

# RIVER BASIN ORGANISATIONS IN INDIA: AN OVERVIEW

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## Abstract

*The paper proposes river basin management as crucial to development and stresses the need of proper management. It looks at the various river basin organizations formed in India, lists their functions and performance. The paper concludes with pointing out the various impediments – political, economic and institutional – in formation of RBOs in the Indian context.*

## 1. INTRODUCTION

Down the ages river basins have been home to civilizations across the world. River water has always catered to the needs of society in different ways. With growth of competitive uses and users at a tandem we have now realized that such a natural resource is priceless and needs to be managed properly. The philosophy of manipulating supply according to the demand for water is shifting towards designing ways and means for economical and efficient use of this resource. In this context, the concept of river basin management becomes important. Further, the institutions responsible for such management need to be evaluated for better allocation and efficient use of water resources.

River basin management may be taken up for various objectives depending on local needs including capturing run-off, minimizing soil erosion or reducing pollutions. This approach requires integrated development of non-arable land, arable land, rain water, vegetation, livestock, local materials, common property resources, human resources and programs for landless in a participatory process. Productive employment generation and conservation of resources are important concerns of watershed management projects. Even emphasis on landless, gender issues and biodiversity utilization are included in the principles of the basin management.

Around the world this idea is gaining importance although implementation may be at the pilot level rather than the whole country. Management models vary from country to country and the direct experiences that have accumulated are relatively small but increasing. Situations across countries vary since they have different cultural, political and administrative traditions. Further, within country basin characteristics, uses and users are also different. For this reason we cannot state any specific set of rules according to which river basins can be managed, but some principles can be identified which will be useful guidelines and can be adopted based on the situation.

This paper tries to address the issues pertaining to river basin management in India from the perspective of River Basin organizations. It probes how River Basin Organizations (RBO) are characterized by law and practice and tries to suggest ways to manage RBOs and overcome constraints of RBO.

### 1.1 Institutional Aspects of River Basin Management

An institution sets the ground rules for resources use and establishes the incentives, information and compulsions that guide economic outcomes. According to North (1990), institutions are defined as “the rules of the game in the society, or more formally, the humanly devised constraints that shape human action”. Institutions can be both formal and informal. While written laws, rules and procedures form the formal institutions,

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informally established procedures, norms, practices and patterns of behavior also form part of the institutional framework. Institutions can take a variety of forms:

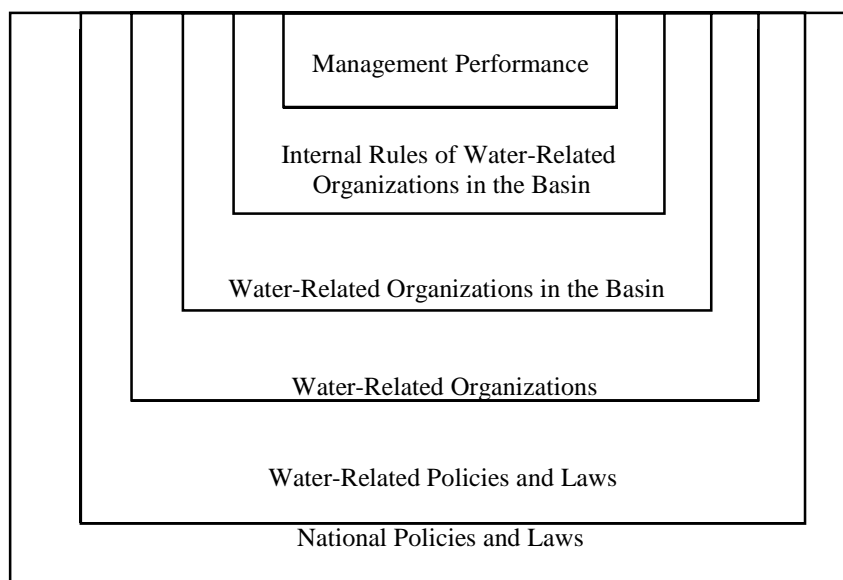
- Policy and objectives,
- Laws rules and regulation,
- Organizations, their by laws and core values,
- Operational plans and procedure,
- Incentive mechanisms, and
- Norms, traditions, practices and customs.

Organizations are defined as “networks of behavioral roles arranged into hierarchies to elicit desired individual behavior and coordinated actions obeying a certain system of rules and procedures” (Cernea, 1987). Organizations are groups of individuals with defined roles and bound by some common purpose and some rules and procedures to achieve set objectives.

The institutional framework for water resources management in a river basin context consists of established rules, norms, practices and organizations that provide a structure to human actions related to water management. The established organizations are only a subset of all possible existing institutions. We can broadly classify the whole institutional framework into three categories – (i) Policies, (ii) Laws and (iii) Administration, all of which are related in some way to water resources management in a river basin context (Bandaragoda, 2002)

- Policies:
  - National policies,
  - Local government policies,
  - Organizational policies
- Laws:
  - Formal laws, rules and procedures,
  - Informal rules, norms and practices,
  - Internal rules of organizations.
- Administration:
  - Organizations at policy level for resources management,
  - Organizations at implementation level for delivery management.

Figure 1: Water institutions that play a role in the management of water resources



Source: Adopted from Small and Svendsen (1990).

The entire framework can be clearly understood from the diagrammatic representation given here. In the diagram we find the representation of the three aspects of the water institutions that play an active role in the management of water resources if we consider the basin as the hydrological unit of study. In this study we restrict ourselves to the administrative unit of institutions and try to find its relationship with policies and laws. Hence, the following sections will concentrate on the administrative units particularly the River Basin Organizations (RBOs) and how are policies and laws related to such organizations.

## **1.2 Administration Responsible for Water Resources Management in India**

At the national level, the Ministry of Water Resources (MoWR) is recognized as the nodal agency for water resources. While under the MoWR, there are a number of technical agencies, such as the Central Water Commission to manage surface water, the Central Groundwater Board (CGWB) on ground water resource and the National Water Development Agency (NWDA) in assessing inter-basin transfer options. There are other agencies linked to the MoWR, the Indian National Committee for Irrigation and Drainage, the Indian Water Resources Society, Water and Land Management Institute, Central Water and Power Research Station (CWPRS), National Institute of Hydrology, Indian Council for Agricultural Research (ICAR) and others. In addition, there are agencies that are involved in various aspects of river basin management, through wasteland development, promoting drinking water and sanitation, agricultural development, pollution control and others. The Planning Commission at the national level provides project clearance and approves financial allocation to various water (irrigation/ hydropower/ multipurpose) projects in different states. However, given that 'water resources' are a state subject under the constitution, the actual legislative and managerial responsibilities are with the public works, irrigation, or water resources departments at the state level. There are also important organizational arrangements to achieve inter-state and center-state coordination. These include various river boards created under the River Boards Act of 1956 and the National Water Resources Council (NWRC) set up in 1983, and the National Water Board (NWB) set up in 1990. The NWRC is an important policy organ in the Indian water sector as it is the apex body chaired by the Prime Minister and includes the Union Minister of Water Resources and the Chief Ministers of each state. The NWB – considered as executive arm of NWRC is chaired by the Secretary of MOWR and includes the Chief Secretaries of all the states, secretaries of the concerned Union ministries as well as the Chairman of CWC. While state irrigation departments have a larger role in the provision and management of public irrigation systems, local governments such as municipalities and *panchayat* (village council) also play an important role in drinking water supply. In larger cities and towns, water for drinking and some other pressing needs is also supplied by small private contractors (though at exorbitant costs) especially during summer months when municipal supplies fall short of the soaring demands. Pollution control boards set up both at the center and in the states have the responsibility for water quality aspects (Saleth, 2004).

## **2. POLICIES, LAWS AND RIVER BASIN ORGANISATIONS**

### **National Water Policy, 1987**

The Indian National Water Resources Council adopted the National Water Policy in September 1987.<sup>1</sup> The National Water Policy of 1987 recognized water as a precious national resource and it talked of development of water resources based on national perspectives. The Policy called for conjunctive use of surface and groundwater, the need for planning water use on a hydrological basis and inter-basin transfers of water from surplus to deficit regions. More importance was placed on drinking water followed by irrigation, hydro-power and industrial uses. The policy mentions proper institutional arrangements for such purposes.

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<sup>1</sup>The Prime Minister is the Chairman, Union Minister of Water Resources is the Vice-Chairman and Minister of State for Water Resources, concerned Union Ministers/Ministers of State, Chief Ministers of all states and Lieutenant Governors/Administrators of Union Territories are the Members. The Secretary, Ministry of Water Resources is the Secretary of the National Water Resources Council.

## **National Water Policy, 2002**

India's National Water Policy of 2002 was adopted by the National Water Resources Commission (NRWC) April 1, 2002. With water demands outstripping supplies, the government felt the need for revision 15 years after first National Water Policy of 1987.

