

Water versus power: Role of dams in geopolitics of Ganges basin

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Abstract

This paper aims to find out the sources of social and regional conflicts due to existing dams in Ganges basin and analyse the viewpoints of Bangladesh, India and Nepal in future co-operation and demands from the prospective large dams in the basin. Farakka dam in Ganges basin is a name of nightmare for 140 million people of Bangladesh. Sarada, Kosi and Gandhak barrage in India-Nepal boarder, were seen as a “sell-out” by many in Nepal. Though these dams are considered reasonable from India’s viewpoint, Bangladesh and Nepal’s viewpoint are opposite. Some prospective large storage dams in upstream Nepal are the matter of hopes and prosperity for 534.3 million people of the riparian countries. But adverse effects of the existing dams in Ganges basin create a sentiment to the people of Nepal and Bangladesh, “No deal is better than a bad deal”. This paper figure out four types of prospective benefits from integrated management of Ganges basin, i.e. benefits to the river; benefits from the river; reducing costs because of the river; benefits beyond the river, which will create “win-win” situations that would be reasonable to be accepted by each country in the basin and which in turn promote regional co-operation, socio-economical, and environmental benefit for the people of Ganges basin and also provide as a good example to resolve the regional conflicts in various river basin’s in the world.

Key words

Ganges Basin; water conflict; regional co-operation; integrated Ganges basin management; mutual benefits

INTRODUCTION

The basin is located 70°-88°30’ east longitude and 21°-31° north latitude (Payne et al. 2003). The river Ganga rises in the Gangotri glacier in the Uttar Kashi district of Uttar Pradesh province in India, at an elevation of about 7,010 m above sea level. After leaving Uttar Pradesh the Ganga enters in Bihar in Rohtas district. As it enters in West Bengal province it swings round the Rajmahal hill ranges and starts flowing south. Nearly 40 km below Farakka it is divided into two arms. The left arm is called Padma and flows eastwards into Bangladesh and it right arm called Bhagirathi continues to flow south in West Bengal. The Bhagirathi flowing west and south west of Calcutta is called Hooghly. After reaching Diamond Harbor it attains a southward direction and it divided into two streams before joining the Bay of Bengal in Dhavlal. The rest arm known as Haldi river also joins the Bay of Bengal (Upteri 1993).

After entering Bangladesh completely, it flows for another 113 km before joining Brahmaputra near Goalanda. Downstream of Farakka, there are only two tributaries that join the Ganges- the Mohananda and the Baral. The combined course of the Ganges and the Brahmaputra takes the name of Padma, which joins the Meghna at Chandpur. From this confluence, the combined course of the three rivers continues as the lower Meghna into the Bay of Bengal. The Ganges has total length of about 2,600 km and the total drainage area is of about 1,087,300 km². Major rivers of Nepal that feed the Ganges are Mahakali, Karnali, Gandak and Kosi. The rivers of Nepal contribute more than 40 % of the total flow of the Ganges and over 70 % of its dry-season flow. Water storage potential in Nepal is 88 bcm (Tanzeema et al 2001; Onta 2001 and Biswas 2001).

Table 1: Ganges basin area and population distribution

Country	Basin area (km ²)	Percentage of total area	Population (million)
China	33,520	3.08	-----
Nepal	147,480	13.56	22
India	860,000	79.10	270
Bangladesh	46,300	4.26	52
Total	1,087,300	100.00	344

Sources: Shrestha and Singh 1996; Onta 2001

In absolute terms, the total amount of water in Ganges basin is enough to meet the social, economical and environmental requirements of the riparian countries. A large number of people of the area live below poverty line. Land man ratio and per capita food grain availability are steadily declining. Ironically Ganges basin is among the poorest and most depressed in the world despite its rich natural endowments of land, water and people. The integrated development and utilisation approach of Ganges basin's huge natural resources have never been sought by the regional countries due to past perceptual differences, legacy of mistrust, lack of political vision, and lack of goodwill (Ahmed et al. 2001).

