Rivers: Legal and Institutional Issues in India[1]

Summary

Analysing the state of rivers in India in the context of legal and institutional issues has a huge canvas. The paper starts with the definition of a river. It then goes on to describe the existing legal and institutional measures that affect the state of rivers in India. There are a number of laws and related institutions (for example, Water Pollution Control Act, 1974 and the State and Central Pollution Control Boards existing since 1974) that have remained ineffective and problematic. There is not even one success story of a polluted stretch of river in India being cleaned up due to the efforts of the legal or institutional mechanism of the government. The few success stories, have come about though social and community efforts. The way the National Water Policy 2002 and the draft National Water Policy of 2012 treat the rivers and river basin related issues, it does not really help the current status or future of our rivers, particularly in the absence of necessary legal and institutional mechanisms to ensure implementation of river friendly aspects of the policy. When we see the place of rivers in the decision making process, one thing that strikes us is that there is no attempt at valuing the services provided by a river, either in qualitative or in quantitative terms. The state of rivers in India is seen from the pollution, freshwater flow and management perspective. The total length of perennial river stretches in India is supposed to be over 45,000 km, but how much of it remains is a moot, unanswered question. This includes 14 major, 44 medium and at least 55 minor rivers. Rivers face many existential threats from dams (including run-of-river and other hydropower projects), pollution, diversions, encroachments, excessive use of groundwater and catchment degradation. Privatisation, climate change and river linking plans are amongst the newer threats that rivers face. A review of experience with the river basin planning efforts shows that they have been largely top-down efforts. There is little by way of participatory, bottom-up effort as far as government efforts are concerned. However, there are examples such as Arvari river in Rajasthan, where bottom-up participatory efforts with institutional innovation in terms of River Parliament, which have lessons for the government. On environment flows, the science and practice of stipulating, monitoring and compliance of ensuring year round freshwater flows in perennial rivers is still evolving with no evidence of any decrease in the slope of the learning curve. The situation with respect to basin wide cumulative impacts assessment and carrying capacity studies is similar. This is not for lack of international examples , for example, the World Commission on Dams and numerous examples of environment flows, dam decommissioning and free flowing rivers in many countries. The paper provides a number of suggestions for a way forward.

Introduction

What is a river? A river is not just a channel carrying freshwater, but a hydrological, geomorphic, ecological, biodiversity-rich, landscape level system that serves as a key part of the freshwater cycle, balancing dynamic equilibrium between snowfall, rainfall, surface water and groundwater, and provides a large number of social and economic services to the people and ecosystems all through its watershed[2]. This does sound a bit complex, but then, a river is a complex and beautiful system which does many things along its course!

Moreover, as ecological systems:

· Rivers have a large-scale directional organisation (upstream-downstream), which leads to their accumulating water and material loads as they flow downstream.

· Rivers are dominated by active rather than diffusive material transport.

· Rivers have exceptionally high rates of energy and material throughput.

[1] This chapter is part of the Volume "Water Conflicts in India: Towards a new legal and institutional framework" published in March 2012 by the Forum for Policy Dialogue on water conflicts in India

[2] This is my attempt at definition of Rivers, first published in *Threat to Rivers* in Mint Newspaper on June 5, 2010

· Rivers always 'contain' many other embedded ecosystems (both terrestrial and aquatic)[3]

The report of the World Commission on Dams notes, "*Rivers, watersheds and aquatic ecosystems are the biological engines of the planet.*"[4] The Strahler Stream Order ranks rivers based on the connectivity and hierarchy of contributing tributaries. Headwaters are first order while the river at delta is the last order.

Current legal and institutional infrastructure

Some of the relevant Acts and provisions in this regard include the following:

- ✓ State Irrigation and Drainage Acts
- ✓ Interstate River Water Disputes Act, 1956
- ✓ River Boards Act, 1956
- ✓ Interstate Water Dispute Tribunal awards
- ✓ The EIA Notification, Sept 2006
- ✓ The efforts at decentralisation through the 73rd and 74th constitutional amendments
- ✓ The Panchayats Extension to Schedule Areas Act, 1996

Interestingly, in British period, there was an act called River Conservancy Act (Madras Act IV of 1884)[5]. However, on reading it, it seems more like an act to regulate the use of land within the river banks rather than the river itself. In the following section, some specific laws that could be used for protection of rives have been reviewed in brief.

The Water (Prevention and Control of Pollution) Act, 1974

The water quality management in India is performed under the provision of Water Pollution Control Act of 1974 along with the Water Pollution Cess Act of 1977. The basic objective of this Act is to maintain and restore the wholesomeness of rivers by prevention and control of pollution. However, the Act does not define the level of wholesomeness to be maintained or restored in rivers of the country. Through the Act, the Central Pollution Control Board (CPCB) at the Centre and State Pollution Control Boards (PCBs) in various states of India were established. Functions and powers of the PCBs include:

- Comprehensive programmes for the prevention, control or abatement of water pollution
- Collecting, analysing and disseminating water pollution information, to inspect sewage and effluents generated
- Evolving economical methods of sewage treatment, utilization and disposal of sewage
- Prohibition of the use of rivers or aquifers for effluent disposal
- Using the powers of withdrawal of Consent

Unfortunately, the Act and the institutional system under it has been complete failure. 37 years since the system was put in place, there is not a single successful example of functioning of the State PCB or a single case where one can say that a river has been cleaned up due to the efforts under this Act. The polluters are happy since they have never, except in some rare cases, been penalised for the damage they cause. One exception is when the tanneries in Vellore, Tamil Nadu were held responsible for widespread contamination. Damages of Rs 26.82 crores were awarded in 2001 to 29,193 families owning 15,164 ha of agricultural land in 186 villages.[6] In another recent case, the dyeing industry of Tirupur (CHECK SPELLING) in Tamil Nadu was ordered to close down following a High Court order.[7] There is also the example from Tungabhadra river

[3] *An Introduction to Rivers — the Conceptual Basis for the Michigan Rivers Inventory (MRI) Project,* Michael J. Wiley and Paul W. Seelbach, Dec 1997, page 7

[4] Executive Summary of the WCD report, "Dams and Development: A New Framework for Decision-Making"

[5] http://demo.cgg.gov.in/apwater/downloads/acts/River%20Conservancy%20Act(River%20Conservation%20Act%20%20).pdf, accessed on February 12, 2010

[6] *India turns into a green pasture for pollution insurers*, Mint, February 17, 2010

[7] *Shut down polluting tirupur dyeing units* in Feb 2011 issue of *Dams, Rivers & People*, page 24

where civil society seems to have used the provisions of the Act and the civil society action resulted in the setting up of Citizens' Watchdog Committee with a view to reduce the pollution in the river[8].

Unfortunately, there is little coordination between different pollution monitoring and controlling institutions. Also all the indicators of pollution are in terms of BOD, COD, TDS, TS and such other chemical or physical parameters. However, no holistic parameters that would indicate overall health of river (or water bodies) is used. The existence and health of certain species of flora, fauna could be one such option.[9]

The Wild Life (Protection) Act, 1972

The provisions of Section 35(6) of the Wild Life (Protection) Act, 1972 prohibit anybody from stopping or enhancing the flow of water into or outside a National Park except by permission from the Chief Wild Life Warden. It further states that no such permit shall be granted unless the State Government in consultation with the National Board is satisfied that the change in the flow of water into or outside the National Park is necessary for the improvement and better management of wildlife therein.[10] That important provision of the 1972 Act which could have come to the rescue of some of the rivers has rarely been used.

In a welcome decision in February 2008, the proposal for survey for the Chambal Development Scheme involving four Hydropower Projects (Rahu Ka Gaon, Gujjapura, Jaitpura & Barsala) on Chambal river in Rajasthan was not granted clearance by the Standing Committee of National Board for Wildlife, that was supposed to protect the river and wildlife therein. Similarly after a long agitation, the Union Government in Oct 2010 decided to abandon the plans to construct hydropower projects on Bhagirathi river upstream of Uttarkashi in Uttarakhand and declared the 135 km of the river as an ecological zone.

The Forest Conservation Act, 1980

The Act is supposed to help protect rivers that pass through the forests, including putting restrictions on mining of minor minerals from the beds of such rivers. Section 4.6 of the Act says, "Extraction of minor minerals shall be from the middle of the river bed after leaving one fourth of the river bed on each bank untouched." However, the Act has not been used specifically for the protection of rivers.

The Environment Protection Act, 1986

This is indeed a very powerful Act which gives the Union Ministry of Environment and Forests substantial powers and could have been used to protect India's rivers directly and indirectly, including when projects are sanctioned under the Act. Unfortunately, the Act has not been used for that purpose even in most deserving cases.