The Policy recognizes that water is a scarce resource and precious national resource and lays down the broad principles that govern the management of the country's water resources. Some of the key additions are shown in Section 4.1:

“4.1 With a view to give effect to the planning, development and management of the water resources on a hydrological unit basis, along with a multi-sectoral, multi-disciplinary and participatory approach as well as integrating quality, quantity and the environmental aspects, the existing institutions at various levels under the water resources sector will have to be appropriately reoriented / reorganised and even created, wherever necessary. As maintenance of water resource schemes is under non-plan budget, it is generally being neglected. The institutional arrangements should be such that this vital aspect is given importance equal or even more than that of new constructions.

4.2 Appropriate river basin organisations should be established for the planned development and management of a river basin as a whole or sub-basins, wherever necessary. Special multi-disciplinary units should be set up to prepare comprehensive plans taking into account not only the needs of irrigation but also harmonising various other water uses, so that the available water resources are determined and put to optimum use having regard to existing agreements or awards of Tribunals under the relevant laws. The scope and powers of the river basin organisations shall be decided by the basin states themselves.” (National Water Policy, 2002).

While National Water Policy 1987 mentions about proper institutional arrangements National Water Policy, 2002 clearly spells out the need for RBOs and recommends such institutional establishments for river basin management. However, in implementation it was not the same.

### **2.1 Legal framework for Creating River Basin Organizations in India<sup>2</sup>**

The legal framework for constituting an Inter-State River Basin Organization is contained within the Constitution of India itself. The Constitution of India has vested powers on the Parliament of India for the “Regulation and development of Inter-State rivers and river valleys to the extent to which such regulation and development under the control of Union is declared by the Parliament by law to be expedient in the public interest” by virtue of Entry No. 56 of List I in the Seventh Schedule to Article 246 [as has been described above]. This power vested in the Parliament of India is supreme because the powers vested in the state (Legislatures) over water, by virtue of Entry 17 List II Seventh Schedule to Article 246 is specifically made subject to Entry No. 56 of List I in the Seventh Schedule to Article 246. The parliament of India within six years of adopting the Constitution of independent India, enacted a specific law for the constitution of the River Basin Authority, namely the River Boards Act, 1956 (Act 49 of 1956). However, despite this path breaking law of 1956, not a single River Board has been constituted under this Act (Iyer, 1994; Naqvi, 2006).

This is largely due to the fact in Section 4(1) of the Act the exercise of the power of the government of India to establish a River Board is dependent on a “request received from a state government”. No state government has either made any such request nor is any state government likely to make any such request.

Another reason for the failure of this act might be the Inter-State Water Disputes Act, which was also enacted in 1956 (Act 36 of 1956). Under the Inter-State Disputes Act the central government is bound to constitute a Water Tribunal when there is a complaint even by any one of the riparian states, whereas in case of the River Boards Act there should be a collective request for the constitution of an inter-State River Board. If this be the position, the co-existence of a River Board and a Water Tribunal seems questionable. Even if a River Board would have been set up it cannot be said that the riparian states would have waived their rights under the Inter-States Water Disputes Act of seeking the constitution of a Water Tribunal for the settlement of any disputes with respect to the very same inter-state river for which the Board is operating. An element of “dispute” seems to be the primary reason for the government to act and not the “regulation and development of the river”.

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<sup>2</sup>This section captures the central theme of the draft report of Naqvi (2006).

River Boards under the 1956 Act were also not constituted as in that case the State's constitutional power over water under Entry 17 would become subject to the power of the River Board following its constitution. Yet another reason could be that whereas under the dispute resolution mechanism under the Inter-States Water Disputes Act of 1956 a state would become entitled to a specific share in the inter-state river water, but under the River Boards Act a state can merely raise a dispute pertaining to an advice given by the Board with respect to the inter-state river. Whereas by the Tribunal Award the state would enjoy absolute rights over the use of that share of water, an agreement subjected to the River Board may prevent the state in exercising its rights over the river water which may have been apportioned to it.

## **2.2 Approaches to River Basin Management in India**

In this section we summarize Indian River Basin Boards with reference to their origin, functions, structure and achievements. As a whole it can be understood from this section that, in the Indian context, most RBOs are structured for planning, design and implementation of large projects-and thus follow the top-down approach rather than the bottom-up approach.

### *2.2.1 Origin of existing basin boards<sup>3</sup>*

The origin of River Basin Boards in India can be seen from two perspectives: (i) function vested upon the board by certain policies, (ii) legal considerations for its formation. The legal instruments that have been applied for the establishment of these boards are –

- Specific Acts for the establishment of RBOs as in the case of the Damodar Valley Corporation or Brahmaputra Board
- RBOs formed by Tribunals as a result of existing inter-states river water disputes among riparian countries. Here the Inter-State Water Disputes Act of 1956 was made use of
- Specific State Acts (Bhakra Beas Management Board), Notifications (Tungabhadra Board) or MoU between states as in the case of Upper Yamuna River Board.

The main functions entrusted upon these River Basin Boards or Organizations include flood control, completion of multipurpose projects, allocation of water resources as provided under the Tribunals, and preparation of basin and regional plans for optimum water usage. No use was made of the legal framework at this point.

### *2.2.2 Organization structure of the RBOs<sup>4</sup>*

River Basin Organizations in India are typically either headed by the Ministry of Water Resources or Power or a Chairman appointed by the GoI (who may be a chief engineer of that particular basin or in certain cases may be the Chairman of the Central Water Commission). The structure of the RBOs is generally highly bureaucratic, with no participation of the stakeholders. Thus, all existing basin boards in India follow the top-down approach with decisions taken at the centre or a basin state. Few water users or waterusing sector are generally represented on these boards.

The majority of the Boards are single-tier consisting of the board members headed by a Chairman. The performance of Basin Boards is influenced by the Chairperson in charge. In general, it is perceived that if a board is headed by engineers (whether of that particular basin or the Central Water Commission) it would perform better than a board headed by the state or Central Ministers<sup>5</sup>.

Only few River Basin Boards in India have supporting committees with powers delegated to those committees. For instance, the Bhakra Baes Management Board has separate wings for irrigation and power which are headed by members of the board under a common chairman. The DVC (Damodar Valley Corporation), on the other hand has a corporate structure, but the board has no Committees or sub-committees.

<sup>3</sup> Detailed Description of this is present in Annex 2, Table 1 provides summary

<sup>4</sup> Detailed Description of this is present in Annex 3, Table 2 provides summary

<sup>5</sup> This statement is based on the perceptions of some of the personnel of Central Water Commission interviewed.

Table 1: Origin of the Existing RBOs in India

River Basin Organisation	Year of establishment	Purpose of Origin			
		Legal			Policy
		Acts	Tribunals	State and Central Acts	
The Damodar Valley Corporation	1948	Damodar Valley Corporation Act, 1948.			
Tungabhadra Board	1955			Notification No. DW VI(4)(S) dated 10.3.55 by the GOI <sup>6</sup> in exercise of the powers vested under Section 66(4) of Andhra Pradesh State Act	Completion of the Tungabhadra Project, maintenance and operation.
Bhakra-Beas Management Board	1976			Constituted by GOI under Section 79 of Punjab reorganization Act 1966	Administration, maintenance and operation of Bhakra-Nangal Project.
Cauvery River Authority	1998		River Cauvery Water Disputes Tribunal (1998)		Implementation of interim order of the tribunal, final verdict was awarded recently.
Ganga Flood Control	1972				Resolution by the Ministry of Irrigation and Power for tackling floods in Ganga and its tributaries
Bansagar Control Board	1976				Constituted for efficient, economical and early execution of Bansagar Dam and connected networks.
Brahmaputra Board	1980	Brahmaputra Board Act, 1980			

<sup>6</sup>GOI refers to Government of India

Table 1: Origin of the Existing RBOs in India

River Basin Organisation	Year of establishment	Purpose of Origin			
		Legal			Policy
		Acts	Tribunals	State and Central Acts	
Narmada Control Authority	1980		Narmada Water Disputes Tribunal under clause XIV		Proper implementation of the decisions of the Tribunal
Rajasthan Canal Board	1958				To ensure efficient, economical and speedy completion of the project
Upper Yamuna River Board	1994			MoU signed by the Chief Ministers of the riparian states (HP, Haryana, UP, Rajasthan and Delhi)	Allocation of utilizable surface water flow
Betwa River Board			Constituted under the Betwa River Board Act, 1976		Efficient, economical and early execution of Rajghat Dam project
Krishna-Godavari Commission	1961				Review of availability of supplies in the concerned basins and to determine the extents to which further demands can be met from this basins
Sone River Commission	1980				Compiling and analyzing Hydrological and Hydrometeorological data, consumptive use data and to carry out investigations and studies for basin level plans

