

Chapter 13

The Ganga Basin Management

A river flowing through more than one country, or one province within a State, is governed by certain international laws. In olden days, rivers were the only source of water for agriculture, navigation, drinking and other purposes. Though no defined laws existed, the right to water was then universally accepted, irrespective of national identity. However, this right led to conflicts between the peoples and nations very often and weaker individuals and nations were oppressed by the stronger. Though there are many uses of water for development and the uses are varying and multiplying every day, the most important users of river water remain the farmers, industry-owners, navigators and suppliers of drinking water.

The First Law

Rivers do not care, nor have any use, for geographical or political boundaries; therefore, disputes arise among the co-riparian States. The law relating to the use of waters of rivers, flowing through several countries was first laid down by the 'Institute de Droit International' in 1911. It drew up a law on 'Utilisation of Non-Maritime International Waters (except for navigation)' in 1961, in which it developed an international law regarding utilization of such rivers, that every State has right to utilize waters of international rivers, subject to the limits, imposed by international law and particularly by co-riparian States.

Article – I says:

The present rules and recommendations are applicable to the utilization of waters which form part of a water course, or hydrographic basin, which extends over the territory of two or more States.

Article – II reads:

Every State has the right to utilize waters which traverse, or border its territory, subject to the limits, imposed by international law, in particular, those resulting from the provisions which follow. . . This right is limited by the right of utilization of other States, interested in the same water courses, or hydrographic basin.

Helsinki Rules

However, so far no clear-cut directions or conventions have emerged to deal with water disputes, in spite of many organizations including legal associations, trying to do so. The most important and effective of these are the Helsinki Rules on the uses of waters of so-called 'international' rivers, adopted by the 'International Law Association' in its 52nd session in 1966 in Helsinki. These rules have acknowledged that the international river basins should be regulated by the rule of customary international law.

Article – V states:

Each basin State is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin.

What is 'a reasonable and equitable share' is to be determined in the light of all relevant factors in each particular case. The factors to be considered for share of water among co-riparian States, according to the Helsinki Rules, are:

- The geography of the basin, particularly the drainage area in each basin State;
- The hydrology of the basin including, in particular, the contribution of water by each basin State;
- The climate affecting the basin;
- Past utilization of the waters of the basin, particularly the existing utilization;
- Economic and social needs of each basin State;
- The population, dependent on the waters of the basin in each State;
- Comparative costs of alternative means of meeting economic and social needs of each basin State;
- Availability of other resources;
- Avoidance of unnecessary waste in utilization of the waters of the basin;
- Practicability of compensation to one, or more, co-basin States to adjust conflicts among users; and
- The degree to which the needs of a basin State may be satisfied without causing substantial injury to a co-basin State.

The factors are not exhaustive and gave rise to controversy and dispute, as the needs of various States in different periods varied widely from region to region. For Europe, or the USA, for example, generation of hydro-power got priority, but for under-developed countries like India and Bangladesh, irrigation overrode other needs and uses.

The Article-II of Helsinki Rules defined 'International Drainage Basin' as 'An International Drainage Basin is a geographical area, extending over two or more States determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus'.

At Stockholm conference of the United Nations on the Human Environment in 1972, a principle, laid down was that,

States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources, pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction, or control, do not cause damage to the environment of other States, or of areas beyond the limits of national jurisdiction. (Principle 21, Declaration on the Human Environment in Report of the United Nations conference on the Human Environment, 1972, UN Declaration 48/14 and Corr.-I).

International River Basin Co-operation

Subsequently, the UN General Assembly emphasized in a Resolution that ‘... In the exploitation and development of their natural resources, states must not produce significant harmful effects in zones, situated outside their natural jurisdiction.’ (General Assembly Official Records, 27th Session supplement No. 30).

The United Nations Water Conference, held in 1977, emphasized development and management of international water resources, keeping in view eventual scarcity of global water resources. This led to a report on ‘International River Basin Co-operation: The Lessons from Experience’ as a supporting document for future UN water conferences. In the beginning it says,

... Globally, there may be potentially enough water to meet forthcoming needs; but, frustratingly, it tends to be available in the wrong places, at the wrong time, or with the wrong quality. And in one way or another, all societies are affected, however rich, however poor.

Political boundaries, dividing a river basin or an aquifer, aggravate the problem. Water flows according to physical laws, not within political boundaries; its use is governed by institutions and patterns of use, responsive to political, social and economic demands. Where national boundaries divide a river basin, which is the physical unit for assessing and allocating water resources for various purposes, the co-riparian, or co-basin, countries must engage in a co-operative endeavour to rationalize the use of the resource in terms of its capacity to meet the full range of the demands that exist.

The use of water by people of a country that shares a water resource, may determine the benefits that those of a co-riparian country can get from the same source. The use by one country without regard for the potentials and demands in co-riparian countries can easily lead to inefficient use of available water supplies and inequitable sharing of the resources of a river basin. Such action can result in ill-filling and serious political controversy.