This paper first outline short overview of existing dams, bilateral water agreements and their roles in geopolitics of Ganges basin. Secondly, this paper focuses the views of three riparian countries for an integrated Ganges basin development. Finally this paper analyses out the areas of potential fields of cooperation and benefits in Ganges Basin between three riparian countries. I categorises the benefits of integrated Ganges basin development into four groups according to the framework developed by C.W. Sadoff and D. Grey (Sadoff & Grey 2002), (1) benefits to the river; (2) benefits from the river; (3) benefits because of the river; and (4) benefits beyond the river. Fortunately, these four types of benefits are achievable in Ganges basin through an integrated Ganges basin management. These will offer "win-win" situations for all riparian countries that would be reasonable and acceptable to be accepted by every country. Integrated Ganges basin management has the potential to improve economical, socio-environmental, and overall situation of riparian countries dramatically.

EXISTING DAMS

Dam in Bangladesh-India border: Farakka Dam

Farakka dam is a serious hydroelectric affair for Bangladesh. It stands close to the point where the main flow of the river enters Bangladesh, and the tributary Hooghly continues in West Bengal past Calcutta. The dispute started in 1951 when India decided to construct the Farakka barrage in order to divert waters from the Ganges River to the Hooghly River in order to maintain navigability of this river and flush out the silt deposited in the Calcutta Port (Kilot et al. 2001) This barrage that feeds the Hooghly branch of the river by a 26-mile long feeder canal, and its water flow management has been a long-lingering source of dispute of Bangladesh and India. Farakka dam was built without the consultation with the downstream riparian state Bangladesh (Payne et al. 2003) and began operation in 21 of April 1975 (Abbas, 1982). Flooding in monsoon and reduction of flow on dry season causes tremendous

socio-economic, and environmental loss for Bangladesh (Huda 2001). Bangladesh claimed that excessive withdrawal of Ganges water at Farakka in West Bengal and further upstream of the river for about 28 years, effected not only agriculture but also fishery, navigation, industry and vegetation in the region that comprise about one-fourth of the landmass comprising Bangladesh. Salinity has intruded more than two hundred miles inland as the Ganges no longer carried enough water to flush its distributaries that empty into the Bay of Bengal (New Nation 2003). The dispute concerns the quantity of Ganges water that India was ready to release from the barrage for the Bangladesh's usage that Bangladesh claimed was insufficient for them. Bangladesh even submitted complains against the Farakka to the UN General Assembly in 1976 (Kitol et al. 2001). In 1993, Bangladesh again complained UN General Assembly about the misery of Bangladeshi people due to Farakka Barrage (Ahmed 2003).

Dams in Nepal-India border

Sarada (1920), Kosi (1954) and Gandhak (1959) barrage in India-Nepal boarder were seen as a “sell-out” by many in Nepal. These large dams in Ganges basin were wholly financed by India and mostly benefited India (with the only benefit to Nepal being a specified supply of water for irrigation and entitlement to power). These barrages were constructed on or close to the Nepal-India border and were based on India's initiatives and needs (Onta 2001).

PAST COOPERATION BETWEEN RIPARIAN COUNTRIES

An important factor in the context of managing Ganges water is the fact that Nepal controls the headwaters of the Ganges and regional development of the Ganges is being limited to bilateral talks and arrangements and this approach may adversely affect each of the riparian states. Recently, although bilateral, a climate of mutual trust and confidence has been created through the signing of the *Mahakali treaty* between India and Nepal (January 1996) and the *Ganges Water Sharing Treaty* between Bangladesh and India.