The Electricity Act, 2003

Section 8(2) of the Act states, "*The (Central Electricity) Authority shall, before concurring in any (hydropower) scheme submitted to it under sub-section (1) have particular regard to, whether or not in its opinion,- (a) the proposed river-works will prejudice the prospects for the best ultimate development of the river or its tributaries for power generation, consistent with the requirements of drinking water, irrigation, navigation, flood-control, or other public purposes, and for this purpose the Authority shall satisfy itself, after consultation with the State Government, the Central Government, or such other agencies as it may deem appropriate, that an adequate study has been made of the optimum location of dams and other river-works*".

[8] See for example: http://kvina.niva.no/striver/Portals/0/documents/STRIVER_D7_1_Part1.pdf, accessed on March 9, 2012

[9] For an analysis of recent CWC report on *Water Quality Hot spots in Rivers of India*, see: http://sandrp.in/rivers/Crisis_of_Water_Quality_in_India.pdf

[10] The report of the Central Empowered Committee of the Supreme Court in the 2005 report in the Keoladeo National Park (Bharatpur Bird Sanctuary) case

This provision could have been used for the protection of rivers, since it requires the Central Electricity Authority (CEA) to give concurrence to hydro projects only after satisfying that the proposal is optimum with respect to all other uses of the rivers. Unfortunately, as the South Asia Network on Dams, Rivers and People (SANDRP) found out through applications under the Right to Information Act, while giving concurrence to hydropower schemes under this Act, the CEA consults only two organisations, namely the Geological Society of India (GSI) and the Central Water Commission (CWC). GSI and CWC evaluate the scheme from specific parameters of geology and hydrology, but do not look at basin wide issues as required under the Act. The CEA itself is not capable of ensuring basin wide optimisation that the Act requires, nor does it consult the concerned stakeholders. Thus the Act is not being followed. In February 2012 the author met the Ministry of Environment and Forests (MoEF) officials and the MoEF's Expert Appraisal Committee (EAC) on River Valley Projects and suggested that the MoEF/ EAC could be tasked to ensure such optimisation.

Maharashtra Water Resources Regulatory Authority Act (2005)

The Act provides for formulation of river basin plans and state water plan through river basin agencies and state water board. One of the important criteria of State Water Plans under the Act is, "*Low flow from ecological considerations is usually unavailable in peninsular rivers. The present low flow (minimum flow in summer months) may be indicated at various parts in the system along with the required flow recommended by Pollution Control Board.*" (Technical Manual for preparation of State Water Plans for basins, MWRRA, 2007)[11] A number of other states, including Uttar Pradesh (Aug 2008) and Andhra Pradesh (2009) have come out with such acts. Both the Acts do not explicitly mention protection of rivers or environment flows.

Relevant judicial pronouncements

There is no formal basis to determine water allocations between different segments of a river basin and between different uses and users either in the Constitutional Directive in respect of inter-state or intra-state rivers or the Central or State legislations. Tribunal awards on sharing of river waters stop at the State level and all entitlements within the state is left to be determined entirely by its government. Since there are no laws, norms or principles on how this is to be done, decisions are generally ad-hoc and political. The absolute power of the States to regulate appropriation and use, and to change entitlements and rules of allocation at its discretion was confirmed by the Supreme Court, while dismissing a plea by the petitioners (who were the prior appropriators and original beneficiaries) that they did *not* have a pre-existing "*right to get a particular quantum of water*" and "*even if they had such a right, it can be restricted to a reasonable extent by an appropriate legislation*"[12] suggesting that the State had an absolute right.[13] Such absolute right of the state is supposed to include right to decide about use of rivers. However, without clearly defined guidelines or legal and institutional checks and balances against arbitrary use of such powers, this does not help protection of rivers.

As against such absolute power under eminent domain doctrine a notable alternative is the Public Trust doctrine, first seen in India in the Span Motels case[14] where the Supreme Court came down heavily on the Central Government for 'validating' the act of a private hotelier who had diverted a river to protect his illegal hotel constructed on the banks of the Beas river in Himachal Pradesh. The Supreme Court while formulating the Public Trust doctrine reviewed several decisions of Courts in the United States, in particular the California Supreme Court order in the Mono Lake Case which stated, "*The public trust is more than an affirmation of State power to use public property for public purposes. It is an affirmation of the State's duty to protect the people's common heritage streams, lakes, marshlands and tidelands, surrendering that right*

[11] *Analyzing the enabling environment for eflows in India and the state of Maharashtra*, Parineeta Deshpande-Dandekar, thesis submitted to Asian Institute of Technology, August 2009
[12] Parambikulam Aliyar Project Assn. v. State of Tamil Nadu AIR 1999 SC 3092.
[13] *Legal Aspects of Water Resource Management* , A.Vaidyanathan and Bharath Jairaj, updated from "Role of Law in Water Resource Management", Indian Jurid. Rev., Vol 1, National University of Juridical Sciences, 2004
[14] M.C. Mehta v. Kamal Nath 1997 (1) SCC 388

of protection only in rare cases when the abandonment of that right is consistent with the purposes of the trust."[15]

In the recent Intellectual Forums case[16] that further expanded the doctrine of Public Trust in India, the Supreme Court was called on to protect two lakes in Andhra Pradesh that were sought to be closed and filled, to enable the construction of houses by the State Government. The State argued that the tanks had long stopped functioning as tanks and that it was State policy to build more houses for the people while the appellants argued that the tanks were not just alive, but currently used for irrigation and also helped improve the ground water table, thus serving the needs of the people around these tanks. The Supreme Court did not buy the eminent domain argument and chose instead to state that "*the tank is a communal property and the State authorities are trustees to hold and manage such properties for the benefits of the community*." The Court went on to confirm that the State "*cannot be allowed to commit any act or omission which will infringe the right of the Community and alienate the property to any other person or body.*"

In another recent case, the Madurai Bench of the Tamil Nadu High Court, ordering the eviction of 500 poor families, who had encroached upon an irrigation tank at Dindigul district, has observed that the need to preserve water bodies would gain priority over the right of landless poor to housing, when there was a conflict between the two. Disposing a batch of petitions the Bench said, "*Landless poor have a fundamental right under Article 21 (Right to life) of the Constitution to demand residence. But such right cannot be extended to the level of encroaching water sources*".[17]

The eminent domain and the public trust doctrines can work in opposite directions and in absence of any legal or institutional mechanisms to define the powers of the state in either case, the state has been using the powers rather arbitrarily and the rivers are one of the many casualties in the process. In an order in January 2011, the Supreme Court has laid stress on preservation of water bodies as common property resources.[18]

The ongoing case in the highest court of the land, the Supreme Court, started in 1994 with the Apex Court taking *suo moto* cognizance of the newspaper report on the dirty Yamuna; yet, it has not led to any effective action or change in the state of Yamuna river passing through the national capital. Delhi, the national capital, is the biggest culprit responsible for this state of affairs, as noted by the Supreme Court, the CPCB and MoEF. Eighteen years later, after spending hundreds of crores for cleaning up the river, after setting up numerous committees, the state of Yamuna has deteriorated, rather than improved. This is a very good example of the combined failure of our executive, judiciary and the society at large. On Feb 27, 2012 the Supreme Court again said it wants to take action, but as *the Hindustan Times* reported, "*the bench was not clear about the background of the case and the directions needed to be issued to various authorities*".[19]

National Ganga River Basin Authority

Deforestation in the catchment areas leading to high silt loads, floods and reduced navigational possibilities, drainage of pesticides and fertilizers and industrial and municipal waste are among other major areas of concern. It is necessary to take measures for preventing irreversible damage and restoring the water quality of this unique riverine system. While a holistic long term programme covering all aspects needs to be planned and implemented in phases, the pollution problem calls for immediate action…
Resolution of the MEF, 1985, setting up the Central Ganga Authority

National River Conservation Directorate To oversee the implementation of the GAP (Ganga Action Plan) and to lay down policies and programmes, Government of India constituted the CGA (Central Ganga

[15] National Audobon Society v. Superior Court of Alpine County, 33 Cal 3d 419 referred to in M.C. Mehta v. Kamal Nath 1997 (1) SCC 388
[16] Intellectuals Forum, Tirupathi v. State of Andhra Pradesh, AIR 2006 SC 1350
[17] See Dec 2009-Jan 2010 issue of *Dams, Rivers & People*, page 9
[18] Jaspal Singh and others Vs State of Punjab and others, see Feb 2011 issue of *Dams, Rivers & People* page 24.
[19] www.hindustantimes.com/India-news/NewDelhi/SC-Want-to-take-action-on-Yamuna-pollution-now/Article1-818119.aspx

Authority) in February 1985, renamed as the NRCA (National River Conservation Authority) in September 1995, under the chairmanship of the Prime Minister. The Government also established the GPD (Ganga Project Directorate) in June 1985 as a wing of Department of Environment, to execute the projects under the guidance and supervision of the CGA. The Government renamed the GPD as the NRCD (National River Conservation Directorate) in June 1994.[20]

Proposal for River Regulation Zone

During the National workshop on conservation of rivers and floodplains in Jawaharlal Nehru University (Delhi) on 23-24 Nov 2001, it emerged that MoEF should take immediate necessary action to formulate the requirements for issuing notification for River Regulation Zone (RRZ) under the Environment Protection Act on lines similar to those of Coastal Regulation Zone (CRZ) notification. Meetings were called by NRCD on Jan 8, 2002 and Sept 26, 2002 to discuss this further. A few experts met, but as per the RTI response from NRCD in April 2007, no further progress could be made. The meeting discussed the need to regulate the various activities affecting the rivers and floodplains. In January 2011 the Union Environment Minister spoke about a RRZ notification to protect riverbeds from encroachments in the future[21]. The Ministry set up an Expert Group to formulate RRZ, which is now (in March 2012) in the process of drafting a notification for RRZ on the lines of CRZ notification.