Source: Compiled by the authors from the websites listed below:

<http://www.uryb.nic.in/home.htm>

<http://wrmin.nic.in/cooperation/uyrb.htm>

<http://www.dvcindia.org/>

<http://wbpower.nic.in/dvc.htm>

<http://wrmin.nic.in/cooperation/brahmaputra.htm>

<http://bbmb.gov.in/english/index.asp>

<http://wrmin.nic.in/responsibility/bbmb.htm>

<http://www.rajirrigation.gov.in/2ignb.htm>

<http://www.wrmin.nic.in/cooperation/abhadra.htm>

<http://www.tbboard.org/>

<http://wrmin.nic.in/cooperation/betwa.htm>

Table 2: Organizational Structure of the RBOs

River Basin Organization	Organizational structure					
	Number of Tiers	Controlled By	Board	Executive Committee	ED/Manager/Secretary	Other Committee
The Damodar Valley Corporation	Corporate (presence of delegation of powers through line officers where respective offices are headed by Chief Engineers)		The Board is headed by the Chairman under whom there are 3 personnel. There are two other members appointed by the riparian state governments			
Tungabhadra Board	Single tier		Board consists of 4 members headed by a Chairman (Engineer Godavari-Krishana basin), 1 member from GOI (Financial Advisor to MOWR), 1 Chief Engineer (Irrigation and CAD dept.) from Govt. of AP and 1 Secretary to Govt. of Karnataka (Water Resources)			
Bhakra-Beas Management Board (BBMB)	Two tiers - under the Chairman comes the Power, Irrigation and Finance and Accounts wing. These wings are further delegated		BBMB is headed by a Whole Time Chairman and two Whole Time Members i.e. Member (Irrigation) and Member (Power) who head the Irrigation and Power Wings of BBMB respectively. There are 5 other members out of which 3 are secretary to the Govt. of riparian			i) Under the Member (Power) there are 3 Chief Engineers, ii) Under the Member (Irrigation) there are 3 Chief Engineers, iii) Under the Finance and Accounts Advisor



River Basin Organization	Organizational structure					
	Number of Tiers	Controlled By	Board	Executive Committee	ED/Manager/Secretary	Other Committee
			states (power and irrigation) and 2 to the GOI (Power and Water Resources).			comes the Deputy Finance and Accounts Officer and Senior Officers
Cauvery River Authority	Single tier		Board consists of 5 members headed by Prime Minister of India, the other members being the Chief Ministers of the 4 riparian states		The Union Minister of Water Resources would be the Secretary of the Authority	There exists a 11 member Monitoring Committee headed by the Secretary to the Ministry of Water Resources (GOI), 2 members from CWC, 4 Secretaries of the riparian state governments and 4 Engineers of the State Governments.
Ganga Flood Control Board(Ganga Flood Control Commission <sup>7</sup> established in 1972 is the Secretariat and Executive wing of the Board)	Single tier	Subordinate office of the Ministry of Water Resources	19 member Board headed by Union Minister of Water Resources comprising of six Union Ministers, Chief ministers of 11 riparian States (including Delhi) ,1 member of Planning Commission and Chairman of GFCC (Patna)			

<sup>7</sup> Ganga Flood Control Commission (GFCC), a subordinate office of Ministry of Water Resources, with its headquarter at Patna, was created in the year 1972 to deal with floods and its management in Ganga basin States vide Govt. of India Resolution No. F.C.47(3)/72 dated 18.04.72, as secretariat and executive wing of Ganga Flood Control Board, headed by Hon'ble Union Minister of Water Resources. Chief Ministers of basin States or their representative and Member, Planning Commission, are the members of the Board. Chairman, GFCC acts as the Member -Secretary of the Board. The Commission is headed by a Chairman, who is assisted by two full time Members, four Directors and 94 nos. of supporting staff. The representatives of the concerned Central Ministries as Well as Chief Engineers of the basin States are either part-time Members or permanent invitees of the Commission.

River Basin Organization	Organizational structure					
	Number of Tiers	Controlled By	Board	Executive Committee	ED/Manager/Secretary	Other Committee
Bansagar Control Board Single tier	Single tier		Board headed by Union Minister of Water resources with all members being politicians including the Chief Minister, Minister of Power and Irrigation of the three states (Madhya Pradesh, Uttar Pradesh and Bihar)	Executive Committee looks into the day to day affairs. It is headed by Chairman of CWC		
Brahmaputra Board	Single tier	Autonomous statutory body	Board consists of 21 members of which, 4 are full time and 17 part-time and 4 other invited member. Members represent seven states of the north-eastern region.		The General Manager, as the Chief Executive Authority of the Board, is responsible for proper administration of the affairs of the Board	
Narmada Control Authority	Single – Comprising of the board members and other Sub-Committees		Board of Fifteen members, out of which 4 are Secretary to GOI, 4 Secretary to the riparian State Governments 3 Chief Engineer appointed by GOI for Environmental concerns and R&R, 4 other engineers appointed by GOI for power and irrigation		The Authority shall employ a Secretary, who shall be an Engineer	Sub-Committees – Environmental Sub-group, Resettlement and Rehabilitation sub-group, Resettlement Committee, Hydromet Sub-group, Narmada Main Canal Committee, Power sub-committee, Sardar Sarovar Reservoir Regulation Committee

River Basin Organization	Organizational structure					
	Number of Tiers	Controlled By	Board	Executive Committee	ED/Manager/Secretary	Other Committee
Indira Gandhi Nahar Board (previously Rajasthan Canal Board)	Two – i) Standing Committee and Chief Engineer, Bikaner ii) Financial Advisor and chief Engineer, Jaisalmer	Under purview of Inter State Control Boards during their construction phase and were passed on to the State Irrigation CAD & WU departments for maintenance and operation headed by Minister (Indira Gandhi Nahar Project) followed by Committee of Directors headed by Chief Secretary	Twelve member Board headed by Chairman cum Administrator, comprising of 7 Secretaries to different Departments and rest are engineers			
Upper Yamuna River Board (one-tier)	Single tier		Board constituting of eleven members headed by Chairman of CWC and comprising of engineers (10)and one hydro-geologist			

River Basin Organization	Organizational structure					
	Number of Tiers	Controlled By	Board	Executive Committee	ED/Manager/Secretary	Other Committee
Betwa River Board (three tier)	Three – Board, Executive Committee and High Level Committee		Headed By Union Minister of Water Resources. It is the apex body of the Board and reviews the progress and performance of the project	Exercises all the executive and financial powers. Headed by Chairman of CWC		High Level Committee – comprises of Chief Engineer, Secretary and Financial Advisor of the Board. This body carries out the activities as laid down by the EC

Source: Compiled by the authors from the websites listed below:

<http://www.uryb.nic.in/home.htm>

<http://wrmin.nic.in/cooperation/uyrb.htm>

<http://www.dvcindia.org/>

<http://wbpower.nic.in/dvc.htm>

<http://wrmin.nic.in/cooperation/brahmaputra.htm>

<http://bbmb.gov.in/english/index.asp>

<http://wrmin.nic.in/responsibility/bbmb.htm>

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<http://www.wrmin.nic.in/cooperation/tungabhadra.htm>

<http://www.tbboard.org/>

<http://wrmin.nic.in/cooperation/betwa.htm>

Thus, there is currently no uniform basin structure in India. Simply increasing the number of members in the board would not necessarily increase the efficiency of the organization; instead a delegation of duties according to the situation that may arise could improve water resources management.

The large majority of the various basin boards and RBOs currently in existence in India are functional in scope, that is, the adopted approach is demand-oriented and focuses on the resolution of specific problems in the river basin.

### *2.2.3 Primary Functions of Indian RBOs*

The functions of River Basin Boards vary ranging from

- I. preparation of basin level and regional plans,
- II. maintenance of the allocation of water supplies for different uses,
- III. generation of hydroelectric power
- IV. investigations for further allocations if it is to be made
- V. maintenance of the multi-purpose projects
- VI. monitoring etc.

Thus, different Basin Boards have different motivations behind their formation, which are basically need-specific. Moreover, the funding of these boards differ: While some generate their own funding and budget, others depend on the government. Details are provided in Table 4.