Bangladesh-India Cooperation

The first water sharing agreement regarding Farakka was signed between India and Bangladesh, on 5 November 1977, for the duration of five years. According to that treaty water was distributed based on a schedule on 10- day basis in the dry season (January-May). The agreement was expired in November 1982, but due to lack of progress on flow augmentation the agreement was not renewed after its expiry (Tanzeema et al. 2001). After 14 years, an agreement between Bangladesh and India on Sharing the Ganges water “*Ganges Water Sharing Treaty*” signed on 12 December 1996. As per treaty the two countries are to have equal shares if the water available at Farakka is 70,000 cusecs or less. However, in case the availability of water at Farakka is up to 75,000 cusecs, Bangladesh share will remain fixed at 35,000 cusecs while India will get the balance of flow. In case the water available at Farakka is in excess of 75,000 cusecs, India will get 40,000 cusecs and Bangladesh the balance of flow. But according to the Joint Rivers Commission, Bangladesh, during the first ten days of January the shortfall in Bangladesh's share was nearly 13,000 cusecs. But all of these have been found to be approximately 50 % less than the pre-Farakka average flow at Hardinge Bridge point of Bangladesh, which means that signing of the Treaty in 1996 is unlikely to make any noticeable difference in solving the water crisis in the dry season in the south-western part of Bangladesh (Tanzeema & Faisal 2001).

Indo-Nepal Cooperation

The Sarada barrage on the border river Mahakali was constructed by India in 1920 after exchanging some land between Nepal and India. In 1954 (subsequently revised in 1966), India and Nepal signed an agreement to construct the Kosi barrage at Bhimnagar. The agreement to construct the Gandak barrage at Baisaltan was signed between Nepal and India in 1959 (subsequently amended in 1964). These barrages are wholly financed by India and mostly benefited India. These early Indo-Nepal water resources co-operation were seen as “sell-out” by many in Nepal, although it was considered reasonable from India’s viewpoint. India’s water resources development in the international river close to the border of Nepal has been perceived as “not-so-friendly activities” by Nepal. This acute mistrust even led to adopt article 126 (2) in the Nepal constitution, which requires that any “treaty” pertaining to natural resources and certain other matters to be ratified by a two-thirds majority by the country’s parliament (Onta 2001). The *Mahakali Treaty* was signed on January 1996 between Nepal and India concerning the integrated development of the Mahakali river including the Sarada barrage, Tanakpur Barrage and Pancheshwar Project (Malla et al. 2001).

VIEWS OF RIPARIAN COUNTRIES IN GANGES BASIN DEVELOPMENT

While analysing the view points of each country for Ganges Basin Development it reveals that India and Nepal want to exploit the basin’s huge hydroelectric power-generating potential (table 2& 3), whereas Bangladesh wants the water managed in such a way as to minimize flooding during monsoon months and water shortage during dry months.

Table 2: Hydropower potential

India	45,635 MW (economically acceptable)
Nepal	83,000 MW (estimated), 42,000 MW (economically acceptable)
Bangladesh	-----

Source: Shah, 2001.

Table 3: Identified hydropower potential in Nepal

River basin	No. Of sites	Identified power potential (MW)
Sapta Koshi	40	10,860
Gandaki	12	5,270
Karnali	7	24,000
Mahakali	2	1,125
Other southern river	5	878
Total	66	42,133

Source: Onta 2001.

Bangladesh has suffered from severe water shortage in the past and will continue to rely on Ganges in the future as its main supply of water. Bangladesh strongly advocates implementation of large dam

projects upstream reaches of Ganges at appropriate sites under a comprehensive regional plan to be chocked out jointly by the co-basin country. Bangladesh wants Nepal to construct large storage dams to regulate the lean season flow of the Ganges and augment the Ganges water so that the needs of both India and Bangladesh in lean seasons could be catered for. The total storage capacity of high dam projects in Nepal's of the order of 88 bcm of live storage that would regulate over 95% of the total annual flow (Bangladesh Nepal Joint Study report). The storage reservoirs can hold the vast monsoon runoff within Nepal and they will play a very significant role in mitigating adverse flood in India and Bangladesh. Augmentation potential in Nepal during the dry season can range from 2,400 to 4,950 cumecs. These incremental flows alone are over four times the present lean season flows in the Ganges at Farakka. A single storage facility such as the Karnali project alone has the augmentation potential to more than double the existing flow low flow of the Ganges (Huda 2001).