Relevant Institutions that affect the fate of the rivers

- **At Central level**
  - Ministry of Environment and Forests
  - Expert Appraisal Committee on River Valley and Hydropower projects
  - Central Pollution Control Board
  - Water Quality Assessment Authority
    - Water Resources Ministry
  - Central Water Commission
  - River basin specific organisations: Upper Yamuna River Board, Narmada Control Authority, Ganga Flood Control Commission, Brahmaputra Board, Bansagar Control Board, Betwa River Board, Ghaggar Standing Committee, Damodar Valley Corporation, Tungabhadra Board
    - Power Ministry: Promoting Hydropower projects
  - Central Electricity Authority: Sanctioning authority for Hydropower projects.
  - Government Hydropower development organisations: Bhakra Beas Management Board, NHPC, NEEPCO, THDC, Sutlej Jal Vidyut Nigam Limited, state level organisations/ departments
    - Planning Commission
- **At States level**
  - Environment, Water Resources (or Irrigation), Power Departments
  - River Basin specific organisations: Bhagirathi River Valley Development Authority, Irrigation Corporations in Maharashtra
  - Water Resources Regulatory Authority (Maharashtra, Andhra Pradesh, Arunachal Pradesh)
  - State Pollution Control Boards

Water policy and rivers

The latest (2002) National Water Policy (NWP) gives fourth priority to ecology after drinking water, irrigation and hydropower. However, the policy does not say what this priority would mean. The section under Water Quality in the NWP2002 has some relevant provisions for rivers:

- Effluents should be treated to acceptable levels and standards before discharging them into natural streams.
- Minimum flow should be ensured in the perennial streams for maintaining ecology and social considerations.

[20] http://www.cag.gov.in/reports/scientific/2000_book2/gangaactionplan.htm, accessed on February 17, 2010
[21] http://www.hindu.com/2011/01/08/stories/2011010865321700.htm, accessed on March 8, 2011

- Necessary legislation is to be made for preservation of existing water bodies (which can include rivers) by preventing encroachment and for deterioration of water quality.

However, credible action, will or intention of following any of these is awaited. The state of rivers in India during the NWP 2002 has only gone from bad to worse.

Draft NWP 2012 and redrafting process

Now there is a process underway to redraft the National Water Policy. SANDRP wrote to the Union Water Resources Ministry on January 20, 2012 requesting that the policy should be formulated in participation with the gramsabhas in rural areas and ward committees in urban areas and the draft should be translated in all Indian languages and sent to them for their comments. However, that is yet to happen. The draft[22] provides second highest priority for ecological needs of rivers; it says in section 3.2, "*A portion of river flows should be kept aside to meet ecological needs ensuring that the low and high flow releases are proportional to the natural flow regime, including base flow contribution in the low flow season through regulated ground water use.*" But there is no mechanism or plan, mentioned or in place either in the NWP draft or otherwise to ensure that this will be achieved. The draft also has a section (Section 8) on *Preservation of river corridors, water bodies and infrastructure*, which is indeed a welcome sign. However, in the absence of any credible process or mechanism in place to achieve this, it may end up paying lip service to this. The section 13.1 of the draft opens with the sentence, "*A Water Regulatory Authority should be established in each State.*" This is unwarranted as we do not have positive experience of functioning of any water regulatory authority. The only state where a fully functional water regulatory authority is functioning is in Maharashtra, where experience is far from welcome. The draft has many other worrying provisions: no clear priority for rain-fed or other farmers in water allocations, proposal to consider water as an economic good, no clear legal provision for right to water, proposal for privatisation of water services, no clear mention of sections of society that are vulnerable in changing climate, no attempt to learn lessons from the past, no recognition of the reality that groundwater is India's water lifeline, among many others.

Rivers in decision making process

India has no law that requires that perennial rivers have freshwater flow all round the year when any dam, diversion or hydropower project is built. No cost or benefit from rivers are accounted for in the cost benefit analysis or decision making process in matters concerning rivers or environment impact assessments or environment management plans.

The Government perspective

The Government unfortunately looks at rivers as a resource to be exploited for various water services, and not as a resource that has certain basic economic, social, environmental and cultural value. Thus when the governments take decision to build a dam to store water, build a structure to divert water or build a hydropower project that either has huge storage capacity or diverts the river through long distance underground tunnels, it does not see that these projects actually destroy an existing important resource. There is no law in India that requires that when such projects are taken up the projects must ensure that rivers continue to flow with perennial freshwater flow. Moreover there is no legal or institutional mechanism to ensure that the assessment process, the planning process, the decision making process, the cost benefit analysis or the environment impact assessments include the cost of the destruction of the existing resource of rivers and destruction of the services provided by that resource. What this thus implies is that the official system has absolutely no value for the river as a resource.

The only state in India that has a clear policy on this is Himachal Pradesh (HP). In September 2005, the HP government. came out with a notification that said that all (existing, under construction and planned) hydro projects should release at least 15% of the minimum observed flow in the river, at all times. This was far

[22] See http://mowr.gov.in/index1.asp?linkid=201&langid=1 to see the drafts in English and Hindi.

from adequate, since to preserve the rivers for its social and environmental flows, much larger flows are required, but this was certainly a step in the right direction. That notification was challenged in the Himachal Pradesh High Court by a Government of India (GoI) body, the NHPC Ltd. and by the Punjab State Electricity Board. The petition in the High Court, in fact said, among other things, that no law of India requires that rivers should have freshwater flows. And GoI's MoEF supposed to be guardian of environment, including rivers supported NHPC in its response in the petition. The MoEF is supposed to have a policy for preservation of rivers, since rivers are also one of the largest repositories of biodiversity. Unfortunately, MoEF has no policy that the rivers should have freshwater flow at all times.

The rivers also face adverse consequences of construction of embankments, channelization schemes and dumping of effluents and pollutants from industrial, municipal, domestic and agriculture sources. Here again the agencies that propose, sanction, build, monitor or operate these schemes do not have to include the value of existing resource of river and the value of the existing services that river provides and the impact of their schemes on such resources and the services. So here again, it seems that the value of the river as a resource and the value of the services provided by that resource is zero in the government calculus.

This mindset has not changed in the 21st century, as is evident from some of the recent official documents such as the 11th Five Year Plan, the working group reports on water resources for the 11th Five year Plan and now the 12th Five Year Plan[23], the midterm appraisal of the 11th Plan, the Integrated Water Resources Policy document prepared by the Planning Commission, the current and draft new National Water Policy, the state water sector restructuring plans, the attempts towards the state water sector regulatory authorities in states like Maharashtra, Andhra Pradesh, Uttar Pradesh and some of the recent state legislations in the water sector. The World Bank's 2006 report on state of India's Water Sector or the more recent report from the 2030 Water Resources Group, which has taken India as a special focus case study, is no different in this respect. The agencies keep referring to the increasing demand, needs for cities, agriculture, power generation, industries etc, giving an impression that if we want freshwater in rivers, none of this is possible, in fact no development is possible. This mindset is the biggest hindrance to freshwater flow in the rivers.

The CPCB said over 25 years ago that there is no river in the plains area of the country that has bathing quality water. Today the situation has only worsened. The World Bank describes India's rivers as fetid sewers. Every major and medium river has been dammed many times over, which in every instance means that the rivers would have no freshwater flow downstream from those dams in most of the non-monsoon months. Even in the mountain ranges, the rivers like the Sutlej, Beas, Ravi, Chenab, Jhelum, Bhagirathi, Alaknanda, Gauri Ganga, Mandakini, the Teesta and so on are disappearing at most of the locations as hydropower projects divert them into underground tunnels. Not a single small, medium, large or metro city of India has operating sewage treatment plants of capacity sufficient to treat the waste water created by them. Most industries are happy to discharge the untreated effluents into the lands, rivers or aquifers. The principles of Integrated Water Resources Management have been championed for over a decade by the Global Water Partnership, established by the World Bank, the United Nations Development Programme, and the Swedish International Development Agency, among others, without having impact on the manner in which rivers are treated.