Table 3: Functions of Indian River Basin Boards

River Basin Organisation	Functions						
	Allocation of Water	Distribution of Water	Civil Construction	Power Generation and Transmission	Comprehensive Plan for Basin Management	Data Generation and Dissemination	Other
The Damodar Valley Corporation	For irrigation and water supply	Supply of water for kharif, rabi and boro cultivation in the command areas as well as for non-agricultural use	From inception a network of four dams have been constructed. The board takes care of maintenance and operation of the dams	Generation of Thermal and hydroelectricity as well as transmission and distribution of power			Flood control, control of soil erosion and socio-economic development of the people living in the valley
Tungabhadra Board	Allocation according to the Tribunal between AP and Karnataka		Maintenance of dam and reservoir of the project	Regulation of power from the two power houses			Granting of lease to the fisheries, development of new schemes for hydropower generation and generation of revenue from the assets of the Board
Bhakra-Beas Management Board		Regulation of supply of water among the riparian states	Operation and maintenance of Bhakra-Nangal project	Generation, regulation of hydroelectricity and distribution of power among the riparian states			Providing and performing engineering & related technical and consultancy services in the various fields of hydroelectric power projects and irrigation projects and to carry on all kinds of business related thereto, either independently or as a Joint Venture with any Central/State/Public Sector Undertaking(s) or establishment(s) under the administrative control of Ministry of Power. Joint venture with any other agency/organization will be subjected to the approval of the Central Government

River Basin Organisation	Functions						
	Allocation of Water	Distribution of Water	Civil Construction	Power Generation and Transmission	Comprehensive Plan for Basin Management	Data Generation and Dissemination	Other
Cauvery River Authority	Allocation of water among riparian states according to the Tribunal's award						
Ganga Flood Control Commission					Plan for flood control and its implementation	Documentation and dissemination of information	Preparation of budgets for implementing plans, monitoring flood control measures and to monitor the execution of the important flood control schemes particularly those receiving Central Assistance or being executed under the Central Sector
Bansagar Control Board							
Brahmaputra Board					Preparing Master Plan for flood control		Controlling bank erosion and improvement of drainage congestion, construction and maintenance of projects

<sup>8</sup> PAs refers to Project Affected Persons

River Basin Organisation	Functions						
	Allocation of Water	Distribution of Water	Civil Construction	Power Generation and Transmission	Comprehensive Plan for Basin Management	Data Generation and Dissemination	Other
Narmada Control Authority	Implementation of the Tribunal for sharing of water			Sharing of power between riparians			Acquisition of land for Sardar Sarovar project, rehabilitation and resettlement of the PAPS <sup>8</sup> , taking environmental safeguards
Upper Yamuna River Board	Supply of water according to the MoU				Planning for catchment area and watershed management, rehabilitation and conservation of environment	Submission of annual reports to the Central and the riparian states	Maintenance of ecological considerations and monitoring groundwater exploitation
Betwa River Board	Sharing of water as per the MoU between UP and MP						
Krishna-Godavari Commission						Reporting on the requirements of the projects on Krishna and Cauvery and on the feasibility of diversion of surplus supplies of the basins	



River Basin Organisation	Functions						
	Allocation of Water	Distribution of Water	Civil Construction	Power Generation and Transmission	Comprehensive Plan for Basin Management	Data Generation and Dissemination	Other
Sone River Commission						Compile and analyse data on - hydrological and hydrometeorological, utilization of Sone waters, socio-economic variables, agronomic and geological, and the completed projects. Preparation of regional plans for optimum use of Sone waters	

Source: Compiled by the authors from the websites listed below:

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<http://www.rajirrigation.gov.in/2ignb.htm>

<http://www.wrmin.nic.in/cooperation/tungabhadra.htm>

<http://www.tbboard.org/>

<http://wrmin.nic.in/cooperation/betwa.htm>

### 3. ACHIEVEMENTS OF INDIAN RIVER BASIN BOARDS

Achievements of Indian River Basin Boards need to be measured in relation to original objectives.

The Damodar Valley Corporation was formed following the model of TVA. The main functions of the DVC are civil works and power generation. The DVC constructed a total of four dams. The board takes care of maintenance and operation of these dams. DVC is responsible for the generation of thermal and hydro electricity as well as transmission and distribution of power. The flood absorption capacity as envisaged in the original plans could not be created due to the reduced scope of work. Despite this, significant flood prevention was achieved. The provision of irrigational facilities has been handed over to the government of West Bengal.

Against the allocation, the utilization of water from the Tungabhadra Project has drastically come down due to heavy siltation in the reservoir.

The constraints facing the BBMB are - (a) Transfer of Control of Head Works at Ropar, Harike and Ferozepur from Govt. of Punjab to BBMB, and (b) Selection of Gauge Discharge sites for installation of Automatic Stage Recorders and drawing of Gauge Discharge Curves at various contact/ control points.

The Cauvery river Authority is a semi-political body for the implementation of the interim order of the Tribunal only. The authority can afford little precedent value or can act as an authority for river basin management. The authority has not yet been formed because the Tribunal has not been accepted by the riparian states of Karnataka and Tamil Nadu. The Narmada Control Authority, Rajasthan Canal Board and the Betwa river Board are yet to complete the projects assigned either by the central or the state governments. The Krishna-Godavari and the Sone river Commission shut down after submission of their final reports as planned.

Table 4. Achievements of the RBOs

RBOs	Envisaged Plan	Achievements
The Damodar Valley Corporation	The Damodar Valley Project was modeled according to the Tennessee Valley Authority and envisaged to generate 200MW of electricity and irrigate 0.308 million hectares in West Bengal through the construction of eight barrages and dams across the river	It was later decided upon to go for four dams – Tilaiya, Konar, Maithon and Panchet and a barrage at Durgapur. Subsequently Tenughat Dam has been constructed by the Government of Bihar. There are hydro-electric power stations at Tilayia, Maithon and Panchet, with total installed capacity of 144 MW. DVC has created irrigation potential of 3640 square kilometres. DVC operates thermal power stations at Bokaro, Chandrapura, Durgapur and Mejia, with total derated capacity of 2745 MW. The power station at Bokaro was biggest in the country when it was built in the fifties. DVC is expanding its thermal power capacity and with the completion of its present plans by 2012 it would be generating more than 5000 MW of power.
Tungabhadra Board	The Krishna Water Disputes Tribunal has made specific provision in the Award for the use of Tungabhadra waters by the States of Karnataka and Andhra Pradesh.	The Board is regulating the water for irrigation, Hydro Power generation and other uses, from the reservoir.

RBOs	Envisaged Plan	Achievements
	<p>The responsibility for carrying out this specific provisions relating to the use of Tungabhadra waters has been entrusted to the Tungabhadra Board by the Tribunal. Two Power Houses are maintained by the Tungabhadra Board with a total installed capacity of 72 MW</p>	<p>The working table for canal-wise distribution of water to the States is prepared every year by the Tungabhadra Board in consultation with the State governments, and is reviewed from time to time during the water year. The working table for canal-wise distribution of water to the States is prepared every year by the Tungabhadra Board in consultation with the State governments, and is reviewed from time to time during the water year. Power generated is 114.8 million units against a target of 200 million units (according to 2000-01 data).</p>
<p>Bhakra-Beas Management Board</p>	<p>Other than operation and maintenance of Bhakra-Nangal Project, Beas Project I and II, regulation of supply of water and power from these projects to the states of Haryana, Punjab and Rajasthan, the other duties envisaged were construction of new Hydro Projects within and outside BBMB System. Construction of Hydel Projects at Thablan, Saunda and Chanarthal on Bhakra Main Line (BML) with an aggregate capacity of 19MW.</p>	<p>It has been remarked that it is one of the best managed Boards in the country. One of the unique characters of the Board is the absence of any Minister either from the State or central in the Board. BBMB plays a vital role in the day to day operation of the northern grid. The powerhouses help in frequency regulation of the grid by flexing generation between 1900 MW and 2800 MW in summers and between 500 MW and 1900 MW during winters. The States of Punjab, Haryana, Rajasthan and Delhi are being supplied, on an average, about 34537.49 MCM (28 MAF) of water per year. All the five units of Bhakra Right Bank powerhouse have been renovated, modernized and uprated from 120 MW to 157 MW each, resulting in an additional installed capacity of 185 MW and additional annual generation of 310 MU. Two units each at Ganguwal and Kotla powerhouses have also been renovated and modernized. All the Six units of Pong Power Plant have been uprated from 60 MW TO 66 MW each. This has resulted into additional peaking capacity of 36MW and additional energy generation of 17.3 MU besides additional reactive power of 90 MVAR.</p>
<p>Cauvery River Authority</p>		
<p>Ganga Flood Control Board</p>	<p>The Commission has been assigned the task of preparing comprehensive plan for flood management of the river system in</p>	<p>The important achievements of GFCC since its establishment in 1972 are summarised below:-(i) An outline plan for flood man</p>