International rivers, lakes and aquifers form a major part of the global stock of fresh water. There are over 200 continental river basins which have a direct contact with the final recipient of water, i.e. an ocean, a closed internal sea, or a lake and tributary basins and aquifers that are divided by international boundaries. In view of the critical importance of using water resources efficiently and to meet the present and prospective demands for water in agriculture, industry and domestic use for increasing world population, it is incumbent to find ways and means of best use of international water resources.

Improved management of international rivers, lakes, aquifers is not easy. Some countries may, out of economic incentive, ignore demands for basin-wide accords. Mistrust and suspicion between States can reinforce one country's incentive to act alone, or undermine mutually advantageous endeavours. Finally, some basin countries may not have the institutional and financial capability, or political interest, to make co-operative endeavours. These are difficult to overcome, but progress is possible if there is the political will.

A number of regions of the world have worked out fruitful arrangements for managing, and using, international water resources. Some of these have been summarized and assessed in 10 case studies, prepared for the UN Secretariat, which provide a basis for arriving at some conclusions about how to foster constructive actions to manage and utilize international water resources, fairly and efficiently. This statement is based on those reports. First, it seeks to (sic) the nature of the problems that must be dealt with in the management of international water resources. Secondly, by drawing on the experiences, reported in the papers listed in the annexure, it seeks to illustrate, how co-operative action has been achieved and the kinds of institutions that have facilitated co-operative action. The concluding section summarizes the kinds of measures and institutional arrangements that experience suggests, will foster the best use of international water resources.

The report mentioned the factors, governing the capability of the States for cooperation as under:

- (a) The differences and similarities in the evaluative frameworks of co-riparian nations;
- (b) The uncertainties that exist with regard to the possible future effects of any joint arrangement;
- (c) The physical and economic characteristics of the water resource management system, as related to international boundaries;
- (d) The international relations environment;
- (e) Domestic factors within the co-riparian nations; and
- (f) The number of nations, involved in the negotiation.

In many cases, in spite of differences of political, social and economic conditions as well as diverse cultural heritage, present and future development activities etc. some practical means of surmounting them have been found in a number of situations. The treaties on share of the water of the Rhine, the Great Lakes, the Columbia, and the Colorado etc. are cited.

Total net benefits from the water resources of a region can be increased beyond these, which can be realized through independent action by a co-riparian country by co-coordinating programmes of development of the basin. This kind of problem is found in river basins, on which countries are either upstream, or downstream, i.e., they lie in the basins of successive international rivers. Two solutions are possible:

- (a) The upstream country may abstract water, or impair its quality and thus reduce the benefits for the downstream countries which cannot do the same to the

upstream country. The upstream country, being under no economic compulsion to reach an accord has to have other incentives to undertake actions jointly with downstream countries.

- (b) A downstream country located at the mouth of a river may not only withdraw water from the river but also pollute it, thus scoring an economic advantage over the upstream countries, in such instances, co-riparian countries have to abide by pollution control regulations, or agreements.

The report adds that co-operative action will vary greatly from situation to situation. If the concerned countries have a common cultural heritage and traditionally good relationships, reaching an agreement becomes simpler.

Information should be sought about the effects of alternative schemes of development and use on each riparian country. The World Bank recognizes that, besides goodwill, basin countries have to be committed to reach an accord and be willing to share technical and economic data. A slew of technical, economic, legal and other data is required to satisfy concerned governments, external financing or other agencies so that the solution is equitable and feasible. The Indus Treaty between India and Pakistan is a relevant example.

Possibilities within each country should be explored for providing the services from water resources that might be secured through international action. The Volta River Basin Treaty is one such example. If a country has limited ability to make technical, economic and social studies, international agencies and members of the international community, such as United Nations Development Programme (UNDP), International Development Bank (IDB), the Organization of American States (OAS) etc. should provide the needed assistance and aid in the training of professional personnel within the countries. Expertise is required to generate information on alternative scheme of development, to assess the advantages of co-operation and to proceed with the construction of the projects. If this expertise is not available for lack of experience and trained personnel for one or more of the co-basin countries, outside assistance must be sought. Actually, assistance may not elude, even if basin countries already have a relatively high professional competence in water resource management, such as, Greece and Yugoslavia had in the Varder-Axios Basin Project.

A concerted effort is necessary to forge basic agreements on the technical aspects of alternative schemes for management and use. Negotiations on substantive normative issues will be needlessly complicated and prolonged if there are disagreements on basic technical issues, which can be readily resolved by working groups of experts from the basin countries, or by a more structured joint technical committee in charge of coordinating and integrating the basic data-gathering and technical feasibility studies. To take the example of the Ganga river treaty between India and Bangladesh, although the Joint River Commission comprised technical experts from two countries, the proposal of augmentation of the Ganga flow at Farakka fell through, as the two countries did not agree on the alternative schemes, proposed by each of them.

Continuing communication and exchange of information at the technical and political levels should be encouraged to build mutual trust among co-riparian countries. Basin-wise co-operation will have to be encouraged, if communication at technical level is continued.