State of rivers in India

The CPCB had also declared in 1985 that no river in plains area of India has water that can be used directly for drinking water. The report of the National Commission for Integrated Water Resources Development (1999) noted that almost 80% of the river stretches in India fall in class C or lower, signifying that the water can be used neither for drinking nor for bathing. The situation thereafter has been only deteriorating with increase in population, urbanization, industrialization, damming of rivers and increased consumptive use of water. The climate change impacts are and will be making things worse. The latest report from the CPCB, namely, *Status of Water Quality in India 2007*, published in July 2008 shows that indeed, more stretches of the rivers are falling in class C or worse. The CPCB report *Status of Water Supply, Wastewater Generation*

[23] See for 12th Plan working group reports: http://planningcommission.nic.in/aboutus/committee/index.php?about=12strindx.htm#wr

and Treatment in Class-I Cities & Class-II Towns of India released in January 2010 describes how cities are impacting India's Rivers. SANDRP colleagues recently (November 2011 and February 2011) made presentations on state of Maharashtra and Gujarat rivers at public meetings in Delhi.[24] Similarly in January 2012, SANDRP colleagues made a presentation on ecological management of rivers at Indian Institute of Technology, Kanpur.[25]

Table 1. Lengths of Perennial Rivers, state-wise

State	Perennial River Length (in Km)
Jammu and Kashmir	2,290
Himachal Pradesh	1,094
Punjab	1,071
Haryana	348
Uttar Pradesh (including Uttarakhand)	5,618
Rajasthan	841
Madhya Pradesh (includes Chhattisgarh)	6,090
Bihar (including Jharkhand)	2,525
West Bengal	1,163
Orissa	2,250
Andhra Pradesh	4,017
Maharashtra	4,612
Gujarat	1,155
Karnataka	2,868
Kerala	1,407
Tamil Nadu	2,028
Assam	2,042
Meghalaya	556
Manipur	758
Arunachal Pradesh	706
Sikkim	753
Nagaland	502
Mizoram	234
Goa	65
Delhi	48
TOTAL	**45,041**

Table 2. Lengths of perennial rivers, basin-wise

River Basin	Length of Perennial River, km
Indus	4,119
Ganga	12,690
Brahmaputra	5,013
Sabarmati	325
Mahi	522
Narmada	1,382
Tapi	977
Subarnarekha	289
Brahmini	585
Mahanadi	1,973
Godavari	4,492
Krishna	3,784
Pennar	520
Cauvery	1,318
Ghaggar	358
MEDIUM RIVERS	5,034
MINOR RIVERS	1,662
TOTAL	**45,043**

Source: Central Pollution Control Board, Water Quality in India: Status and Trends (1990-2001), 2002

[24] See: http://sandrp.in/rivers/Rivers_of_Maharashtra_Dec_2011.PDF and http://sandrp.in/rivers/Rivers_of_Gujarat_March_2012.pdf

[25] See: http://sandrp.in/rivers/Ecological_Management_of_Rivers_in_India_Jan_2012.PDF

In this regard, following paragraph from a study[26] on *Environmental Compliance and Enforcement in India: Rapid Assessment* by OECD in Dec 2006 provides useful overview, "*(In India) Untreated sewage and non-industrial wastes account for four times as much pollution as industrial effluents. While it is estimated that 75 percent of the wastewater generated is from municipal sources, industrial waste from large and medium-sized plants contributes to over 50 percent of the total pollution loads. In major cities, less than five percent of the total waste is collected and less than 25 percent of this treated.*"

Minimum flow stipulations

Since around 2007-08, while giving clearances for run-of-the-river hydropower projects, the MoEF has started stipulating that certain minimum flow must be allowed in the rivers at all times. However, the stipulated flows are ad hoc and inconsistent, and at the most 10% of the observed minimum flow in the river on which the project is proposed. In mid 2010, the stipulated minimum flow of water to be released went up to 20% of average flow observed in four lean months at 90% dependability. In late 2011, the Expert Appraisal Committee of MoEF on River Valley Projects started stipulating higher monsoon flows in addition to the minimum flows.

Importantly, there is no credible mechanism to ensure that the stipulated indeed flows are released at all times. For example, in case of the NHPC's 510 MW Teesta V hydropower project on Teesta River in Sikkim, the stipulation was that the project will ensure release of 1 cubic metre per second at all times. When SANDRP asked MoEF through an application under the RTI as to who is ensuring this flow, the answer was amusing, "*A regular monitoring is being done by the project itself*". So the agency that stipulates the norm for freshwater flow has neither the capacity nor the will, nor the intention, it seems, to ensure that its stipulations are implemented. The regulator depends on the developer to ensure that the regulations are followed. This cannot be considered credible. In late 2011 the EAC started asking for recording meters for environment flows to ensure that the flow stipulations are followed, but it is still unclear how this will function since the area where the flow meters exist are out of bounds for the people. In Feb 2012, this author met the EAC and suggested that there should be an empowered monitoring committee for this which should include people from local area to ensure that such stipulations are indeed followed.

In Oct 2008, while giving clearance for a project involving pumping water from the Chambal river for providing drinking water to 926 villages and 4 towns of Karauli and Sawai Madhopur districts in Rajasthan, the Supreme Court stipulated that flow of minimum of 4.78 cusecs (cubic feet per second) of water will be maintained at all times, downstream from the pumping point[27]. This was the minimum observed flow in the river in the last twenty years. So now the river will possibly have no more than that amount (provided the norm is adhered to, this time there is a monitoring committee involving forest department) for most of the non monsoon months, in most of the years. And what impact such low flows will have on the river, the downstream biodiversity and so on is not even assessed; it is assumed, without any study, that this once in 20 years flow should be sufficient for all those purposes downstream!!

That takes us to the basic question. Why have freshwater flows in river? Briefly, it is helpful for social, including cultural and religious needs, fisheries, groundwater recharge, biodiversity, pollution dilution, stopping salinity ingress, navigation and so on. In fact the first criterion for a healthy river is to have freshwater flowing in the rivers at all times. The perennial rivers need to have freshwater flow all round the year also to preserve the cultural and natural heritage value of the rivers. In addition, rivers also need to have high volume flushing flows at least once every year, sufficient to wash down the annually accumulated pollutants, debris, etc.

Fortunately, in recent years, there is increasing awareness and agitations to ensure that we indeed have some healthy rivers. Such agitations have been seen for Alaknanda, Arvari, Bhagirathi, Brahamaputra, Chalakudy, Damodar, Ganga, Kali Bein, Narmada, Sastri (Maharashtra), Teesta and Yamuna among other

[26] http://www.oecd.org/dataoecd/39/27/37838061.pdf
[27] http://www.forestcaseindia.org/updates2008/FCUpdate,%20Issue%2048,%20September%20and%20October%202008.pdf

rivers. While there have been some successes in some of these campaigns, unfortunately, these campaigns have not yet yielded effective or policy wide results.

Perennial riverine length in India

One of the parameters of ensuring sustainable existence of rivers in India would be to ensure that perennial rivers remain perennial when a dam, diversion or hydropower project is built on the river. According to the latest report from the Central Pollution Control Board[28], the perennial riverine lengths in different states and river basins in India are as given in the Tables 1 and 2.

These figures include a total of 113 rivers, including 14 major rivers (with about 38000 km of perennial river length), 44 medium[29] and 55 minor rivers. The CPCB has in its report of 1984[30] defined a major river as one with catchment area above 20,000 sq km, a medium river with a catchment between 2,000 and 20,000 sq km and a minor river with a catchment below 2,000 sq km. Some of the preliminary parameters of such river basins are given in Table 3.