On the other hand India wants to develop inter-basin transfer of water from the Brahmaputra basin to the Ganges Basin through a link canals as the Brahmaputra has plenty of water mostly untapped. India highlighted that this inter-basin transfer of water would be feasible to minimise the flood hazards as the floods in the Brahmaputra came in advance of two months compared to the Ganges. But Bangladesh showed negative views about this proposal, as it would create the same problem like Ganges in Farakka. India doesn't want to construct large dam projects in Nepal, as there are possibilities to be dependent on Nepal for water.

Nepal wants to sell hydropower to India and Bangladesh and also wants to be benefited from enhanced/developed inland waterways in one of its major rivers, mainly the Kosi, to have access to the sea for its export trade. In the case of augmentation of low flow in the Ganges at the Farakka barrage, the Kosi high dam would be an appropriate scheme because of its proximity to Farakka, and Nepal should seek access to the sea by developing a navigation channel from Nepalese territory. Nepal wants to get reasonable share from the proposed high dam projects and wants that those high dam will be fully constructed in Nepalese territory. In Nepal, opinion is that "no deal" is better than a bad deal. Nepal hopes that sooner or later India will listen to Nepal's concern (Onta 2001).

POTENTIAL BENEFITS FROM COORDINATED DEVELOPMENT

In absolute terms, the total amount of water in Ganges basin is enough to meet the social, economical and environmental requirements of the riparian countries. Coordinated management approach of an international river could offer four types of benefits, benefits to the river; benefits from the river; reduction of costs because of the river; and benefits beyond the river (Sadoff & Grey 2002). In case of Ganges basin these four types of benefits is achievable. Below, I am shortly summarising these four types of benefits in Ganges basin.

Benefits to the river

The deterioration of both surface and ground water quality is now a serious concern for all riparian states in Ganges Basin. Integrated river basin management of Ganges basin will offer the opportunity to improve water quality, sustaining biodiversity, maintaining river flow characteristics, and industrial pollution to the river. Joint cooperation in water quality monitoring at all rivers in the basin, inter-country standardisation of water quality parameters, real time data exchange regarding water quality through an integrated mechanism will ensure safe and cleaner water quality. By achieving cleaner

water quality, the fisheries sector could be developed. One of the main challenges for water quality improvement in international rivers, streamlining legislation for improving water quality, also can be achieved through cooperation between riparian countries. As for example “EU Water Framework Directive” (2000/60/EC) adopted by European Union is playing an important role for achieving overall water quality in Europe.

Benefits from the river

Coordinated Ganges basin management has the huge potential to improve the overall economical situation of the three riparian countries. The most imminent fields of development are hydropower, meeting the agricultural needs for the increasing population of the basin, and flood and drought management. To achieve Millennium Development Goals (MDGs) in Bangladesh, India and Nepal, integrated management of Ganges basin is the best tool. Most importantly MDG number one, “To halve the proportion of people living on less than 1 dollar per day and the proportion of people suffering from hunger”, is definitely achievable through coordinated management. Perhaps, this is the only way to achieve so.