Imaginative ways of sharing benefits and costs to provide incentives for forging an agreement should be explored. The basic incentive for cooperation is that each country must have some gain. Sacrifices in achieving a joint objective must be more than compensation for expected benefit. The direct cash compensation, received by Pakistan from India to compensate the loss of water from the Indus tributaries that normally flowed to Pakistan, as per the Indus Basin Treaty is an example. Especially, in sequential rivers where the upstream country gets little from cooperation, a more flexible approach to encourage joint actions may be appropriate. Benefits, such as, improved trade links may induce one country to make another cooperate.

The international community should build consensus, as to what constitutes an equitable distribution of benefits and costs, resulting from the development and use of international water resources. Resolutions 21 and 22 on the States' responsibility and liability, adopted at the UN Conference on Human Environment, the Helsinki Rules, the European Convention of the Protection of International Water Courses against pollution and the Principles of Trans-frontier Pollution of the Organization for Economic Cooperation and Development (OECD) are some of the global and regional principles as well as rules of conduct which, if adhered to by basin States, can facilitate cooperation. They help reduce the issues for negotiated settlement, using the responsibilities of each country and setting out principles for equitable division.

If a country does not have financial resources to get its share of a potential joint development programme, leading inter-national institutions and the international community can contribute funds. In many basins, development will not be possible unless their governments receive outside assistance. Multilateral and bilateral financial assistance by organizations in the donor countries can bolster a basin country get its due share of a river's water. Such bilateral and multilateral assistance should be extended to basin countries, needing it and should also be coordinated and complementary. The Indus Basin and the Volta Basin treaties are examples in this respect. Under the Indus Basin Treaty, funds were made available from international organizations and the outside world. The storage works on the western rivers in Pakistan and connecting canals were constructed for diversion of water into it.

To minimize friction among countries, involved in basin development, the agreement should limit, as much as possible, the dependence of one country on continuing actions by another, so that the former gets its share of the benefits. Countries are often reluctant to forge joint arrangements, if projects vital to their economy and development are controlled by another basin country. There can be no guideline for the degree of sovereignty control over projects, because the requirements for each situation are unique. To reduce unease over potential loss of sovereignty, entailed in international cooperative arrangements, strategic works should, as much as feasible, be designed and located in such a way that each State retains as much control as possible over works, on which it is greatly dependent. A key point in solving the

Indus river controversy between Pakistan and India was to find a scheme in which Pakistan would have control over the works on which it would be most dependent.

International agreements should be as flexible as possible to adjust water use and manage unforeseen changes in conditions. Inflexibility freezes political motivations, technological possibilities and economic conditions at the time of signing. Some inflexibility is, however, unavoidable. Dams, once constructed, are a permanent commitment to one form of technology and can hardly be modified for adopting a newer technology. Nevertheless, within this limitation, flexible cooperation is possible. A treaty is a framework which sets out the principles on which joint development can proceed, with detailed planning. Implementation of projects has to be left to joint technical groups, operating under political direction. This permits a response to changing economic and technological circumstances within the terms of the agreement, obviating the need for re-negotiation of a major international undertaking.

Treaties and agreements between and among basin countries, which call for development on shared costs and benefits, should be flexible enough to maintain an equitable division of net benefits over a period of time. The exact arrangements for working out the net benefits for each country must be made in accordance with political and economic opportunities and constraints at the time of negotiation.

Where the prospects for agreement are limited because of too many riparian countries being involved, sub-dividing a water resource system into sub-systems, each involving as few countries as possible should be explored. The interest and priorities for the management and use of a river basin will vary in each country, according to their dependence on the river, the opportunities for increasing their benefits from the use of the river and their contribution to the problems, faced. What may appear critical to basin countries in one region may be of little concern to another. When many countries share a basin, the problems of differing priorities, involvement with the river along with other domestic and foreign policy issues between the basin countries complicate negotiations and reduce the prospects for basin-wise agreement. Limiting the agreement to the countries, among which mutual interest and concern prevail, is the most feasible approach. The Rhine basin is an example where several countries like Austria, Switzerland, the federal Republic of Germany, France and the Netherlands are involved.

Where an international river is expected to achieve a high degree of development and use, the basin countries should give early consideration to joint planning so as to avoid conflicting claims on the resources that may arise in the future. Disputes arise, when demands on a common resource exceed its capacity to meet them. In many cases, the basin countries can avoid such disputes, if they compare the projected demands by each country on the river water; this will reveal the incompatibility of claims. Given time, joint plans can be drawn up to regulate the flow, increase the capacity for use, apportion the waters, or to work out some other schemes to use, equitably, the shared resource without conflict. Varder-Axios project is an example where Greece and Yugoslavia exchanged information and found that the plans for developments of the resource were greater than the supply available. The incentive for co-operation was received to avoid conflict over possible future water shortages.

The problems of the river basin development and their solutions, as stated ante, are cited in the 1977 UN Report, prepared by Prof. I. K. Fox, Director of the West Water Research Centre, University of British Columbia, Canada and his colleague, Le Marquand.

International Organisations

Organizations, concerned with the development and management of international water resources, are of two categories – river basin organizations and the global and regional organisations.