Table 3. Basic parameters of rivers in India

Basins	Catchment, m sq km	% of total catchment	Runoff, BCM	% of total run off	% of population in the basin
Major	2.58	83	1406	85	80
Medium	0.24	8	112	7	20
Minor	0.20	6	117	7.4	
Desert	0.10	3	10	0.6	
TOTAL	3.12[31]	100	1645	100	100

SANDRP filed an application with CPCB under the RTI Act to get to know when and how CPCB arrived at these figures. However, we did not get any useful response from CPCB. Then we had written to Dr Ramesh Trivedi, who was credited to be one of the authors of the relevant CPCB report. Dr Trivedi's response did throw some light here:

"CPCB carried out a detailed study on Classification and Zoning of Rivers in India in collaboration with concerned State Pollution Control Boards during late seventies and early eighties. The study resulted in a Water Use Atlas of India, wherein all the river basins were presented along with their 'Designated Best Use'. The intention was to super-impose this water use map on water quality map to identify the rivers or their parts in need of restoration (polluted stretches of rivers). As CPCB's mandate was to maintain and restore the 'wholesomeness' of aquatic resources, this was a pre-requisite. During this exercise, Survey of India, Ministry of Water Resources, Govt. of India and concerned water resources departments of different states were consulted. During this study CPCB estimated perennial riverine length of about 45000 km. This was published in one of the CPCB's report. The perennial riverine length might have significantly changed since early eighties due to over-abstraction of surface and ground waters. However, we do not have better information than this. It was important to give impression about the polluted stretches in the country for the planners and decision makers. The information is more indicative than precise." (Email communication dated March 13, 2009)

Sheonath river privatised for water supply project: Background

In 2001, Radius Water, a local private company was given a concession to build a dam across Sheonath river, for supplying water to the industrial estate of Borai, near Durg city in Chhattisgarh on build-own-operate basis. Once the contract was signed, the owner asserted his rights to the 23.6 km water reservoir, banned the locals from using the waters, and was supported by the state in this. The villagers who used to fish in the river, who used the river ghats for bathing, who took water from the river for growing vegetables

[28] "Status of Water Quality in India- 2007"- CPCB, July 2008

[29] KL Rao, *India's Water Wealth: Its assessment, Uses and Projects*1975, p 54

[30] *Water Quality Monitoring: the Indian Experience*, Nov 1984

[31] The report says that the difference with the geographical area of 3.29 million sq km is because there are remote areas for which details are not available.

and depended on the river for other needs lost access to the river. Intense local struggles, supported by nation-wide campaigns challenged this. The Public Accounts Committee (2006-07) of the Chhattisgarh Assembly, in its 64th report, tabled on March 16, 2007 recommended that the Agreement and Lease Deed between MP Audhyogik Kendra Vikas Nigam (MPAKVN), now Chhattisgarh Rajya Audhyogik Vikas Nigam (CRAVN), and Radius Water Ltd for the Sheonath Water Supply project must be cancelled, and that all the assets and the ownership of the project must be taken back by CRAVN. It has recommended initiation of criminal proceedings against the then Managing Directors of MPAKVN (Raipur) and MP State Industrial Development Corp Ltd and the Chief Engineer of MPSIDC for conspiracy to damage the interests of the governmment and transferring government properties to a private agency through manipulation and forgery of documents. It has recommended registration of an offence against the CEO of Radius Water Ltd for participation in this criminal conspiracy and gaining profit by causing harm to govt. properties. So far, there is no action on these recommendations.[32]

River basin management

With the constitution of the Ganga River Basin Authority by the Government of India under the Environment Protection Act (1986), the issue of River Basin Management has again come into focus. However, governments' in India have failed in achieving credible river basin management. Since the country's independence, river basin management has been tried out in several different ways.

Acts of Parliament

The first attempt at river basin management was through an act of parliament when the Damodar Valley Corporation Act was passed in 1948 and had the most comprehensive mandate among all such organisations. The first Chief Executive Officer of the Damodar Valley Corporation (DVC) has acknowledged that the DVC has failed in achieving its objectives. In 1956, the Parliament passed the River Boards Act, but no River Boards under the act have been formed till date. In 1976 Betwa River Board was set up through an act of Parliament. In 1980, Brahmaputra Board was set up under an act of the Parliament, under the Ministry of Water Resources, covering the Brahmaputra and the Barak Valleys for planning, investigation and implementation of water resources projects in these valleys.

Tribunal Orders

An example in this regard is the Narmada Control Authority, which was formed following the order of Narmada Water Disputes Tribunal Award of 1979. Similarly the Cauvery Tribunal and the Second Krishna Tribunal have recommended formation of basin wide authorities.

Statutory Orders

Several basin management-like entities have been created through statutory orders, as is also case of Ganga River Basin Authority. The Water Quality Assessment Authority of 2002 has mandate wider than a single basin. However, it is of comparable nature and its mandate included ensuring water quality and environment flows in rivers.

The tripartite (Centre, Andhra Pradesh and Karnataka) Tungabhadra Board (with very limited mandate) was constituted by the President of India in exercise of the powers vested under sub section 4, section 66 of Andhra State Act 1953. The Bhakra Beas Management Board was constituted through an executive order as per the section 79 of the Punjab Reorganisation Act 1966 to regulate supply of the Sutlej, Ravi and Beas rivers and to distribute power from the Bhakra Nangal and Beas projects.

Supreme Court orders

[32] *Dams, Rivers & People*, April 2007

An important instance in this regard is the Central Ground Water Authority, constituted through an order of the Supreme Court in 1996, under the EPA (1986). This authority had mandate wider than a single river basin, but this is also an attempt at water management over large area.

Inter-State agreements

The Bansagar Control Board was set up in 1976 following agreement between Madhya Pradesh, Uttar Pradesh and Bihar in 1973 for sharing the waters of river Sone. The Upper Yamuna River Board was set up by the Union Ministry of Water Resources in 1995 as its subordinate office following signing of a Memorandum of Understanding between the basin states in May 1994. The Mahi Control Board and Chambal River Board were set up on similar lines.

Union Government. Organisations

The Union government has set up a number of organisations with basin level mandates. The Ganga Flood Control Commission was set up in 1972 through a Government of India resolution for planning, phasing, monitoring, performance evaluation etc of flood management in the Ganga basin. Similarly the Ganga Action Plan, the Yamuna Action Plan and river action plans for a number of rivers have been taken up by the Union government under the National River Conservation Plan of Ministry of Environment and Forests.

Basin level corporate entities by set up by the States

Some States have created basin level or large area based corporate entities for some specific water management functions. Some organisations on these lines are the Krishna Bhagya Jal Nigam, Irrigation Corporations in Maharashtra, and the Narmada Valley Development Authority in Madhya Pradesh.

Basin authority set up under environment clearance conditions

As per the conditions of the Environmental Clearance to Tehri dam project given by Ministry of Environment and Forest on July 19, 1990, it was required of Ministry of Power to ensure constitution of a Bhagirathi River Basin Authority on statutory basis through legislative action before March 31,1991. In compliance of this directive of the Ministry of Environment and Forests, Government of India, Uttar Pradesh River Valley (Development & Management) Act, 1999 was passed by the state Legislature of Uttar Pradesh. The then Uttaranchal (now Uttarakhand) Legislative Assembly passed an act, which was given assent by the Governor on January 27, 2005, called *The Uttaranchal River Valley (Development and Management) Act, 2005*, "*For the sustainable development and proper management of River Valley with special reference to the Bhagirathi River Valley up and downstream of Tehri Dam including its Catchment and Command Area in the State of Uttaranchal.*" The jurisdiction of the Bhagirathi River Valley Development Authority, formed under this act, was limited as per the act, "*in the First Instance it shall apply to the Bhagirathi River Valley in Tehri and Uttarkashi Districts of Uttaranchal*".

Voluntary corporate body

In case of Sutlej basin, at one stage the various corporations (both public and private) having the hydropower projects in that basin in Himachal Pradesh realized that due to lack of basin level management, problems are faced and there is huge scope of optimization through cooperation. These organisations hence came together voluntarily and attempted to form a basin level organisation.

Community efforts

The example of the formation of the Arvari River Parliament in Alwar district in Rajasthan (see Box 1) to manage the almost perennial flow of the river (made possible due to the community efforts in creating and rejuvenating local water systems) is notable. In this case, the communities came together to take decisions about the management of the river. Baba Balbir Singh Seechewal's success in transforming the 160 km

long sacred river Kali Bein (Box 2), in Hoshiarpur district in Punjab, from a filthy drain to a picnic spot has won him a place of honour among *Time* magazine's 30 environment heroes from around the world. This was entirely a community effort.

Box 1.

Arvari Parliament: When communities come together to manage a river basin

The Arvari Sansad, or Arvari Parliament, is an example of community ownership and management of natural resources. In late 1998, people of the 70 villages in the Arvari basin were quite concerned as the monsoon had failed. Over-extraction of water would have created a situation similar to the 1980s, when the area was declared a dark zone. The villages also had to contend with the government. Once the river had been revived and fish were seen in its water, the government issued a contract to a Jaipur-based contractor to fish in the Arvari waters. This got the people thinking. Who owned the river?

