base. The

knowledge base indicates that shortfalls in technical, financial, and economic performance have occurred and are compounded by significant social and economic impacts, the costs of which are often disproportionately borne by poor people, indigenous peoples and other vulnerable groups. This is followed by a chapter on range of options for the development of water and energy resources and another on process of decision making, planning and institutions responsible for construction of large dams.

Second part expounds the theme of human development, enhancement and goes on to propose a policy framework for development of water and energy resources in future. Within this framework the Commission has developed seven strategic priorities and related policy principles. It has translated these priorities and principles into a set of corresponding criteria and guidelines for key decision points in the planning and project cycles. It is claimed that together they provide guidance on translating the framework into practice. They help us move from the traditional, top- down, technology focussed approach to advocate significant innovations in assessing options, managing existing dams, gaining public acceptance and negotiating and sharing benefits. The seven strategic priorities are: (1) Gaining Public Acceptance, (2) Comprehensive Options Assessment, (3) Addressing Existing Dams, (3) Sustaining Rivers and Livelihoods, (4) Recognizing Entitlements and Sharing Benefits, (6) Ensuring Compliance, and, (7) Sharing Rivers for Peace, Development and Security.

The report moves from policy to practice. It identifies 5 key decision points in planning and project development in water and energy sector. The seven priorities and related policy principles are recommended to be implemented at each of these decision points.

It is claimed that “We have: (1) conducted the first comprehensive global and independent review of the performance of essential aspects of dams and their contribution to development. We have done this through an inclusive process that has brought all significant players into debate; (2) shifted the center of gravity in the dams debate to one focussed on investing in options assessment, evaluating opportunities to improve performance and address legacies of existing dams, and achieving an equitable sharing of benefits in sustainable water resources development; and, (3) demonstrated that the future for water and energy resources development lies with participatory decision-making, using rights-and risk approach that will raise the importance of the social and environmental dimensions of dams to a level once reserved for the economic dimension.” (WCD p xxxvii).

4 RESPONSE TO WCD REPORT

The report has generated violent reactions from one extreme to another and the conflict has become more intense as reflected in the diverse reactions. Whereas one section has called it harsh and gross rubbish, another has welcomed it with gusto. The top professional bodies namely ICOLD, ICID, and IHD have rejected the report. In the joint major comment they have stated the following (Kumar 2002).

The report does not reflect the fundamental purpose of development of reservoirs and construction of dams which is to support sustainable economic development, increase in consumption of water and energy which cannot be met without dams, especially since storage of water is unavoidable due to spatial and temporal distribution of water.

The group accepts WCD’s review of development effectiveness and its constructive initiative such as studies to develop portfolios of broadly acceptable projects; involving the affected people and making them beneficiaries and guarantees for social and environmental mitigation works. However, it feels that the report is unbalanced in so far as it ignores, major benefits accruing to large mass of people. It ignores that the performance in irrigation sector is much better than ‘no project’ alternative. There are several other such lapses. Concern was also felt

about suitability and bonafides of the commissioners. It was considered that the Commission is heavily tilted in favor of environmental and social concerns.

MOWR, which along with China is the largest builders of dams, expressed similar views. The Ministry was also concerned about the country paper, which was got prepared by a team, the majority of whom had not got enough experience with dams, water resources and energy development, when there are large number of leading experts. There were also large factual errors. Similarly, the Chinese representative on the Commission withdrew himself.

5 PERFORMANCE OF DAMS

Reference performance of dams constructed in the past, it is well known, it is not as good as it could have been but the fault is not with dams as technological choice but is on account of several other factors. It is well accepted that the advances in scientific development were made after the era of large scale water resources development in the industrialized countries, particularly USA, was over and even during this period, or even currently in these countries, the modern advances are not being fully incorporated in practice (Hall and Dracup, 1970; Rogers and Fiering 19 86). The poor performance of dams in these countries is thus on account of lack of scientific developments in the past and several practical reasons such as delays in construction and so on.

The position in developing countries is different. Focussing on India, water resources had been developed under the British colonial regime but only diversion structures and canals to transfer the low flows after monsoons, for irrigation were constructed. From a constellation of technology, economy, finance, management and policy considerations an apology of irrigation was provided to stabilize the sustenance agriculture. There were no storage works.