River Basin Organizations

International organizations exist in many parts of the world to facilitate the management of ‘international’ rivers, lakes and other water-bodies. They perform many functions with varying degree of authority and effectiveness in promoting cooperative action. Some of these organizations are the International Commission for the Protection of the Rhine against Pollution, the Central Commission for the Navigation on the Rhine, the Niger Commission, the Yugoslav-Greek Commission for the Varder-Axios River, the Volta River Authority, the International Joint Commission (IJC), set up by Canada and the United States for the Colorado, the Columbia River Treaty, the International Columbia River Engineering Board, the International Boundary and Water Commission, set up by Mexico and the United States, the Mekong River Commission, set up by Lao, Thailand, Cambodia and Vietnam, the Joint Rivers Commission (JRC) set up by India and Bangladesh and the Indus River Commission set up by India and Pakistan etc.

According to the UN report by Prof. I. K. Fox, several conclusions can be drawn from the experiences of river basin organizations in various parts of the world as below.

1. Communications among national representatives through meetings of river basin organizations can build mutual trust and confidence among co-riparian countries, obviating the need for an elaborate formal organization and procedures. The organizations have to be designed in accordance with prevailing political and economic realities in the concerned basin country.
2. River basin organizations should have a limited mandate and focus on issues of mutual interest.
3. River-basin organizations have been most effective, when they have focused reaching an agreement on the technical aspects of alternative schemes and avoided efforts to resolve political issues. On the one hand, limiting an organization’s responsibility to collect and exchange data does not realize the full potential of a commission. On the other hand, assigning responsibility to such an organization for resolving political issues tends to limit its capability to deal effectively with important technical matters, which need to be dealt with to

provide a basis for effective political action. Experience suggests that negotiations on political issues should be handled by national political representatives who specialize in such activities.

Global and Regional Organizations

These, according to Prof. Fox's Report, include the United Nations, its sister organizations and regional bodies, such as, the Organization of American States and the Council of Europe, which made major contributions. A report of the Secretary General on International River Basin Development to the UN Committee on Natural Resources at its fourth session gives an overview of the activities in the field of the UN and related bodies as well as several other global and regional organizations. The major contributions are as under:

- Generation and dissemination of legal and technical data: The efforts of the UN outfit in the area have varied from convening panels of experts and seminars to the publication of various documents on technical, economic, legal and institutional aspects of international water resources development. Since the first symposium on Comprehensive River Basins Development was convened by the UN at Lake Success, New York in 1949, the Secretariat has held many meetings and issued publications, related or specifically oriented, to international water resources. These provide guidelines on the technical and institutional issues, on which focus should be made, particularly in countries where the development of an international river basin is in the initial stage.
- The UN outfit has also published a number of documents, dealing specially with the legal aspects of management of shared water resources and reference material. The Food and Agriculture Organization (FAO) and the National Law Commission have reviewed bilateral and multilateral treaties and conventions, relating to the uses of international water courses and published reports which give important inputs to further legal principles for use of international river basins. The United Nations Environment Programme (UNEP) is currently carrying out work on cooperation in the field of environment, concerning natural resources, shared by two or more countries.
- Provision of technical assistance, financing and training: The UNDP has financed and assisted in various ways other UN agencies and the Secretariat, as also regional organizations, in executing development projects on a large number of international river basins. The latter include the Centre for Natural Resources, Energy and Transport of the Department of Economic and Social Affairs of the UN Secretariat, the FAO, World Meteorological Organization (WMO), the World Bank and regional organizations, such as the Organizations of American States (OAS) and the Inter-American Development Bank (IADB) which provide technical support, directly, or supervise the work done either by individual experts, or consultant firms. In addition, the UNDP assists in providing fellowships abroad and training of local personnel during the execution of projects and arranges

delivery of equipment, needed for project implementation. In several 'international' river projects, the UNDP, as the executing agency, provided technical supervision services too.

- The World Bank has a long experience in financing and assisting international river development projects. During 50 years of its existence, it has been involved in many projects, dealing directly with the development of international rivers and river basins. In addition the Bank has, on several occasions, conspicuously in the case of the Indus basin, provided its good offices to assist in resolving disputes.

To sum up, these global and regional organizations provide much-needed technical and financial assistance to international river basins, which have not only aided the cooperating States in developing the information required to plan and assess potential development schemes but also helped strengthen technical capabilities of national organizations, particularly through training of personnel to carry out these works by themselves, which is the ultimate goal of aid programmes.

There are a number of organizations in many countries for effective river basin management and development. These and other water resources agencies create conditions that enable political leaders appreciate fully the opportunities and responsibilities and the constraints of joint use for development of a national or international river basin. If an international river basin organization exists, the concerned national outfits are called upon to participate in its works. From Mr. Fox's report some important conclusions emerge.