To discuss this matter, the villagers met on December 18, 1998 in Hamirpur village. A suggestion came up at the meeting, "Why don't you people form a parliament and manage the river yourselves?" The idea appealed to the meeting and a parliament was formed. The Arvari Sansad met for the first time in Hamirpur on Republic Day, January 26, 1999. It represents all the 70 villages in the Arvari basin. It has 142 members nominated by the respective village assemblies. Every village up to 500 hectares in size appoints one member. Villages of about 1,000 hectares appoint two. The maximum limit for a village is three members. A coordination committee comprising members selected by the parliament handles the operations and ensures that the rules are observed.

The parliament met for second time on June 5-7, 1999 in village Samra. The villagers were determined to carry out all that they had planned. A liquor company was interested in setting up a brewery in the region as barley is the main crop here and water was now available in plenty. "The villagers got together to ensure that no industrial concern exploited the river's resources," says Rajendra Singh, the then secretary of Tarun Bharat Sangh (TBS). The greatest threat to the Arvari, however, was from within. If the farmers had resorted to uncontrolled extraction of the river water, all the good work would have come to nought, especially in years with low rainfall. The parliament adopted an elaborate set of rules. They were to be executed through existing village institutions. A study was conducted to estimate the observance of the decisions taken during the first session. The compliance level was about 70 per cent. "The Arvari Sansad has forged a new bond among the people. They are joined not only by the river but also by their sweat," says Anupam Mishra, secretary of the Gandhi Peace Foundation, New Delhi. He was also the chairperson of TBS.

In the third session held in village Bhaonta on December 28-29, 1999, the parliament reviewed implementation of the rules. The fourth meeting was held on June 10, 2000 in Devka-Devra village. The relationship between the members of the parliament and the village assemblies was discussed. It was decided that the parliament members would assist the village assemblies in implementing the rules. It was laid down that the young members in the village assemblies would be informed and trained in traditional methods of common property resource management.[33] The experiment is now over a decade old. The Rajasthan government has refused to recognize the river parliament, but the parliament continues to manage the basin for the benefit of the residents of the basin. The President of India did go to the community to honour them, but the government has found no lessons worth learning from this success story.

Lessons from basin management experience

It is noteworthy that in the successful cases cited above, the common theme was that they were all bottom-up efforts, starting at the community level. They were attempts in which the people staying on the banks of the river had the central role. As against this, all the attempts at the river basin management by the governments have been top-down, lacking accountability, non-transparent and non-participatory. The local

[33] Down to Earth, Nov 29, 2000, among others

people who have the greatest stake in ensuring proper management of the rivers had absolutely no role in these authorities, whereas the lives or livelihoods of the people who were sitting on these authorities had no bearing on proper management of these rivers.

This disconnect is at the heart of the failures at river basin management attempted by the government. The recently constituted National Ganga River Basin Authority is no different in this regard.

Rivers and Dams

The dams are the single biggest impediment to ensuring continuous freshwater flow in rivers. Most of India's major, medium and minor rivers have been dammed at several places, thus affecting the freshwater flows downstream from such dams, particularly in the non monsoon months, and also affecting the character of floods in the monsoon. India had less than 350 dams in 1947 when the country became independent. Today, as per the latest figures from the Central Water Commission, India has over 5100 large dams. The pace of dam construction in recent years has only gone up. However, as noted earlier, the services provided by the rivers have zero value in the planning, decision making, construction, operations and other processes of dam building.

Box 2.

The case of Kali Bein in Punjab: communities join to clean up a river:

In Punjab, India, there is a seasonal rivulet flowing between Beas and Sutlej rivers, called Kali Bein. The 160 km long rivulet originates from Wadhya village in Hoshiarpur district, passes through from Mukerian through Dasuya to Sultanpur, and joins the Beas River near the Harike Lake. It had been reduced to a dirty drain because of neglect, misuse of water and pollution. The untreated effluents of six towns and around 40 villages poured into it, along with industrial waste and pollutants from factories upstream. Kali Bein has significance in the Sikh history. It is along this rivulet, at a place called Sultanpur Lodhi that Guru Nanak Dev Ji, the founder of Sikhism, spent his younger days and also attainted 'enlightenment'.

On July 16, 2000, the cleaning of river itself was started. The task involved clearing the rivulet's bed, preparing roads, planting trees, construction of dykes, and removal of hyacinths and silt-deposits. There were numerous hitches - lack of official records, farmers' opposition and the constant flow of polluted water. "When the kar seva began at Sultanpur Lodhi, the Bein was nowhere in sight. Instead, there were heaps of garbage and decaying carcasses of cattle. But the sangat did not lose heart. They continued the cleaning work. Their years of toil have borne fruit. Silt-deposits have been cleared. Beautiful ghats have been constructed. Instead of stinking garbage, it's a riot of colourful flowers on both sides of the Bein," says Sant Balbir Singh. Old trees have also been preserved.

"It's the community participation that is making this task successful", says the sant. When the work was started, there was initial mistrust among people. Many felt that the task of cleaning the rivulet was too difficult to be undertaken at the community level. However, Sant Balbir Singh's commitment to the cause soon made kar seva at Bein popular. The project started from Budho Barkat-Gallowal Bridge upward to Mukerian Hydel Channel to Dhanoa. Later, the downward cleaning was initiated. People from Gallowal, Budho Barkat, Dhanoa, Terkiana, Begpur, Saidowal, Passi Bet, Kaire, Bhushan, Gilzian, Miani, Pul Pukhta, and Bahadur Pur Awana villages participated in the kar seva. Thousands of people living along the Bein joined him in this work, with money and materials and it became almost a movement. The Government then woke up and joined the effort. The then President of India, Dr Abdul Kalam noticed all this and came specially to visit the river in 2002. The name of the Kali Bein has now been changed to the Holy Bein. In 2008, *Time* magazine named Sant Seechewal as one of the activist "Heroes of the Environment".[34]

It is clear that it is possible to clean up some of the most polluted stretches of long rivers in a time bound manner, provided there is strong community involvement.

[34] The Tribune Feb 11, 2005, Oct 19, 2008 and many other sources

Today Union Ministry of Environment and Forests does not even require the assessment of comprehensive downstream impacts of dam proposals, including how the dam would change the downstream flood characteristics, how it would change the downstream silt flows and their impact, what would be the downstream flows in the non-monsoon months and what would be their impacts , and also how the peaking power generation would change the downstream flows and their impacts. When some of us met the Union Environment Ministry officials and its Expert Appraisal Committee on River Valley Projects in Feb 2012, we suggested that all such studies should be required for each dam and also the downstream affected should be included in the resettlement and rehabilitation measures. In just one state of Assam, we learn there are about 40-45 lakh people who depend on the fisheries in the Brahmaputra and tributaries. This is just one among many aspects of how the people depend on rivers. But such aspects are not included in the impact assessment, in livelihood protection measures, in resettlement and rehabilitation measures nor are they taken account of at policy level or in legal and institutional mechanisms. India's biggest anti dam movement is underway in North East India, raising these and other related issues.

Basin studies: Cumulative impacts, carrying capacity

As mentioned earlier, most rivers in India have been dammed multiple times. The cumulative impacts of more than one dam is not the same as sum of impacts of individual dams, it could be more than the sum in case of many impacts. But no credible cumulative impact assessment is done for any basin. Cumulative impact assessment is also relevant in the context of carrying capacity of a basinand ensuring that cumulative impacts do not go beyond the carrying capacity. The first known case where basin carrying capacity study was attempted was in case of Teesta basin. This happened because of the condition included in the environment clearance letter for the Teesta V project in 1995. The study left a lot to be desired, but recommendations of even this incomplete study have not been followed and the MoEF itself is violating them. The cumulative impact studies done in case of Bhagirathi-Alaknanda[35], Lohit[36], Bichom and Sutlej are plagued by serious problems: inadequate terms of reference and highly inadequate scope and ground surveys, lack of involvement of local communities, among others.. WAPCOS, the agency assigned to do the study, has carried out a number of them but has a very poor track record and there are serious issues of conflict of interest. AHEC, an IIT-Roorkee centre that did the Bhagirathi-Alaknanda basin study has similar problems.,

SANDRP has put together maps of most of India's river basins with the location and some features of the existing projects indicated on them. (In some basins projects under construction and planned hydropower projects are also indicated). See: http://sandrp.in/basin_maps/.

Environmental flows Definition[37] "*The flows required for the maintenance of the ecological integrity of the rivers and their associated ecosystems, and of the goods and services provided by them*". The working group set up by the Government of India (June 2005 report, see below) adopted a methodology wherein "*certain percentages of the annual flows are prescribed as minimum flows as well as flushing flows during the monsoon*".