RBOs	Envisaged Plan	Achievements
	<p>flood management of the river system in the Ganga basin, drawing out the phased programme of implementation of various schemes, monitoring of important flood management schemes, assessment of adequacy of waterways under road and rail bridges and providing other technical guidance to the basin States.</p>	<p>agement in Ganga Sub-basin was prepared in 1973.(ii)An approach to the flood problem and remedial measures in Ganga Sub-basin was prepared in 1980. (iii)The comprehensive plans for flood management in all the 23 sub-basins of the Ganga river system were prepared and are being periodically updated. (iv)Formulated guidelines on preparation of flood management schemes including design criteria. (v)Examined the adequacy of water ways in the road and railway bridges in 20 river systems and reports sent to concerned departments/ organizations of Central/ State Governments for follow up action. (vi) Performance evaluation of six completed major flood control schemes has been carried out. (vii)GFCC has been monitoring eight “on-going flood control schemes in Ganga basin</p>
Bansagar Control Board	<p>It has been decided to set up the Bansagar Control Board with a view to ensuring the efficient, economical and early execution of Bansagar dam including all connected works in Madhya Pradesh, but excluding the canal systems which will be executed by respective States namely, Madhya Pradesh, Uttar Pradesh and Bihar. Expected year of completion of the project was: Dam – 2003 Canals - 2012</p>	<p>The project is being executed by the Madhya Pradesh Government under overall direction of the Board/Executive Committee on broad policies concerning the project. There are two field units e.g. Works and Land Acquisition and Rehabilitation (which is functioning independently since 1987).</p>
Brahmaputra Board	<p>The main functions of the board are spelled out in the Brahmaputra Board Act 1980. This consists mainly of preparation of the master Plan to control floods after carrying out surveys and investigations. The Master plan should have regards to the utilization and development of the water resources for irrigation, hydropower and navigation. This should also contain the budgets and estimates for proposed projects.</p>	<p>Three Master Plans (I, II, III) have been set up for Brahmaputra, Barak and 41 tributaries respectively. Several Multipurpose Projects have been identified by the Board namely, Pagladiya ( in Assam), Tipaimukh (at Manipur-Mizoram), Subansiri (at Gerukamukh, Tamen), Menga (in Arunachal Pradesh), Dehang at Pasighat, Along, Pugging (in Arunachal Pradesh), Lohit (in Arunachal Pradesh), Debang (in Arunachal Pradesh), Kameng (in Arunachal Pradesh), Bairabi (in Mizoram), Someshwari (in Meghalaya), Jadukata (in Meghalaya), Kulsi (in Meghalaya). Till now Detailed Project</p>

RBOs	Envisaged Plan	Achievements
		<p>Reports of five multipurpose projects have been completed by the Board. These are Subansiri, Dehang, Pagladiya, Tipaimukh and Bairabi Dam Projects. In addition to this North-eastern Hydraulic and Allied Research institute have also been set up to facilitate the functioning of the Board.</p>
<p>Narmada Control Authority</p>	<p>The role of the Authority will mainly comprise of overall coordination and direction of the implementation of all the projects including the engineering works, the environmental protection measures and the rehabilitation program and to ensure the faithful compliance of the terms and conditions stipulated by the Central Government at the time of clearance of the aforesaid projects</p>	<p>i) The Resettlement and Rehabilitation Policy for the affected persons of Sardar Sarovar Project (SSP) is based on the decisions and final orders of the Narmada Water Disputes Tribunal (NWDT) Award. Considering the socio-economic and cultural background of the population being displaced and with a view to improving the living conditions of these people, all the three participating States have formulated their own policies which contain more liberal provisions than those envisaged in the Narmada Water Disputes Tribunal (NWDT) Award. ii) All studies relating to the clearance of Sardar Sarovar Project and Indira Sagar Project have been completed. Further studies to firm up to mitigative measures are continuing. The studies so far conducted have shown that the positive impacts, if any, can be managed with the help of safeguards being implemented. Relevant environmental action plans are also in place and under advance stage of implementation. Draft guidelines for conservation and development of Fisheries in the reservoir, streams and rivulets are on the anvil. A management information system using computer network with participating States and coordinating Ministry of Government of India is being developed in NCA. iii) The Narmada Control Authority has planned the setting up of Energy Management Centre at Indore at a cost of Rs. 36.9 million for monitoring the sharing of power produced at Sardar Sarovar Project by the Party States. The Narmada Control Authority has planned the setting up of Energy Management Centre at Indore at a cost of Rs. 36.9 million for monitoring the sharing of power produced at Sardar Sarovar Project by the Party States.</p>

RBOs	Envisaged Plan	Achievements
Rajasthan Canal Board/IGNP	Indira Gandhi Nahar Project was designed to utilise 9,367 Mm <sup>3</sup> /yr of the total 10,608 Mm <sup>3</sup> /yr allocated to Rajasthan from the surplus waters of the Ravi and Beas rivers. The construction of the project has been divided into two stages: Stage I – consists of 204 km feeder canal, 189 main canal and 3454 km long distribution system. In addition to irrigation and domestic water supply through this project, it has been proposed by the Rajasthan State Electricity Board (RSEB) to install a total of 12.76 MW of mini hydro electric power stations, to utilize the available water fall in the canal. Stage II - IGNP Stage II comprises construction of a 256 km long main canal and 5,606 km of a lined distribution system, and will serve 1,410 kha of CCA	Stage I – feeder canal, main canal as well as the distributary canals are all lined serving an area of 553 kha of command area. One such power station, with an installed capacity of 2.2 MW has already started functioning at the Suratgarh branch of IGNP stage I. Stage II - The main canal in the entire length was completed in the year 1986.
Upper Yamuna River Board	After the MoU was signed between the states ( comprising of Himachal Pradesh, Delhi, Uttar Pradesh, Rajasthan and Haryana) a separate agreement on construction of Hathnikund Barrage on the Yamuna was signed on 2nd November, 1994, and agreements on Kishau Dam on the Tons river and Renuka Dam on the Giri river were signed on 6th November, 1994 by all co-basin States, except Rajasthan.	The construction of the Hathnikund Barrage, since completed, was taken up under the World Bank assisted Haryana Water Resources Consolidation Project. While the Renuka Dam Project has been cleared from the techno-economic angle subject to clearance of concerned State Governments/ Ministries for cost sharing, environmental conservation and rehabilitation and resettlement considerations, the clearance of Kishau Dam Project has been deferred pending establishment of its economic viability. A review Committee to the UYRB has been set up to look into the allocation of the available surface water.
Betwa River Board	The Betwa River Board has been established for the creation of a reservoir at Rajghat by Construction on behalf of the Government of Madhya Pradesh and Uttar Pradesh, of a Dam on Betwa River at Rajghat and for the regulation of such reservoir. It is an Inter-State Project and it performs development of Betwa River & River Valley by creating a dam known as Rajghat Dam.	The Rajghat Dam and Rajghat Hydro Electric Projects are inter-State projects of Madhya Pradesh and Uttar Pradesh. The estimated cost of the Rajghat Dam is Rs 300.60 crore (at 2000 price level) and that of the Power House Rs 139.74 crore (at 1997 price level). The total expenditure incurred on the project is Rs 270.38 crore up to December 2004. The Rajghat Dam is almost complete. All the three units of

RBOs	Envisaged Plan	Achievements
		Rajghat Hydro-Electric Project have been synchronised during 1999 and 1431 units of electricity was generated during the year 2004-05 and 972 units up to 5 December 2005.
Krishna-Godavari Commission	Review the availability of supplies in Krishna and Godavari basins and to determine the extent to which further demands on these basins.	The Commission was wound up after submission of its final report in 1962. The recommendations of the Commission include establishment of a network of hydrometrological, sediment and water quality observation sites as well as setting up of inter-state river board for coordinated planning and integrated operation of all projects.
Sone River Commission	The scope of the Commission was limited only to the extent of compiling and analyzing hydrological and hydrometeorological data, consumptive use data and to carry out investigations and studies for the preparation of basin and regional plans.	The Commission prepared a comprehensive Sone river basin plan for the optimum use of its water for various uses after carrying out system studies. The Sone River Commission had since been wound up in 1988 after submission of the final report containing the details of master plan for the Sone basin.

Sources: Compiled by the authors after visiting the following websites –

<http://www.uryb.nic.in/home.htm>

<http://wrmin.nic.in/cooperation/uyrb.htm>

<http://www.dvcindia.org/>

<http://wbpower.nic.in/dvc.htm>

<http://wrmin.nic.in/cooperation/brahmaputra.htm>

<http://bbmb.gov.in/english/index.asp>

<http://wrmin.nic.in/responsibility/bbmb.htm>

<http://www.rajirrigation.gov.in/2ignb.htm>

<http://www.wrmin.nic.in/cooperation/tungabhadra.htm>

## 4. CONCLUSION

According to Hooper (2006), we can classify the River Basin Organizations into the following heads: Advisory Committee / Board, Association, Commission, Corporation, Council, Federation, Tribunal and Trust. This classification is based on the structure, formation and the functioning of the institutions related to the river basin management. In India, all the boards which are discussed fall under Advisory Committee/Board excepting DVC (which falls under Corporation) and Cauvery River Authority and Narmada Control Authority which are formed under the Tribunals (though both of them are set as Authorities).