Water resources development was given the highest emphasis after Independence to meet the food shortages and requirements of the increasing population. Construction of dams was an important feature in view of the hydrologic-climatic conditions. The precipitation is confined to about 4 monsoon months of June, July, August and September, and that too over few days of heavy rains, when about 80 to 90 percent of the annual rainfall takes place.

Indigenous capability was tried to be built rapidly, but to start with the practices adopted in USA were followed¹. Engineers were sent to USA to study the latest technology and technical help was also provided by the US Bureau of Reclamation and the US Army Corps of Engineers. The planning and design of dams, in the earlier stages, followed the traditional approach, as in USA. Further, these dams were part of the existing irrigation system of diversion canals which had been developed to stabilize a sustenance agriculture, rather than providing timely, reliable and adequate supplies for modern agriculture with high yields. These storage structures only contributed to expansion of the system, continuing to provide an apology of irrigation. Concern about environment and humanitarian aspects had not developed as yet. These aspects were, unfortunately, neglected. Yet, wherever dams were introduced in the system, considerable development has taken place.

The difference in the development of the western and eastern Indo-Gangetic plains, where about 15 percent of the humanity, which is the poorest of the poor lives, is glaring testimony of positive contributions, on the balance, of dams to development. Dams have been constructed on the Indus system in India in the west, while they have not been constructed on the Ganges and its tributaries (except one on Ramganga) in the east. Floods have been controlled, better and more extended irrigation is available, and hydroelectric power, besides contributing to industrial development has led to development of private tubewell, on the Indus system. As a consequence, the Green Revolution took place in this region. No such impact has been introduced in the Ganges basin. The GNP per capita of the former region is almost twice that of

the latter. Detailed studies of the impacts of several dams confirm the glaringly evident testimony.

Several conclusions follow. One, even with the shortcomings of the technology prevalent when dams were constructed in the industrialized countries, the impact, on the balance, at least in socio-economic-environmental conditions of India was markedly positive. Thus the findings about the adverse impact of dams of the past, as arrived at by the WCD are not correct, as far as the Indian experience is concerned. Second, the overall balance would have been even better if modern technology, as is currently being followed, were to be adopted. Third, if the modern technology had been adopted in the industrialized countries or elsewhere when the dams were developed, the impact of dams would not be as identified by the WCD. Thus the fault lies not with dams but with their design in the past. Therefore, the findings of the WCD regarding dams, besides being fallacious should not be projected to dams of the future as considerable advances have taken place in the area, which will contribute to positive impacts and minimize the negative impacts. Fourth, one of the most disturbing activities regarding impacts of dams on society and environment is the disruption caused by the activists of the industrialized countries and their associates in developing countries who have little stake in the development of the country or the people. The case of the Sardar Sarovar Project is a classic example as brought out by Chitale (1997). It is very well planned and designed. Environmental enhancement of the entire command area is being undertaken by planting trees, and developing sanctuaries as water becomes available. The ratio between the population displaced by submergence and the agricultural population benefited is 1.37 % even if only the land-related beneficiaries are concerned. If the population receiving benefits from supply of drinking water is taken into account, the ratio between the affected and the benefited is only 0.3 %. The resettlement work of the displaced oustees is being undertaken with the principle objective of improving their standard of living. NGOs have been involved in this work. The support of the people for the project is brought out by the fact that after the World Bank withdrew the support to the project, deep discount bonds and debentures were floated for the project, which have been over subscribed by the local people.

6 DAMS FOR DEVELOPMENT -A PERSPECTIVE

There is no alternative to dams in water resources development considering river basin development. They are an integral and important part of a portfolio of activities for development of water resources of a river basin. Reference to a typical real life case in India will illustrate the subject. Figure 1 shows the scheme of development of one of the tributary systems of the Ganges-Brahmaputra-Meghna system. The diversion canals, Western Yamuna Canal (WYC), East Yamuna Canal (EYC), Agra Canal, were constructed on River Yamuna. Similarly, Upper Ganges Canal (UGC), and Lower Ganges Canal (LGC) were constructed on River Ganges. These were constructed about one and a half-century back. The policy was to divert all the post-monsoon low flows for providing an apology of irrigation to stabilize sustenance agriculture. In this process the rivers became almost dry. With the exploding population, there is urgent necessity for increasing irrigated area and introduce modern dependable, adequate and timely supplies. In addition with rapid urbanization and industrialization the rivers have been turned into open gutters. There is urgent need to increase the low season flows to improve river water quality and provide drinking water to people. Unless, the dams as being constructed or proposed to be constructed are developed urgently, it will not be possible to meet the challenge of providing water for irrigation, water supply or environmental restoration or to mitigate the floods. The non-dam options such as demand-side management, supply efficiency and new supply options are also important but they follow development of dams because unless better services of reliable, adequate and timely supplies are provided they cannot be introduced. Even groundwater development cannot be undertaken unless energy is made available.