WCD on how EFRs can help

The report of the WCD has noted that Environment Flow Releases (EFR) can help minimize the impact of large dams on the river downstream from the dams[38]:

"At least twenty nine countries seek to minimize ecosystem impacts from large dams by using the EFR to meet predetermined ecosystem maintenance objectives. The practice of EFRs began as a commitment to ensuring a

[35] For SANDRP comments see: www.sandrp.in/hydropower/Pathetic_Cumulative_Impact_Assessment_of_Ganga_Hydro_projects.pdf
[36] For SANDRP comments see: www.sandrp.in/rivers/Lohit_Basin_Study_by_WAPCOS_A_mockery_of_e-flows_and_cumulative_impacts.pdf
[37] Workshop Resolution from the Indian National Workshop on Environment Flows, held at New Delhi on 23-24 March, 2005, see April 2005 (Vol. 2, issue 1) issue of *Environmental Flows*, published by International Water Management Institute.
[38] *Dams and Development: A New Framework for Decision-Making*, The Report of the World Commission Dams, Nov 2000, p 81

'minimum flow' in the river (often arbitrarily fixed at 10% of the mean annual runoff). It has since grown to include a definition of ecosystem requirements and a planned flow release programme, which may vary annually or seasonally, to meet downstream needs for both the environment and people. The level of EFR required is determined by the need to maintain particular ecosystem components downstream, often with reference to national legislation. The countries that use this method have recognized that a short term reduction in financial returns from a project often leads to improved long term sustainability and attainment of broader societal objectives for a healthier environment. Still, this represents a re-distribution of the benefits of a dam project and thus existing beneficiaries such as irrigators and operators of hydropower facilities may resist EFRs."

1992 CWC Guidelines

The Guidelines for sustainable water resources development and management prepared by the Central Water Commission (CWC) of the Government of India in 1992[39] suggested that the minimum flow in the river should not be less than the average of 10 days minimum flow of the river in its natural state.

September 1999 NCIWRD report

In the report of the Government of India's National Commission for Integrated Water Resources Development (NCIWRD)[40], a provisional projection of the environmental needs has been given as 5 billion cubic meters (BCM), 10 BCM and 20 BCM in the years 2010, 2025 and 2050 respectively. However, no basis is given for these figures. The report accepts, "*Estimation of fresh quantity of water needed for managing ecological standards for all water bodies including lakes and rivers on sustainable basis is not possible at present*."

May 2001: WQAA Created

The MoEF constituted the Water Quality Assessment Authority (WQAA) (under the section 3 (1) (3) of the Environment Protection Act, 1986) with effect from May 29, 2001 through a notification in the Gazette of India. The authority was constituted 'on the advice of Ministry of Water Resources'[41]. One of the terms of reference of this authority is, "*To maintain minimum discharges for sustenance of aquatic life forms in riverine system.*" As per an MoEF order dated May 25, 2005, the mandate of the authority included, "*to draw scheme for imposition of restriction in surface water abstraction and discharge of treated sewage/ trade effluent on land, rivers and other water bodies with a view to mitigate crisis of water quality.*" The authority was created for an initial period of three years; the tenure has been extended up to 31st March, 2012 as per the latest extension order. The 12 member authority has no non-government members.[42] However, it has taken no effective action for ensuring minimum flows in the rivers and on imposition of restriction in surface water abstraction and discharge of effluents. It set up the working group, whose report WQAA has not accepted. The WQAA has completely failed in its mandate.

NWP 2002

Section 1.3 of the NWP says, "*Water is part of a larger ecological system. Realising the importance and scarcity attached to fresh water, it has to be treated as an essential environment for sustaining all life forms.*" While giving priorities for water use, the NWP puts ecology at fourth priority after drinking water, irrigation and hydropower, but before industrial and navigation use. Further, in section 14.3 the NWP states, "*minimum flow should be ensured in the perennial streams for maintaining ecology and social considerations*". However, when SANDRP asked the Union Ministry of Water Resources (MWR) through RTI application as to what the MWR has done to ensure continuous flow of freshwater in perennial rivers, the ministry essentially, by implication said they have done nothing. Most of the major water resources

[39] See page 49 of the report of the working group report on minimum flows set up by the WQAA, see below for details.
[40] Published by Ministry of Water Resources, Govt of India, Sept 1999, see Vol. 1, page 68
[41] http://wrmin.nic.in/index3.asp?subsublinkid=718&langid=1&sslid=708 as seen on December 21, 2008
[42] As per MWR leter dated Feb 10, 2009, in response to an RTI application from SANDRP.

projects in states are funded through central grants. Through this and various other ways, centre could have played a role to ensure that the rivers continue to have freshwater flows.

The Maharashtra Water Policy (2003) does not mention the need for environmental flows or minimum flows in rivers.[43]

May 2003 WQAA Working Group

During the second meeting of the WQAA on May 14, 2003 the WQAA constituted a Working Group to advise the authority on the *minimum flows in the Rivers to conserve the ecosystem*[44]. The 9 member working group had one non-government member, namely Prof Brij Gopal of Jawaharlal Nehru University.

Dec 2004 WQRC

To fulfil its mandate, the WQAA set up Water Quality Management Committee at the national level and directed that in state a Water Quality Review Committee (WQRC) be set up. The minutes of the third meeting of WQAA held in Dec 2004 noted, "*The Member (RM), CWC also suggested that proposal regarding restriction in water abstraction should emanate from respective WQRCs towards criteria for imposition of restriction on abstraction and discharge of treated sewage… States have to prepare water quality management plans for the respective river stretches and the concerned central authority will have to act for peer reviews for the management plans. The state must ensure that a decided criterion on water quality is followed when the river leaves a state.*" However, there is no evidence of state management plans, its peer review or action thereof to ensure that rivers maintain the designated water quality when they leave the state.

The minutes of the fifth meeting of WQAA noted, "*CPCB is already monitoring the quality of Inter-State river water at state boundaries.*" The meeting also noted that "presently there is no agreement on water quality" for international rivers.

June 2005 11th Plan Working Group

The Report of the Working Group on Water Resources for the 11th Five Year plan says, "*In 2004-05, the Ministry of Environment and Forests appointed a committee headed by Member (RM), CWC to develop guidelines for determining the EFR (Environment Flows in Rivers). The committee submitted its report in 2005.*" This is in reference to *the Working Group to advise WQAA on the Minimum flows in the rivers*. In a response dated August 14, 2007, Director (WP & P, CWC) informed SANDRP, "*The report has not yet been approved by WQAA*."

It is interesting to note that while the TOR of the working group was to advise the WQAA on the *minimum* flows in the rivers, the report of the working group title used the term environmental flows. Some of the main recommendations of the working group are:

- **Himalayan Rivers** Minimum flow to be not less than 2.5% of 75% dependable annual flow, all flows expressed in cubic meters per second. One flushing flow during monsoon with peak not less than 250% of 75% dependable Annual Flow.
- **Other Rivers** Minimum flow in any ten daily periods to be not less than observed ten daily flow with 99% exceedance. Where ten daily flow data is not available this may be taken as 0.5% of 75% dependable annual flow. One flushing flow during monsoon with peak not less than 600% of 75% dependable annual flow.

Unfortunately, the WQAA or the MoEF has not taken up even these recommendations for implementation.

[43] Dandekar, August 2009

[44] TOR dated Sept 9, 2003, for constitution of the working group, signed by member secretary (WQAA & Commissioner (GW & MI), MWR).

July 2005 WQAA meeting

The minutes of the fourth meeting of the WQAA held on July 19, 2005 decided that "Water Quality Management Plans for polluted areas are required to be submitted by the states to the National River Conservation Directorate" and "It should be targeted that from 11th Plan onwards, funding through NRCD would be subjected to such management plans." On the important issue of *Report of the Working Group on minimum discharge in rivers* the minutes noted, "*Secretary (MoEF) suggested that the effect on legal and institutional aspect on the findings of the group should also be looked into by it (the Working Group on minimum discharge in rivers)*."

Nov 2007 meeting presided by the Prime Minister

A meeting was held under the chairmanship of Prime Minister and it was decided to revamp the National River Conservation Plan (NRCP) to cover the following issues: a) Focus on quantity and quality of river waters, b) Limiting the scope of NRCP to selected river basins, c) Holistic plan for treatment of point and non point sources of pollution, d) Protection of flood plains through regulatory measures, e) Estimation of ecological flows and maintenance of minimum flow, f) Bio-monitoring using indicator species approach and g) conservation of aquatic resources. This was noted in the minutes of the 6th meeting of the WQAA, but the conclusions of the meeting Chaired by the Prime Minister remain unimplemented.