Parliament can develop inter-state river basin boards [1956 River Boards Act] when they are in the public interest and requested collectively by states, but states are generally not interested, and perceive this as a loss of power. Till date this remains a 'dead letter' (Iyer, 2003). The legal instruments that have been applied for the establishment of these boards are –

- Specific Acts for the establishment of RBOs as in the case of the Damodar Valley Corporation or Brahmaputra Board
- RBOs formed by Tribunals as a result of existing inter-states river water disputes among riparian countries. Here the Inter-State Water Disputes Act of 1956 was made use of
- Specific State Acts (Bhakra Beas Management Board), Notifications (Tungabhadra Board) or MoU between states as in the case of Upper Yamuna River Board.

### *Indian river basin management to date thus focuses on solutions of specific problems*

Similar to other countries and regions, for example, Sub-Saharan Africa, the great majority of existing organizations for IRBM in India is functional in scope, e.g. the adopted approach is demand-oriented and focuses on the resolution of specific problems in the river basin in question. The two main functions are planning and construction of infrastructure, and conflict resolution. Many of the Indian basin organizations have short-term objectives and some have been disbanded following achievement of these objectives.

Integrated approaches to (transboundary) river basin management that focus on the river basin as a whole and try to resolve the existing hydrologic, ecologic and socio-economic problems through holistic policies is not currently practiced in India. The integrated approach has been widely endorsed and promoted by international organizations, for example, GWP, as well as by NGOs and scientists but suffers from very limited practical applications. Examples include the Damodar Valley Corporation, the Bhakara-Beas Management Board, or the Cauvery River Authority, respectively. The experience gathered in these Basin Boards and River Authorities could serve for future more integrated approaches to river basin management. End users are currently not included in basin management structures.

Study on Indian River Basin Boards, how they can be more integrative in terms of agencies involved and in terms of end users. This is to be done particularly keeping in mind the efficiency of the proposed functions for the RBOs. Several model RBOs have been proposed of which perhaps the model proposed by the National Commission for Integrated Water Resources Development and Plan (recommendations put forward in 2004 report) can be taken up for such purposes after considering its suitability.

However, the following impediments can be identified for the formation of the RBOs in India. There impediments are based on formal rules, laws and procedures. Leaving those aside there are also other impediments originating from the political, economic, and institutional environment.

### *Political Impediments*

Political reasons might have led to the enactment of the River Boards Act in 1956, but might also have stopped the central government in constituting any River Boards for the inter-state rivers. The political compulsions may be due to multi-party political structure of the country where there may not be the same political party ruling at the Centre and the State simultaneously. This prevents the central government from imposing upon a state, a decision, which a state is unwilling to accept.



### *Economic Impediments*

Insufficient funds for the large projects may also be one of the reasons to create River Boards and Organizations.

### *Institutional Impediments*

Over the past 50 years several River Basin Authorities have been constituted. Despite this, the National Commission for Integrated Water Resources Development Plan admits in one of its reports submitted in 1999 that India does not have a successful model of RBO and it is in this report it recommended for a model RBO. Till date such a model RBO has not yet been constituted.

## **REFERENCES**

- Abernethy C.L. (2005), River Basin Management and Organizations: A General Overview, Paper presented at Training Workshop on River Basin Management and Organizations, organized by NARBO, Sri Lanka.
- Amarsinghe et al (2005), Spatial Variation in Water Supply and Demand across river basins in India, IWMI, Research Report 83, 2005, available at [http://www.iwmi.cgiar.org/pubs/pub083/RR83\\_distribution.pdf](http://www.iwmi.cgiar.org/pubs/pub083/RR83_distribution.pdf)
- Anon (1993), Sardar Sarovar Project - review of Rehabilitation & Resettlements in Maharashtra. *Economic and Political Weekly*. 28, 34, 21, August. p.1705-14.
- Bandaragoda, D J (2002), A framework for institutional analysis for water-resources management in a river-basin context, Integrated Water Resources Management in a River Basin Context: Institutional Strategies for Improving the productivity of Agricultural Water Management. Sri Lanka: International Water Management Institute, p 3-18.
- Bandyopadhyay, Jayant. (1987), Political ecology of drought and water scarcity: Need for an ecological water resources policy. *Economic and Political Weekly*, 22, 50, p.2159-2169.
- Bansil, P C. (2004), Water Management in India. Concept Publication, New Delhi.
- Cernea, Michael M. (1987), Farmer Organisations and Institution building for sustainable development. Regional Development Dialogue, Vol. 8, No. 2, p 1-19.
- Chandra S, India: Flood Management- Damodar River Basin in WMO/GWP Associated Programme on Flood Management available at [http://www.apfm.info/pdf/case\\_studies/india.pdf](http://www.apfm.info/pdf/case_studies/india.pdf)
- Damodar Valley Corporation website <http://www.dvcindia.org/> and <http://wbpower.nic.in/dvc.htm>
- Hooper, B. P. 2006. Key Performance Indicators of River Basin Organizations. Technical Note, Visitor Scholar Program-01, Institute of Water Resources, US Army Corps of Engineers.
- Iyer R. (2003) Water: Perspectives, Issues, Concerns, Sage Publications, New Delhi.
- Kerr, J. (2002), Watershed Development Projects In India: An Evaluation. (in collaboration with Ganesh Pangare and Vasudha Lokur Pangare). Washington, D.C.: IFPRI.
- Mitra, K. Ashok (1986), Underutilised surface irrigation in drought prone area of Western Maharashtra. in *Economic and Political Weekly*. 26 April. p. 752-6.
- Naqvi, S; (June, 2006), River Basin Organisation for Brahmaputra-Barak Basins- Legal and Constitutional Issues in Background Paper 9 of Study on Natural Resources, water and the Environment, Nexus for Development and growth in North-East India.

- North, Douglas C. (1990), Institutions, institutional change and economic performance. Cambridge University Press, New York.
- Raju K.V; A. Taron and C. Ringler (2007), Integrated River Basin Management: The Indian Context. (Unpublished Report).
- Report of the Water Resources Ministry on Upper Yamuna River Board available at <http://wrmin.nic.in/cooperation/uyrb.htm>
- River Basins Organizations in India – Institutional Frameworks and Management Options. A Case for Fundamental Review, published by South Asian Network of Rivers, Dams and people, November, 1999 in Thematic Reviews: Institutional and Governance Issues, available at [http://www.zef.de/module/register/media/0f22\\_Saravanan-RiverBasin\\_wcd.pdf](http://www.zef.de/module/register/media/0f22_Saravanan-RiverBasin_wcd.pdf)
- Report of the Ministry of Water Resources on Brahmaputra Board available at <http://wrmin.nic.in/cooperation/brahmaputra.htm>
- GOI, (1999), Report of the National Commission for Integrated Water Resources Development Plan (September, 1999), Vol. I, Ministry of Water Resources, Government of India, New Delhi.
- Radosevich E.G et. al., (1999), Existing and Emerging Basins Arrangements in Asia: The Tarim Basin Water Resources Commission and the Mekong River Commission, Paper presented at the Third Workshop on River Basin Institution Development, The World Bank, Washington DC.
- Thakkar H., (2005), A reality check on Bhakra published in the website [http://www.sandrp.in/dams/reality\\_bhakra.pdf](http://www.sandrp.in/dams/reality_bhakra.pdf)
- Saleth, R.M. (2004), Strategic analysis of water institutions in India: Application of a new research paradigm. Colombo, Sri Lanka. IWMI.
- Small, Leslie E.; and Mark Svendsen (1990), A framework for Assessing Irrigation Performance. Irrigation and Drainage Systems, Vol. 4 p 283-312.
- Shah, Tushar; et. al. (2002), The Challenges of Integrated River Basin Management in India, IWMI Research report available at [http://www.iwmi.cgiar.org/home/integrated\\_river\\_basin.htm](http://www.iwmi.cgiar.org/home/integrated_river_basin.htm)
- World Bank (1999), India Water Resources Management Sector Review – Initiating and Sustaining Water Sector Reforms. Report No. 18356-IN with five supporting volumes.