- (a) There is no substitute for the will to cooperate by the co-riparian countries in each situation, where a water resource is shared by two or more nations.
- (b) Where the will to cooperate is present, it is of critical importance that each riparian country understands the existing potential management and issues as also alternative schemes and the physical, economic and social consequences and uncertainties. For this purpose, the States' own resources are to be efficient and reliable.
- (c) Resolving technical differences by methodical exchange of data/records and assistance by river-basin organizations are invaluable in building mutual trust and confidence among the riparian States, which provide a solid basis for political negotiations that every agreement requires.
- (d) As in many cases, an economic incentive does not exist to negotiate an efficient and equitable agreement on the management and use of 'international' water resources, a consensus has to be built on legal principles, governing the development and use of such resources. Some general principles of global applicability could be developed on the basis of experiences in reaching bilateral, multilateral and regional agreements on management of shared resources. In particular regions, a set of regional principles is needed, such as those devised by the Council of Europe to control pollution on international rivers in the region.
- (e) In some situations, regional training and information centres should be created. These would meet the needs of groups of countries in specific technical fields,

which they otherwise could not independently afford to create. It might also be useful to consider promoting exchange of personnel, engaged in international water resources management, to train management staff and as a means of sharing and disseminating experience in applying the criteria and methods for collection, storage, retrieval and standardization of basic basin data.

International Organizations and Treaties

There are three kinds of international rivers in the world— the successive, the contiguous and the successive-cum-contiguous. Successive rivers flow through one country first and then enter another country, leaving the first one. The contiguous rivers flow through more than one country at a time (two banks in two countries). The successive-cum-contiguous rivers flow through one country first and then flow through two countries (one bank in one country) before finally entering a third country. Treaties have been concluded on sharing of waters etc. on La Plata (among Argentina, Bolivia, Brazil, Paraguay and Uruguay) on 23rd April 1969, on the Mekong (among Lao, Thailand, Cambodia and Vietnam), on the Columbia (between Canada and the USA), on Senegal (among Mali, Mauritania and Senegal), on the Colorado (among Canada, the USA and Mexico), on the Volta (among Ghana, Togo and Benin), on the Rhine (among Austria, Switzerland, Germany, Netherlands, France and Luxemburg), on the Vardar-Axios (between Greece and Yugoslavia), on the Nile (between Egypt and Sudan) in the 1920s, on the Danube (among Bulgaria, former Czechoslovakia, Hungary, Rumania, Yugoslavia and the former USSR) and on the Indus (between India and Pakistan). For relevance to our subject, let us have a closer look at the Indus River Treaty.

Indus River Treaty

The Indus (the *Sindhu* in ancient Hindu texts) flows through India and Pakistan. Before 1947, when there was no Pakistan, it passed through one single country, India. Afterward, it was divided between the territories of two countries. Before 1947, it irrigated Punjab, Sind, North-West Frontier Province (NWFP), Bahawalpur and Bikaner etc. but it did not have enough water to meet the demands of each State, giving rise to occasional disputes. In 1935, the then Government of British India constituted Anderson Committee to forge an agreement on some outstanding issues. The committee recommended certain modalities which the government accepted and gave effect to in 1937.

However, the government of Sind was not happy and lodged a complaint in 1941 that the withdrawal of water by Punjab upstream would affect irrigation through the inundation canals in Sind from May to October and also would create a shortage of water at Sukkur in winter. The Government of India appointed the Indus Commission with Justice B. N. Rau as Chairman and the chief engineers of Uttar Pradesh and Madras Provinces as members to look into the complaints.

The Commission's report in July 1942 said that the Punjab withdrawals are likely to cause material injury to the inundation canals, particularly in September. It recommended sharing of Indus water in the winter months, but Punjab and Sind did not accept any recommendation in spite of discussions at technical and administrative levels from 1943 to 1945. Ultimately, two governments referred the matter to his Majesty's Government in New Delhi but no final decision was taken till August, 1947, when after the Partition, eastern Punjab came within India and western Punjab and Sind went to Pakistan.

Western districts of Punjab in Pakistan were receiving water for irrigation of the Sutlej, the Beas and the Ravi belonging to be Indus system before Independence, though control structures were located in eastern Punjab in India. India continued to release water, as per an interim agreement ('Stand Still Agreement') up to the end of March 1948. As Pakistan did not show any interest in reviewing the agreement within the period, India discontinued supply of water to the Upper Bari Doab Canal which passes through Pakistan's western areas. Supply was resumed a few weeks after the signing of the 'Delhi Agreement' on 4th May 1948. In it, India assured Pakistan that it has no intention to withhold water to Pakistan, without giving it time to tap other resources. On the other hand, Pakistan recognized the genuine anxiety of India to discharge its obligation to develop areas of east Punjab where water ran short and the areas were underdeveloped, compared to West Punjab. The problem arose afterwards on the issue of availability of water, which lingered for more than three years in spite of discussions between the two governments.

In this period, David Lilenthal, ex-Chairman of the Tennessee Valley Association (TVA) who had earlier visited India and Pakistan, in an article in 1951 in an American journal, suggested that instead of dealing with the issue at the political level, it could be solved from a purely technical angle and that the World Bank might help to provide the necessary money. It was accepted and the negotiations commenced between the two countries with the good offices of the World Bank at Washington in May 1952 and the Indus Water Treaty came into effect in September 1960, after more than eight years.