May 2008 meeting of the WQAA

The minutes of the sixth meeting of the WQAA held on May 23, 2008 noted, "*The power projects, especially the run-of-river schemes are planned in a manner to release the water through a tunnel at a large distance downstream of diversion dam. This results in negligible flow just below the structure up to the point at which the releases are made from the tunnel. There is a need to ensure minimum flows below diversion structures.*" The minutes also noted that "*the Working Group submitted its modified report on minimum flows incorporating Water Quality aspects in August 2007… a committee was constituted on October 5, 2007 under the Chairmanship of Chief Engineer (EMO), CWC, to advise WQAA on the legal and institutional implications of the recommendations of the report. The meeting of the said Committee could not be held so far due to some preoccupations of some of the members.*" So a working group that was supposed to submit report within three months did not find time to meet for *nine months*!

Specifically on the issue of minimum flow in Yamuna in Delhi, the minutes noted, "*It was stated by Director NRCD, MoEF that the figure of minimum flows of 10 cumecs to be ensured in river Yamuna does not have sound scientific/ engineering basis… However, after detailed discussions, it was considered that looking at the present polluted condition of the river Yamuna in the stretch between Wazirabad and Okhla and below, there is need to have the minimum flows in the river Yamuna of the order higher than 10 cumecs. Accordingly, it was decided that CWC would take up a study for assessment of minimum flows required in river Yamuna… and submit the detailed report to WQAA by Nov 30, 2008 in this regard.*" It is not known if CWC has submitted this report and what has been done about it.

The minutes also noted, "*During discussions it was mentioned that not much progress has been made by the WQRCs in identifying the hot spots for surveillance monitoring and in reviewing/ assessing schemes launched/ to be launched to improve quality of the water resources of the state.*"

Dec 2008 CWC order

Through a CWC order dated Dec 4, 2008, a committee was formed "to carry out studies on assessment of environment flows in rivers of India with reference to recommendations of report on the determination of minimum flows in rivers of India submitted by Working Group under the chairmanship of Member (RM), CWC" as per recommendation of the 6th meeting of WQAA. That committee was asked to submit report in two months, nothing is known beyond this.

Tirthan River: the Only Example of Protected River in India?

Tirthan river, (a tributary of Larji river, which in turn is a tributary of the Beas river) in Himachal Pradesh, is possibly the only river of India, which has been, by a government decision, protected from development of Hydropower project. The decision was taken by the state government to protect this river basin in Kulu-Mandi districts, on May 31, 2004, in the interest of brown trout fish[45]. However, in 2007, when the Himachal Pradesh government started awarding some small hydro power projects in Upper Seraj (Jibhi-Hirab) Valley, the southwest part of the Tirthan valley, the decision of awarding such projects in Tirthan Valley was challenged by some of the local people in the High Court and the case is still going on.

Recent studies

The International Water Management Institute has been doing several studies and estimations of environment flow requirements in India, including their papers of 2006 and 2007. However, some IWMI papers have also been saying that excessive groundwater use, rainwater harvesting and watershed development in the upstream catchments also have impacts on the downstream river flows and availability of water at the downstream reservoirs. In fact some of the IWMI authors have been advocating restrictions on such upstream uses so that downstream reservoirs are filled. Such advocacies go against the rights of the people in the upstream areas and can have dangerous and unacceptable implications of giving priority to existing big reservoirs over decentralized and local water systems.

International Norms

The Helsinki Rules (1966, these rules have no legal status in international law) on the Uses of the Waters of International Rivers and the 1997 UN General Assembly adoption of the Convention on the Law of the Non-Navigational Uses of International Watercourses (not yet ratified by the required number of countries) are relevant here. The Berlin Rules of 2004 are supposed to replace the Helsinki Rules, as noted by the Preface of the Berlin Rules, "*Berlin rules are the result of revision of the Helsinki and other International Law Association rules on international water resources*".[46] The principle of equitable sharing for beneficial uses (in the Helsinki language) or of utilization in an equitable and reasonable manner (UN Convention) are noteworthy. There is agreement that the upper riparian must not cause harm to the lower riparian, though the wording has changed from 'substantial harm' in the Helsinki Rules to 'significant' adverse effects in the UN Convention.

The World Commission on Dams report (2000) goes further and says[47] under the strategic priority *Sharing Rivers for Peace, Development and Security* that any projects on Transboundary Rivers have to be taken up only after agreement conducted in good faith and with prior information to all concerned. The report gives detailed guidelines for implementation of this strategic priority, which are useful for river management at all levels.

The Ramsar Convention for management of wetlands, for conserving their biodiversity and wise use extending its scope to a wide variety of habitats is supposed to apply to rivers, and India is a signatory to the Ramsar Convention. But India has not taken any steps for conserving the biodiversity and wise use of rivers. On December 2, 2010 the Union Ministry of Environment and Forests notified the Wetlands (Conservation and Management) Rules 2010, but the definition of the wetlands in that notification excludes main river channels[48].

International examples

[45] See http://himachalpr.gov.in/cabinetdes1.htm and http://www.tribuneindia.com/2007/20070415/himachal.htm#4, for example.
[46] http://www.cawater-info.net/library/eng/l/berlin_rules.pdf, accessed on February 10, 2010
[47] WCD report, page 251
[48] For detailed critique of the Wetland Rules, see cover story in Dec 2010-Jan 2011 issue of *Dams, Rivers & People*.

South Africa has already set ecological standards for its rivers. It allocates, through a law, 20 percent of flows as a minimum for the environmental sustainability of a river.

Sweden has had a long history of agitations against large hydropower projects. The agitations, ultimately, lead to the Swedish govt declaring in its Natural Resources Act of 1987 that explicitly prohibits construction of new hydropower dams on "those rivers that had been designated for protection in the Physical Plan for Sweden, including the last four large free flowing rivers: The Torne, Kalix, Pite and Vindel rivers. In fact, not only is construction of dams in new sites prohibited, but so is enlargement of existing dams that can cause negative environmental effects. For most of the streams and rivers that are out of bounds for hydro exploitations, this protection extends to both the mainstream and all the tributaries, writes Ann Danaiya Usher[49].

Free flowing rivers While many countries have put in place policies and laws for maintaining environmental flows in their rivers, there is also a rarer category: Rivers which have not been dammed yet, rivers which retain their connection from the source to the sea, nurturing myriad ecosystems and communities in their wake! These are known by many names like Free flowing rivers, Wild rivers, Pristine/ Virgin rivers, Heritage rivers, etc., each indicating their rare character and value. In ecological and cultural terms, the value of these rivers is immense and as more and more rivers are being dammed the world over, this value is increasing steeply. Unfortunately, in today's economic terms, these rivers are still waiting to get their due recognition, but as human systems evolve, they will surely be seen as 'invaluable' service providers with phenomenal use and non use values. As Parineeta Dandekar has written about this[50], "Such free flowing rivers are, as is evident, dwindling fast throughout. Of the 177 large rivers of the world only one third are free flowing and a mere 21 rivers, more than 1000 kms long retain a direct connection to the sea." There is a strong case for identifying and ensuring some rives of India in their natural undammed state, particularly in areas like the Western Ghats, North East and Himalayan states.

Decommissioning of dams for river restoration

Many countries in the world, including US, Spain, France have decommissioned hundreds of dams over the years. In the United States alone, the WCD report said, a total of 467 dams were removed by the year 2000, of which at least 28 were large dams. Among the many reasons for taking up dam removal, restoration of the river was an important objective. In each case a study was done that established that it was economically more beneficial to remove the dam rather than let it continue to exist. This shows that if right value is given to the flowing rivers and the benefits it gives, many of the dams may not be taken up or built dams could be decommissioned.

Way forward

This chapter largely takes stock and analyses the prevailing legal and institutional situation around rivers in India. Through the analysis the paper also provides suggestions for changes in the legal and institutional set up for better management of rivers from the point of view of their sustained existence, while minimizing conflicts and ensuring protection of access to water and livelihoods. The Forum needs to identify how we should proceed further in building an enabling legal and institutional framework conducive to an equitable, sustainable and just resolution of water conflicts in the context of rivers.

Some of the key elements for this would include National Rivers Policy, river zone regulation, flood plain protection, catchment management, protection of local water systems, wetland and forests, ensuring freshwater flow in perennial rivers even from existing dams, hydropower projects and diversions and also from future such projects, credible community managed pollution control regime, ensuring natural flow in selected rivers in Western Ghats, North East India and Himalayan states, credible redressal mechanisms, ensuring compliance, among other elements. Some additional areas where urgent action is required

[49] *Dams as Aid: A political anatomy of Nordic development Thinking*, Routledge, 1997, p 29
[50] *Free flowing rivers around the world* in June July 2010 issue of *Dams, Rivers & People*.

include: Documentation of successes; Survey of international successes/ trends; Assessment of river basin wide potential of local water systems for a small river basin; Documentation of benefits of a river flowing all round the year and how that should be part of the decision making process.

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