Nepal’s 83,000 MW hydropower potentials can be utilized efficiently, which could meet the demand of India and Bangladesh, and hence promote industrialisation and other economic activities. Although the identified economically feasible potentials are about 40,000 MW, in modest load curve, Nepal’s energy market lies in the northern and eastern regions of India as well as Bangladesh and possibly even in Pakistan. The installed power capacity of Bangladesh is only 3,000 MW and the country’s hydropower potential is limited due its flat terrain. India’s total installed hydropower generation capacity is about 22,000 MW, which is only 25 percent of the country’s total installed power capacity. India’s demand for electricity is growing at an average 8-9 percent annually (Ahmed et al. 2001). As for example, Northern India, alone, remains short of power to the tune of more than 50,000 MW (Institute of Integrated Development Studies, 1997; cited in Onta 2001). To meet the growing demand for electricity and hence to ensure common economic development of the Ganges region, the international cooperation between the riparian countries is necessary to exploit Ganges huge hydropower potential through a regional grid. Hydropower is a renewable source of energy, which also does not emit greenhouse gases (except little amount due to rotting vegetation in reservoirs) and cost effective. The integrated regional development for proper utilisation of Ganges hydropower potential will not only ensure economic sustainability, but also ensure a sustainable environment for future generation of Ganges water citizens.

Wise management of Ganges water through large-scale storage dams and reservoirs in upstream, will facilitate and ensure the flow of water during dry season and hence increase agricultural activity. This integrated approach will also reduce the threat of sudden flooding every year, especially in downstream India and Bangladesh. The total storage capacity of high dam in Nepal is about 88 billion cubic meters of live storage, which is enough to regulate 95 percent of the total annual flow (Bangladesh-Nepal Joint Study Team 1989, cited in Huda 2001). Adverse devastating floods are creating enormous loss to Bangladesh. *Flood Action Plan* efforts taken in 1990 by Bangladesh government after devastating flood of 1988 were abandoned in 1996 due the fact that effective flood control measures need cooperation from upper riparian countries (Bangladesh Ministry of Water Resources 1997). This kind of flood can only be managed upstream in Nepal and India.

Besides flood control the stored water would help for augmenting the flow of Ganges during dry season. The fact remains clear that the dry season flow of the Ganges at Farakka is insufficient to meet the water demands for both Bangladesh and India. Nepal's augmentation potential, which is about 2,400 to 4,950 cumecs, alone are over four times the present lean-season flows in the Ganges at Farakka. This regulated flow can be also used to irrigate 27 million hectares of land and most of this water will be utilised by water-hungry co-basin countries, India and Bangladesh, since Nepal has very limited agricultural land (Huda 2001). This will enhance the quality of life in the region through achieving nutritional self sufficiency.

Water regulation in Ganges basin will also offer other tangible benefits. Nepal is a landlocked country and north-eastern states of India are seeking for direct access to other parts of India. Flow augmentation in Nepal could ensure round the year navigation and also provide a riverine transit through Bangladesh from Nepal to seaport and direct access for the north-eastern states of India (Huda 2001; Onta 2001). India can be benefited economically through getting cheap electricity from Nepal and also generating their own hydroelectric potential, ensuring water in dry season, and mitigation of floods. For Bangladesh, the downstream country of Ganges basin, the most important benefit will be its mitigation of floods that causes a usual threat to their agriculture, their economy. By giving transit to India, it can also earn huge customs levy.

However, for the achievement of successful cooperation between the countries, political vision; wisdom; mutual trust and goodwill are necessary. All major infrastructures can be co financed by three riparian states and managed by a coordinated organisation through win-win tradeoffs. As for example, in the Senegal Basin, there are co-owned infrastructure assets with a legal and institutional framework. The Manantali dam is located 300 km inside of Mali but jointly shared by Mauritania, Mali and Senegal. Lesotho is earning 5 % of the country's GNP from the transfer of water to Gautang, South Africa (Sadoff et al. 2002).