The treaty was signed at Karachi by Jawaharlal Nehru, India's Prime Minister and Pakistan President, Ayub Khan. It was ratified by the two governments and the ratifications were exchanged in Delhi in January 1961; the treaty came into force with retrospective effect from 1st April 1960. Under the treaty, the waters in the Indus and its tributaries were to be diverted and those that formerly flowed into Pakistan from India were to be replaced, in part, by storage, on the western rivers in Pakistan through connecting canals. India would have unrestricted control over the waters of the Sutlej, the Ravi and the Beas, except during the transition period, 'when supplies to Pakistan would be continued by India according to the provisions of the treaty.' The period commenced on 1st April 1960 and ended ten years later on 1st March 1970. India was allowed to draw water from the two Indus tributaries – Jhelum and Chenub for irrigation of existing areas and developing 0.7 million acres of irrigation by these rivers, subject to certain conditions, as per the treaty. India would allow the rest of waters of these rivers to flow downward for use by Pakistan.

The provision of the 10-year 'transition period' was made to give Pakistan sufficient time to build engineering diversion and storage works for the substitute water

supply from other sources, previously received by it from the Sutlej, the Ravi and the Beas but the agreement could not be through, as funds were not available for these works from sources outside the basin countries. The World Bank established the 'Indus Basin Development Fund', to which, besides Pakistan and India, Australia, Canada, the Federal Republic of Germany, New Zealand, the United Kingdom and the United States also contributed. India agreed to contribute 62 million pound sterling, in equal instalments toward the cost of these works. The agreement also made it clear that India would have no right to take part in the decisions on the system of works and also have no responsibility.

The treaty provided for regular exchange of river and canal data and for future cooperation. A permanent Indus Commission was formed by the two permanent commissioners, selected by two countries from among expert engineers, competent in hydrology, water management and use. The Commission would meet regularly, alternately in Pakistan and India and tour to both countries to clear any doubt or difficulty which might arise. It would also make cooperative arrangements to implement the treaty, submit an annual report to the two governments and resolve, by agreement, any differences concerning the interpretation, or application, of the treaty. Provisions also exist in the treaty, regarding the procedure to be followed, if the Commission could not resolve any problem by reference to a 'Neutral Expert' or a 'Court of Arbitration'. A plan of Indus river basin is shown in Fig. 13.1. The



Fig. 13.1 Index plan of Indus river system

Indus treaty underlines the importance of planning and negotiation to account for the financial capability of the basin countries to undertake the required works to ensure an equitable agreement and the important role that leading international institutions play in strengthening financial capability of the basin countries.

The so-called 'international rivers', lakes and aquifers form the major global stock of freshwater. There were 214 international river basins, as per the list prepared by the United Nations Department of Economic and Social Affairs up to 1975. Out of these, the UNDP has financed, and assisted in various ways, other UN agencies and the Secretariat as well as regional organizations, in executing development projects, totalling about 30 International river basins. The World Bank has also long experience of financing and assisting 'international' river development projects. The Bank has been involved in 29 projects up to 1975 to deal directly with the development of 'international' rivers and river basins and to resolve disputes.

Inter-State River Basin Organization in India

Disputes also arise on sharing water of rivers that flow through different provinces within one country, making it difficult for a federal government to resolve them. Sometimes, they linger for years owing to political influences on the most essential technical considerations for irrigation and agriculture, drinking water, navigation, flood and erosion control, power generation etc. Many of such disputes were settled by joint discussions at the initiation of the central government and agreement reached. Some examples are cited as under:

- i) *Bhakra Nangal Project*: Disputes arose between Punjab and Rajasthan on the share of the waters of the Indus tributaries—the Sutlej, the Ravi and the Beas. The Bhakra Nangal agreement was reached in 1959 and Rajasthan got its share of water through a network of canals for irrigation and drinking water.
- ii) *The Krishna River Project*: The river flows through Maharashtra and Karnataka. A dam at Nagarjun Sagar in Karnataka was constructed and the issue of sharing of water was settled through a commission in 1962.
- iii) *The Godavari River Project*: The river flows through five States – Maharashtra, Karnataka, Madhya Pradesh, Orissa and Andhra Pradesh. Sir Arthur Cotton, a British engineer, constructed an anicut in 1847 across the river for irrigation. It functioned nicely for about 100 years, during which the upstream of the anicut was totally silted and rendered obsolete. Another dam was constructed over the branch river to distribute water between the States. Thereafter, a barrage was constructed on the river in 1980 to transfer water through link-canals.
- iv) *The Sone River Project*: The river passes through Madhya Pradesh, Uttar Pradesh and Bihar. A barrage has been constructed and an agreement signed in 1973.
- v) *The Mahi River Project*: The river flows through Madhya Pradesh, Rajasthan and Gujarat. A barrage on the river has been constructed and an agreement on water-sharing has been signed in 1965.