## **WEBSITES VISITED**

### **BRAHMAPUTRA BOARD**

<http://brahmaputraboard.gov.in/>

<http://wrmin.nic.in/writereaddata/linkimages/anu1732289380.pdf>

<http://wrmin.nic.in/index3.asp?sslid=425&subsublinkid=716&langid=1>

### **Tungabhadra Board**

<http://wrmin.nic.in/writereaddata/linkimages/anu232446218181.pdf>

<http://wrmin.nic.in/index2.asp?sublinkid=561&langid=1&slid=757>

### **Upper Yamuna River Board**

<http://uyrb.nic.in/banner.htm>

<http://wrmin.nic.in/writereaddata/linkimages/CHAPTER%20-%2081946894100.pdf>

*Bhakra Beas Management Board*

<http://bbmb.gov.in/english/index.asp>

Betwa River Board

<http://wrmin.nic.in/writereaddata/linkimages/BRBAct5732622713.pdf>

Ganga Flood Control Commission

[wrmin.nic.in/writereaddata/linkimages/anu156988494413.pdf](http://wrmin.nic.in/writereaddata/linkimages/anu156988494413.pdf)

Bansagar Control Board

<http://wrmin.nic.in/writereaddata/linkimages/anu228556756739.pdf>

<http://wrmin.nic.in/writereaddata/linkimages/bcboard1298196372.pdf>

United Nations Development Programme

[http://europeandcis.undp.org/WaterWiki/index.php/River\\_Basin\\_Organizations#Lessons\\_Learned\\_re:\\_River\\_Basin\\_Organizations](http://europeandcis.undp.org/WaterWiki/index.php/River_Basin_Organizations#Lessons_Learned_re:_River_Basin_Organizations)

## Annex 1: RBOs and their origin

River Basin Organisation	Origin
The Damodar Valley Corporation	<p>The Damodar Valley has been ravaged by floods of varying intensities, but it was the flood of 1943 that left the worst devastation in its wake. As a result the Governor of Bengal appointed a Board of Inquiry to search for a solution. The Board recommended the formation of an Authority similar to that of Tennessee Valley Authority of USA. The Government of India then appointed Mr. W.L.Voorduin, a senior engineer of the Tennessee Valley authority (TVA) to make recommendations for comprehensive development of the valley. He submitted “Preliminary Memorandum of the Unified Development of the Damodar River” suggesting a multi-purpose development plan designed for achieving flood control, irrigation, power generation and navigation in the Damodar Valley. By April 1947, full agreement was reached between the three governments of Central, Bengal and Bihar on implementation of the scheme. In 1948, the Damodar Valley Corporation Act was passed by the Central Legislature requiring the three governments to participate jointly for the purpose of building the Damodar Valley Corporation (DVC).</p>
Tungabhadra Board	<p>Tungabhadra Board was constituted in March, 1955 vide notification No. DW VI (4)(S) dated 10.3.1955 by the Government of India in exercise of the power vested under Section 66(4) of the Andhra Pradesh State Act for completion of Tungabhadra Project and for its operation and maintenance.</p>
Bhakra-Beas Management Board	<p>The Bhakra-Nangal and Beas Projects were originally the joint ventures of the States of erstwhile Punjab and Rajasthan. On reorganisation of Punjab on Nov.1, 1966, Bhakra Management Board was constituted by the Government of India under section 79 of the Punjab Reorganisation Act 1966 for the administration, maintenance and operation of Bhakra-Nangal Project with effect from 1.10.1967. The Beas Project works on completion were transferred to Bhakra Management Board and it was renamed as Bhakra Beas Management Board (BBMB) w.e.f. 15.5.1976.</p>
Cauvery River Authority	<p>The States of Karnataka and Tamil Nadu are the main riparian States to River Cauvery. The disputes between these States dates back to the 18<sup>th</sup> century. Two agreements were executed between the States, one in 1892 and the other in 1922. In seventies, disputes arose again with Karnataka contending that the agreements have expired. After negotiations failed the Government of India, on the directions of the Supreme Court of India in a Petition filed by the farmers of Tamil Nadu, constituted the River Cauvery Waters Disputes Tribunal. The Tribunal issued an interim order directing Karnataka to release 205TMC of waters to Tamil Nadu in a year. Disputes arose again on the allegations by Tamil Nadu that Karnataka has failed to implement the interim order of the</p>

River Basin Organisation	Origin
	<p>Tribunal. Tamil Nadu moved the Supreme Court for the implementation of the interim order. Before the Supreme Court the Government of India, which was arrayed as party by Tamil Nadu, agreed to constitute an Authority for the implementation of the interim order of the Tribunal. It is in these circumstances that the Cauvery River Authority came to be constituted in 1998.</p>
Ganga Flood Control Board	<p>Ganga Flood Control Commission (GFCC) was constituted through a resolution of the erstwhile Ministry of Irrigation and Power in April, 1972 for tackling the flood problem in the Ganga and its tributaries and the facilitate effective coordination of flood management amongst the Ganga basin states.</p>
Brahmaputra Board	<p>The Brahmaputra Board was set up by the Govt. of India under an Act of Parliament i.e. Brahmaputra Board Act. 1980 (46 of 1980) under the Ministry of Irrigation (now renamed as Ministry of Water Resources). The jurisdiction of the Board includes both the Brahmaputra and Barak Valleys and covers all the States of the North Eastern Region either in full or in part.</p>
Narmada Control Authority	<p>In pursuance of the decision of the Narmada Water Disputes Tribunal under Clause XIV of its final order, the Government of India framed the Narmada Water Scheme, which, inter-alia, constituted the Narmada Control Authority and Review Committee in 1980 for proper implementation of the decisions and directions of the Tribunal.</p>
Rajasthan Canal Board	<p>The Rajasthan Canal Board, later renamed as Indira Gandhi Nahar Board was constituted in December 1958 under resolution No. 19/4/8 1 /IT dated 7th Jan. 1985 by the Ministry of irrigation and Power, Government of India, to ensure efficient, economical and speedy execution of the project. The Board was reconstituted under resolution No. 19/4/81/IT dated 26th Feb. 1990 and again under resolutions dated 6th Jan. 1992, 21st April 1992 and 4th March 1993. The Headquarters of IGN Board is at Jaipur.</p>
Upper Yamuna River Board	<p>Yamuna water dispute regarding allocation of utilisable surface flow of Yamuna among the co-basin States up to Okhla was resolved by way of a MoU signed by the Chief Ministers of Himachal Pradesh, Haryana, Uttar Pradesh, Rajasthan and National Capital Territory (NCT) of Delhi on 12 May 1994. As per the provision in the MoU, the Upper Yamuna River Board (UYRB) with its headquarters in the National Capital Region was constituted. Upper Yamuna Review Committee (UYRC) was also constituted, for supervising the working of the UYRB to ensure implementation of the MoU regarding allocation of surface flow of Yamuna and to issue directions, as deemed necessary, for proper development and management of the upper reaches of the Yamuna River Basin up to Okhla. Uttaranchal has also been made Member of Upper</p>

River Basin Organisation	Origin
	<p>Yamuna River Board and Upper Yamuna Review Committee. The Upper Yamuna Review Committee held a meeting under the Chairmanship of Hon'ble Union Minister (WR) on 12 April 2006. The meeting was inter alia attended by Hon'ble Chief Ministers of Rajasthan, Haryana and NCT of Delhi and Irrigation Ministers of Himachal Pradesh and Uttar Pradesh.</p>
<p>Betwa River Board</p>	<p>The Betwa River Board was constituted by the Ministry of Water Resources for efficient, economical and early execution of the Rajghat Dam Project, a joint venture of Madhya Pradesh and Uttar Pradesh. Headquarter of the Board is at Jhansi (U.P.).</p>
<p>Krishna-Godavari Commission</p>	<p>The Krishna-Godavari basin was constituted in 1961 in order to review the availability of supplies in Krishna and Godavari basins and to determine the extent to which further demands on these basins could be met on the basis on annual flows at Vijaywada on Krishna and Dowlaiswaram on Godavari and the other points taking into account upstream utilization.</p>
<p>Sone River Commission</p>	<p>The Sone River Commission was constituted in 1980. The scope of the Commission was limited only to the extent of compiling and analyzing hydrological and hydrometeorological data, consumptive use data and to carry out investigations and studies for the preparation of basin and regional plans for the optimum use of Sone river waters for irrigation and multi-purpose uses, without any binding on the part of the states to accept its findings.</p>