Reducing the costs because of the river

The control of rivers and river flows has long been a source of political tensions, an issue of sovereignty, strategic necessity, national pride, and occasional exchange of fire, between Arab and Israelis; Indians and Bangladeshis; Americans and Mexicans; and all 10 riparian countries of Nile Basin (Beach et al. 2000). Sadoff and Grey (Sadoff et al. 2002) mentioned that water plays a significant part in a number of recent and current disputes and conflicts around the world, so it is difficult to unbundle the importance of shared waters in the dynamics between riparian states from other contributory factors in conflict. International cooperation can ease tensions over shared water, and provide gains in the form of the savings that can be achieved, or the costs of non cooperation or dispute that can be averted. These tensions and costs are always present at a very high degree in case of Ganges basin and create enormous challenges for regional development. Long-term benefits from cooperation in Ganges basin development may save the costs of non-cooperation arising because of the river (Sadoff et al. 2002).

Water is a source of conflict, mistrusts, and disputes between the three riparian states of Ganges basin. Indian diversions of Ganges water through Farakka barrage, is a long-term source of tremendous political tensions, mistrust and non-cooperation between India and Bangladesh (Beach et al. 2000). In case of Sarada barrage (1920), Kosi barrage (1954) and Gandak barrage (1959), was seen as a no friendly activities in Nepal (Onta 2001). India's recent \$125 billion *River Interlinking Project* already

creates tension in the region. Environmentalist fears that this unilateral plan may create a long-term crisis in the region (The Guardian, 24 July 2003). Recently Bangladesh Government placed an official note to India claiming that this plan will create a serious water crisis in Bangladesh. Bangladesh fears that diversion of water from the Brahmaputra and the Ganges, which provides 85% of the country's fresh water flow in the dry season, would cause an ecological disaster (BBC, 2003). Integrated development of Ganges Basin can ease tensions over shared waters, regional relations, and political economy impacts and it has the potential for shifting policy to cooperation from disputes, and a policy shift to food and energy security away from self-sufficiency. All previous water management approach in Ganges basin was bilateral. If Ganges basin can be managed by an integrated plan with the participation of all riparian countries, it will reduce the risks for conflict and even in some cases, reduce military expenditure. Coordinated international approaches in any multilateral water project will relief this kind of tension between countries.

Co-operation with regards to share water in Ganges basin definitely strengthen relations between riparian countries and catalysing broader co-operation, integration, and stability. Cooperation in shared water resources between countries will enhance the cooperation and integration in other fields *beyond the river*.

Benefits beyond the river

Cooperation in the management of international rivers often contributes to the political processes and institutional capacities that open the door of other coordinated actions between riparian, promoting cross border cooperation beyond the river. Improved coordinated management of rivers offers the opportunities of development in regional infrastructure, markets, and trade. The easing of tensions between the riparian states due to water sometimes offer cooperation in other sector unrelated to water that would not have been feasible under strained relations (Sadoff et al. 2002).

The indirect opportunities for development through integrated management of Ganges basin are regional trade relations, industrialisation due to the available hydropower, educational development through the exchange of expertise in different sectors, cross border relationship due to ease of tension, gas export from Bangladesh to India, achievement of development and stability in Northern part of India through a easy communication by transit through Bangladesh, regional cooperation in health sector. As whole world is now passing through a new era of regional coordination (i.e. European Union, ASEAN, NAFTA), this kind of cooperation will facilitate the regional integration between the countries in South Asia. The Ganges basin cooperation will create a web of interdependency between riparian states due to its major role in energy, agriculture, and flood control roles. As for example, Thailand and Laos continued their relation in hydroelectric trade during the period of tensions between the countries in the last decade, which enables them to build their friendly relations. Integrated Ganges basin management has the potential to make the region economically solvent through the cooperation beyond the river.

CONCLUSIONS

The control of water is the control of livelihood. The control of Ganges river has become a source of tension and dispute and an issue of sovereignty, strategic necessity in the region. Past bilateral efforts have not been conducive to the balanced development of the resources, and have been source of antagonism between the riparian countries. The four types of benefits, i.e. benefits to the river; benefit

from the river; benefit because of the river; and benefit beyond the river offers “win-win” situations for each riparian state. It will provide environmental, economic, political and indirect economical benefit for the riparian countries. It has the potential to reverse the conflict to cooperation.

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