The WCD has also mentioned alternatives for energy besides hydroelectricity. This is a complex subject and much work has been done in this context which is briefly summarized by

Chaturvedi (2003). Some other important studies may also be mentioned (PCAST 1997, 1999; UNDP 1997). The analysis by WCD does not bring out the latest thinking on the subject. To mention one important issue, not generally emphasised in literature, one great advantage of hydropower is the integrated development of water and power sector, which contributes significantly to, enhanced benefits in both the sectors. (Chaturvedi 1987, 2002, 2003a, 2003b).

Long-term perspective of development of water resources of the region brings out the portfolio of activities to be undertaken to develop the water resources. It clearly stands out that dams are essential for sustainable development of water resources. (Chaturvedi 1985,1991, 2003c). Analysis of water resources development on the national level also brings out that large number of dams will have to be built for sustainable development of India's waters (NCIWRD 1999, Chaturvedi 2001, 2003b). The central issue is that they have to be developed increasingly scientifically.

WCD's report brings out an obsession with involvement of the stakeholders. It is important that the stakeholders be involved in decision-making and should be well informed. This has been neglected in the past. But there are practical problems in real life and the democratic governments are the best judges as to who are the stakeholders and how they should be involved. For example, in any large dam to be developed the entire river basin or even the entire country becomes the stakeholder. A point to be emphasized is that the international donor agencies and the international community of environmental activists are certainly not the stakeholders.

7 PROCESS OF PLANNING

The process of planning of dams is much more complicated than described simplistically by the WCD. Much work has been done in this area and an entire science of water resources systems planning has been developed (Loucks et al 1981, Chaturvedi 1987, Chaturvedi and Rogers 1985) Further advances have been made recently in the context of sustainable development (Loucks and Gladell 1999). Further advances in the context of environmental systems planning have been made (Chaturvedi 2003a).

To give an example, Fig.1 illustrated a real life case of a complex of dams. This is only part of the river basin, where there are several such complexes. Much creative engineering and scientific analysis is required to work out an integrated development of the portfolio of activities for development of water and energy resources (Chaturvedi, 1987, 1991, 2003c). It is necessary that participatory decision making is undertaken and the neglected social and environmental dimensions of dams are given due importance but this should not become an obsession as with WCD.

8 THE PROCESS OF WCD

More than the WCD study, which has been found to be inadequate and erroneous, it is the process of setting up the so called World Commission on Dams, which is found to be irksome by the scientists of the developing countries, and the MOWR. As the MOWR noted the people associated with WCD did not arouse respect for their knowledge of the subject, to say the least.

Water resource development of the future is predominantly in the developing countries, with China and India occupying the leading positions. The finances come from the Government of these countries. The World Bank contributes only 5 percent and that of the private sector marginal (WB 2002 p29, 38). The challenge of water resources development is, thus, to the scientists of these countries. As has been emphasized of late the central issue is developing attitudes to achieve leadership in the area. Culture counts (Harrison and Huntington 2000). The developing countries, India and China particularly, have to try to achieve global leadership in

the area, as historic experience suggests (Yamumara 1994, Chaturvedi 2003a). This should be undertaken as a Project, starting with humility to learn of the advances in the industrialized countries (Chaturvedi 1993).

9 CONCLUSION

Dams are crucial for water resources development in the conditions of South Asia, Southeast Asia, and many other developing countries. There is no alternative to them for water and energy development. They are part of a portfolio of developmental activities. Developing dams for sustainable development is a complex scientific- engineering subject to be undertaken with increasing creativity and analysis with transparency and participatory development. The challenge is first and foremost for the scientists of the developing countries who can best appreciate the complications of the matter as emphasized by Bower and Hufschmidt (1984). The WCD report is simplistic and unrealistic. The failure of WCD or the environmental activists of the industrialized countries and their associates in developing countries, to understand this simple fact is understandable. Their effort and activities are unfortunate.

Notes

1. The author occupied a leading position in his effort. After designing three major projects, including two major dams, he went to USA for his doctoral studies, and has since been on the Board of Consultants of several major dams including two of the world's highest. Systems planning of several river basins, having several dams has been carried out. One complex is shown in Fig.1.