- vi) *The Chambal River Project*: The river flows through Madhya Pradesh and Rajasthan. A barrage on the river has been constructed and an agreement on water-sharing signed.
- vii) *The Narmada River Project*: The river flows through Madhya Pradesh, Maharashtra and Gujarat. A commission was constituted by the Government of India, headed by A. N. Khosla, a renowned engineer. An agreement was signed in 1965, but none of the States was satisfied because of shortage of water for irrigation. A large project of dams on the tributaries with potential of hydro-power was planned and designed by the Central Water Commission, New Delhi with the consent of the three States. It was cleared by the Government of India, but the dispute lingered owing to large-scale submergence by the big reservoirs and the dire prospect of re-settlement of a large population, to be affected by it. An environmental protection group, led by Sunder Singh Bahuguna and Medha Patekar launched a movement against high dams, ecological imbalance and also widespread submergence. The Government of India constituted the Narmada Control Authority (NCA) with experts, but the problem could not be solved. Very little progress on the project has been achieved so far.
- viii) *The Cauvery River Project*: The river flows through four southern States – Karnataka, Kerala, Tamilnadu and Andhra Pradesh. A dam was constructed at Almatti and an agreement reached in 1942 on sharing and distribution of water in the four States. A growing need for more water compelled these states to demand raising the height of the dam for storage of more water. The Government of India agreed to meet this demand, but Andhra Pradesh differed on the quantity of water, demanded by the other States, as this would leave much less water for it and the districts which were suffering badly for want of water for yield of cotton, maize, *bajra* etc. would be affected more. So in spite of a clear judgement of the Supreme Court about the release of specific volume of water for Andhra Pradesh, the disputes continued and the problems remained unattended.
- ix) *The Damodar River Project*: The river flows through Bihar and West Bengal. Dams were constructed on the river and its tributaries – Barakar, Maithan, Panchet, Konar and Tilaiya– for irrigation and hydro-power generation for these two and other adjoining States. The Damodar Valley Corporation (DVC) was set up by the Government of India to implement schemes and remain responsible for their operation, maintenance and distribution of water. The scheme is shown in Fig. 13.2.
- x) *The Mayurakshi River Project*: The river also flows through Bihar and West Bengal. A dam was constructed at Masanjore on Bihar–Bengal border for irrigation as well as power generation.
- xi) *The Subarnarekha River Project*: The river flows through Bihar, Orissa and West Bengal. A scheme was conceived for storage and distribution of water for irrigation through a network of canals within the three States. The work was in progress in 2008.

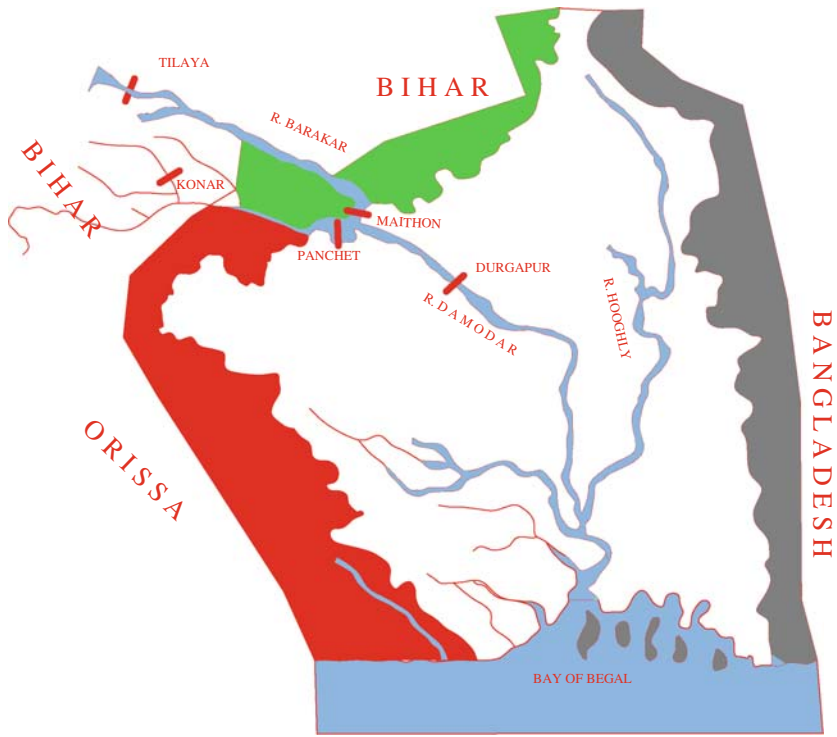


Fig. 13.2 Index plan of Damodar river

Discussion

'International' and national rivers, flowing through different countries and different provinces of a country, respectively provide sweet water for irrigation, use of human and other livestock, industries, power generation and navigation, irrespective of political or geographical boundaries. Most of the treaties have been successfully signed in Europe and America through mutual understanding and at the initiative of international organizations. The UNO has been playing a major role on these and many treaties have been signed between and among concerned countries.