## Annex 2: Structure of Indian RBOs

River Basin Organisation	Origin
The Damodar Valley Corporation	The Board is headed by a Chairman and two other members appointed by the Central government.
TungaBhadra Board	Composition of the Board: i) Chairman- Appointed by the Government of India ii) Members – one representative each from the riparian states of AP and Karnataka and the Central Government, iii) The administrative set-up is divided into (a) Irrigation wing (b) Hydro-electricity wing.
Bhakra-Beas Management Board	The Board consists of: i) a whole time Chairman, ii) two whole time members, appointed by the GOI, iii) one representative each from states of Punjab, Haryana, Rajasthan and Himachal Pradesh, iv) one member from Ministry of Power, v) one member from Ministry of Water Resources
Cauvery River Authority	Two tier authority: i) Authority – this consists of the Prime Minister of India and the Chief Ministers of the four riparian states. ii) Monitoring Body – composed of a) the Secretary-in-charge of the Ministry dealing with the Water Resources, b) Chief Secretary of the riparian states and their nominees, c) Chairman of the CWC, d) one officer each from the riparian states not below the rank of chief-engineer.
Ganga Flood Control Board	The Commission is headed by Chairman, two full time Members, nine part time Members and four permanent invitees
Bansagar Control Board	i) Union Minister of the Water resources is the Chairman, ii) Union Minister of Power as a member iii) Chief Ministers, Finance and Irrigation Ministers of partner riparian states as members iv) Electricity Minister of MP as a member. The day-to-day affairs of the Board are managed by the Executive Committee under the Chairmanship of Chairman, CWC.
Brahmaputra Board	The Board is headed by a Chairman appointed by the Government of India and has members from governments of the basin states.
Narmada Control Authority	The Authority is headed by the Secretary, Ministry of Water Resources, Government of India, as its Chairman, with Secretaries of the Union Ministries of Power, Environment and Forests, Social Justice and Empowerment, Chief Secretaries of the four party States, one Executive Member and three full-time Members appointed by the Central Government, and four part time Engineering Members nominated by the

River Basin Organisation	Origin
	<p>party States, as Members. The Review Committee of the Narmada Control Authority (RCNCA) headed by the Union Ministry of Water Resources may suo-moto or on the application of any party State or Secretary to the Government of India, Ministry of Environment and Forests, review any decision of the Authority. In urgent cases, the Chairman of the Review Committee may, on application of the Government of any party State, or Secretary to the Government of India, Ministry of Environment and Forests, grant stay of any order of the Authority pending final decision or review.</p>
<p>Rajasthan Canal Board</p>	<p>The Board is headed by a Chairman who is also the Administrator of the Project and is ex-officio Commissioner and Secretary to the Government of Rajasthan in the Indira Gandhi Nahar Department. The members of the Board are:-</p> <ol style="list-style-type: none"> <li>1. Financial Advisor, Ministry of Water Resources</li> <li>2. Jt. Secretary Agriculture, Ministry of Agriculture GOI</li> <li>3. Commissioner, Indus Ministry of Water Resources, GOI Chief Engineer CAD, Ministry of Water Resources, GOI</li> <li>4. Chief Engineer Monitoring CWPC, GOI</li> <li>5. Secretary Finance Department, GOR</li> <li>6. Secretary CAD, GOR</li> <li>7. Secretary PHED, GOI</li> <li>8. Area Development Commissioner CADA IGNP</li> <li>9. Chief Engineer IGNP</li> <li>10. Chief Engineer II IGNP</li> <li>I 1. Chief Engineer CAD IGNP</li> <li>12. Colonization Commissioner, GOR</li> </ol>
<p>Upper Yamuna River Board</p>	<p>The Board consists of Member, CWC as part-time Chairman and one nominee each , not below the rank of Chief Engineer, from the States of U.P., Rajasthan, H.P., Haryana, Uttranchal and NCT of Delhi and a Chief Engineer of Central Electricity Authority and representatives of Central Ground Water Board and Central Pollution Control Board as part time Members. A full time Member Secretary of the Board is required to be appointed by Central Government for a period of 3 years at a time. Further, the expenditure on UYRB is to be shared equally by the aforesaid basin States viz U.P., Uttranchal, Rajasthan, H.P., Haryana and NCT of Delhi</p>
<p>Betwa River Board</p>	<p>The Union Minister for Water Resources is the Chairman of the Board. The activities of the Board are managed by the Executive Committee of the Board under the Chairmanship of Chairman, Central Water Commission.</p>



### Annex 3: Functions of Indian RBOs

River Basin Organisation	Origin
The Damodar Valley Corporation	The original functions of the DVC were: promotion of development and operation of irrigation, water supply, drainage, generation of thermal power and hydro-electricity, flood control, afforestation, navigation, control of soil erosion, public health, agricultural, industrial, economic and general well-being of the valley.
Tungabhadra Board	The board is in charge of the common portion of the Tungabhadra Project and it was entrusted by the Krishna Water Disputes to carry out some specific provisions made in its Award for the use of Tungabhadra water by the states of Karnataka and Andhra Pradesh. The State has been utilising the water for irrigation through the Left Bank main canal, which is exclusively for Koppal and Raichur districts and from the two canals on the right bank — high level and low level — in three taluks of Bellary district along with Andhra Pradesh.
Bhakra-Beas Management Board	<ul style="list-style-type: none"> <li>i) to regulate the supply of waters Beas, Sutlej and Ravi to the states of Punjab, Haryana, Rajasthan and Union Territories of Delhi and Chandigarh</li> <li>ii) Distribution of power in the above States and Union Territories</li> </ul>
Cauvery River Authority	Limited purpose of the authority – for the implementation of the interim order of the Tribunal, until the tribunal issues its final order (Award).
Ganga Flood Control Board	<p>The main functions of the Commission are-</p> <ul style="list-style-type: none"> <li>i) to prepare a comprehensive plan for flood control for the Ganga basin,</li> <li>ii) draw out a phased program for implementation of the plans,</li> <li>iii) advising the concerned states to take up specific guidelines,</li> <li>iv) preparing the budgets for the measures to be undertaken,</li> <li>v) monitoring the works taken up for flood control measures</li> <li>vi) Documentation and dissemination of information.</li> </ul>
Bansagar Control Board	The actual works of the construction will be carried out under the direction of the Control Board by Chief Engineer concerned of the Government of Madhya Pradesh. The Control Board will be overall in charge of the project including its technical and financial aspects.
Brahmaputra Board	The main functions assigned to the Board are to- i) carry out survey & investigation and to prepare Master Plan for the control of floods, bank erosion and improvement of drainage congestion giving the importance to the development and utilization of water resources of the Brahmaputra Board & Barak Valleys for irrigation, hydropower, navigation and other beneficial purposes. ii) Its assignment also includes preparation of detailed project report of the dams and other projects identified in the Master Plan as approved by the Central Government and iii) to take up construction and maintenance of the projects approved by the Central Govt. and works connected therewith as proposed in the Master Plan and also to maintain and operate such dams and works.

River Basin Organisation	Origin
Narmada Control Authority	The Narmada Control Authority has been vested with the powers for the implementation of the orders of the tribunal with respect to the storage, apportionment, regulation and control of the Narmada waters, sharing of power benefits from Sardar Sarovar Project (SSP) regulated release of water by Madhya Pradesh, acquisition of land likely to be submerged under the Sardar Sarovar Project by the concerned States, compensation, resettlement and rehabilitation of the oustees, sharing of costs and implementation of the environmental safeguard measures.
Rajasthan Canal Board	Mainly for irrigational projects.
Upper Yamuna River Board	<p>The main Functions of the Board include:</p> <ul style="list-style-type: none"> <li>i) Regulation and supply of water from all storages and barrages having regards to the agreements made in the MoU.</li> <li>ii) maintenance of minimum flow for ecological considerations, and monitoring return flow after allowing different consumptive uses,</li> <li>iii) Overview of the plans for the catchment area, water shed management, rehabilitation and the conservation of environment,</li> <li>iv) monitoring the exploitation of groundwater in the Upper Yamuna catchment,</li> <li>v) submission of Annual Reports to the Central government and to the Basin States.</li> </ul>
Betwa River Board	
Krishna-Godavari Commission	<ul style="list-style-type: none"> <li>a) reporting on the requirements of the projects on the Krishna and Godavari – i) in operation in 1951, ii) as approved by the GOI for execution, iii) included in the plans but not yet approved by the GOI, iv) projects proposed by the States; and v) such minor schemes as may have been sanctioned upto March 1961.</li> <li>b) reporting on the feasibility of diverting any surplus supplies in the Godavari to the Krishna indicating the quantity to be diverted and the cost involved.</li> </ul>
Sone River Commission	<ul style="list-style-type: none"> <li>i) to compile data and analyse hydrometeorological data of river Sone and its tributaries including assessment of yield according to different dependability at different points,</li> <li>ii) to collect and compile data in respect of projects completed, under construction, proposed or under investigation,</li> <li>iii) to collect and compile data of utilization of Sone waters in the tree states including agronomic, geological and socio-economic aspects,</li> <li>iv) to undertake supplementary investigations and studies as necessary for preparing basins and regional plans for development of water and land resources,</li> <li>v) to prepare a comprehensive and regional plan for optimum use of Sone water for irrigation and other multi-purpose uses.</li> </ul>