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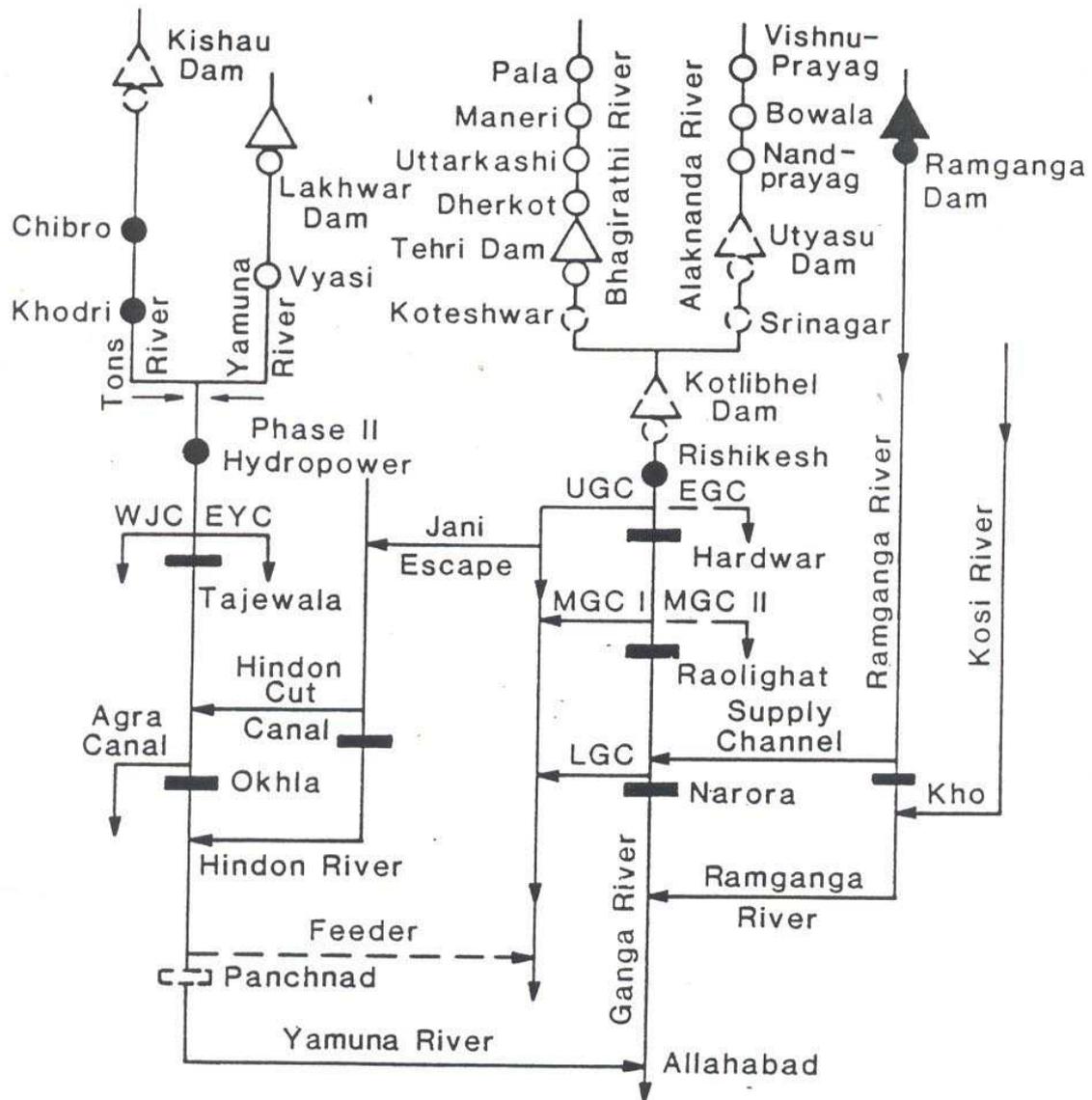
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Dams: Proposed, Under Construction, Constructed

Barrage: Proposed, Constructed

Canals: Proposed, Constructed

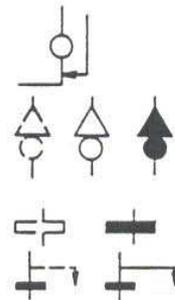


Fig. Line Diagram Of Yamuna - Ganga System