Though favoured by the upper riparian countries, the 'Harman Theory' of 1896, named after a US Attorney General, that every State has absolute sovereignty over the rivers flowing through its territory was deemed totally unjust by lower riparian States. According to another theory – the 'Natural Flow Theory' – the lower riparian States are entitled to the natural flow of the river, uninterrupted by upper riparian countries. The theory was initiated by Egypt in respect of the claim on the Nile water by Sudan. Both these theories did not offer any acceptable solution to all concerned owing to conflicting interests. There is need, therefore, of a theory, safeguarding the interest of both upper and lower riparian States and of adopting a solution which would be acceptable to all parties. This can be called the 'Theory

of Equitable Utilisation’, according to which the entire basin of a river would be deemed as one economic unit and its water would be utilized to the best advantage of all basin countries. Development schemes would have to be planned and the works are to be executed, jointly or singly, within each territory and benefits to be shared with other countries. The USA-Canada Treaty on the development of the Columbia river basin is an example. The river originates in Canada and flows down through the USA. The scheme envisaged construction of storage dams to help control floods in the USA and generation of hydro-power for consumption by both countries. In addition, Canada would get huge financial benefits from the USA to compensate for the construction of storage dams in Canada and their operation. The index plan of the Nile river is shown in Fig. 13.3.

The Indus Treaty between India and Pakistan is another example, where interests of both countries were safeguarded. A compromise between conflicting interests is the only solution, when faced with the existing and the new, each affecting the other. Judicial decisions alone cannot resolve water-related disputes; practical considerations yield better results. The most satisfactory and abiding settlement of water disputes is possible through agreements or treaties, treating concerned countries as a single united community, undivided by political or administrative boundaries. The observations of the Rau Commission on the Indus water dispute were on above lines, which made it most relevant in the eyes of reputed international jurists. Helsinki Rules emphasize this aspect as under.

Although certain disputes about international rivers and river basins may lead themselves to third party adjudication under established international laws, the maximum utilization of drainage basins can more effectively be secured through joint planning. The great number of variables involved the possibility of future changes in the condition of the waterway, the necessity of providing affirmative conduct by the basin States and the enormous complexity of a river basin makes comparative management of the basin greatly preferable to adjudication of each source of friction between the basin States.



Fig. 13.3 Index plan of the Nile river

The UN Conference on the Human Environment, held at Stockholm on 15th and 16th June 1972 made the following recommendations for settlement of problems arising out of sharing water resources, common to more than one jurisdiction, with particular reference to the effect of environment. These are reproduced below:

It is recommended that governments concerned consider the creations of river basin commissions, or other appropriate machinery, for cooperation between interested States for water resources, common to more than one jurisdiction. The recommendations are

- In accordance with the UN Charter and the principles of international law, full consideration must be given to the right of permanent sovereignty of each country concerned to develop its own resources.
- The following principles should be considered by the States concerned when appropriate:
 - i) Nations agree that when major water resource activities are contemplated that may have a significant environmental effect on another country, the other country should be notified well in advance of the activity envisaged.
 - ii) The basic objective of all water resource use and developmental activities from the environmental point of view is to ensure the best use of water and to avoid its pollution in each country.
 - iii) The net benefits of hydrologic regions, common to more than one national jurisdiction are to be shared equitably by the nations affected.
- Such arrangements, when deemed appropriate by the States concerned, will permit undertaking on a regional basis, as under:
 - i) Collection, analysis and exchange of hydrologic data through some international mechanism, agreed upon by the States concerned.
 - ii) Joint data collection programmes to serve planning needs.
 - iii) Assessment of environmental effects of existing water uses.
 - iv) Joint study of the causes and symptoms of problems, related to water resources, taking into account the technical, economic and social considerations of control of water quality.
 - v) Rational use, including a programme of quality control, of the water resource as an environmental asset.
 - vi) Provisions for the judicial and administrative protection of water rights and claims.
 - vii) Prevention and settlement of disputes with reference to the management and conservation of water resources; and
 - viii) Financial and technical cooperation of a shared resource.
- Regional conferences should be organized to promote the above considerations.

These principles were further enhanced by their affirmation in two resolutions of the General Assembly, adopted immediately after the Stockholm Conference (Resolution No. 2995 [xxvii] on 15th December 1972), which emphasized that:

‘... In the exploitation and development of their natural resources, States must not produce significant harmful effects in zones situated outside their natural jurisdiction.’ To sum up, it can be said that although New Delhi wanted to solve the problem of sharing the Ganga water with Bangladesh through mutual cooperation and understanding, Bangladesh did not. India envisaged schemes, when it was united and undivided but could implement them only after the Partition with full

knowledge of East Pakistan and later Bangladesh. Diversion of water from Farakka Barrage started in 1975 in the presence of engineers and experts of Bangladesh. In the beginning, a short-term agreement and two MOUs were executed and thereafter, a long-term treaty was signed in keeping with international guidelines but problems and dissatisfaction of the concerned countries remained.

Thus, although the Ganga River Treaty could have been another example of the two concerned countries solving the problems of an 'international' river, flowing through them, it remained short of this ideal owing to lack of mutual cooperation, accommodation and understanding in the part of the lower riparian country, i.e., Bangladesh in spite of sacrifices and friendliness of the upper riparian country, i.e., India.