

# An Overview Presentation on Inter-linking of Rivers in India -Challenges & Prospects- Need for Conflict Management in Tune with Supreme Court's Decision

**Er. RADHEY SHYAM GOEL**

National Convener, Coordination Committee,  
Water & Hydro-power Related National Professional Societies,

## 1. Introduction

India accounts for 2.4% of the world's surface area but supports 16.7% of the world's population. India possesses meager 4% of world's water resources, that too highly uncertain in time and space due to its monsoonic climate. Still, India possesses dismal per capita storage capacity compared to those countries where rainfall is more or less evenly distributed in time and space. While per capita storage capacity in North America, Russia, Australia, China are respectively 6150, 6013, 4729 and 2486 cubic metre, the same in India is only 262 cubic metre. Hence to build robustness to climate variability and to overcome water scarcity in India, India must very fast harness accelerated water storage capacity at all feasible sites.

## 2. Supreme Court's Judgment 2012

Hon'ble Supreme Court's 3 Judge Bench headed by Hon'ble Chief Justice of India, in its significant Judgement Dated 27<sup>th</sup> February, 2012 (Writ Petition No. 512 of 2002) directed -

"It is clear that primarily there is unanimity between all concerned authorities - including the Centre and a majority of the State Governments, with the exception of one or two, that implementation of river linking will be very beneficial. In fact, the expert opinions convincingly dispel all other impressions. There shall be greater growth in agricultural and allied sectors, prosperity and stimulus to the economy potentially causing increase in per capita income, in addition to the short and long term benefits likely to accrue by such implementation. These would accrue if the expert recommendations are implemented properly and within a timeframe. Then there shall be hardly any financial strain on the economy. On the contrary, such implementation would help advancement of India's GDP and bring greater wealth and prosperity to the nation as a whole. Besides actual benefits accruing to the common man, the Governments also benefit from the definite possibility of saving the States from drought on the one hand and floods on the other. This project, when it becomes a reality, will provide immeasurable benefits. We see no reason as to why the Governments should not take appropriate and timely - interest in the execution of this project, particularly when, in the various affidavits filed by the Central and the State Governments, it has been affirmed that the governments are very keen to implement this project with great sincerity and effectiveness.

The States of Rajasthan, Gujarat, Tamil Nadu have fully supported the concept. Madhya Pradesh has also supported the Scheme, but believes that it must be implemented by the Central Government. The States of Karnataka, Bihar, Punjab and Sikkim have given some qualified approvals. Their main concern is, with regard to inter basin transfer, which must involve *quid pro quo*, as with any other resources inter-linking must be from water surplus to water deficit States and in regard to environmental and financial implications. Some of the other States are not connected with these projects as they have no participation in inter-linking of rivers.

National Commission for Review of the Working of Constitution (NCRWC) 2002 in its Report also dealt with another important facet of river interlinking. Explaining the doctrines of river sharing, it - described Doctrine of Riparian Rights, Doctrine of Prior Appropriation, Territorial Integrity Theory, Doctrine of Territorial Sovereignty, English Common Law Principle of Riparian Right, Doctrine of Community Interest, Doctrine of Equitable Apportionment. It also explained that when it also explained that when determining what a reasonable and equitable share is, the factors which should be taken into consideration. In that behalf, it specifically referred to agreements, judicial decisions, awards and customs that already are in place. Furthermore, relative economic and social needs of interested states, volume of stream and its uses, land not watered were other relevant considerations. Thus, it will be for the expert bodies alone to examine on such issues and their impact on the project. Be that as it may, we have no hesitation in observing that the national interest must take precedence over the interest of the individual States. State Governments are expected to view national problems with a greater objectivity, rationality and spirit of service to nation and ill-founded objections may result in greater harm, not only to the neighbouring States but also to the nation at large.

We would recommend, with all the judicial authority at our command, that these projects are in the national interest, as is the unanimous view of all experts, most State Governments and particularly, the Central Government. It will not only be desirable, but also inevitable that an appropriate body should be created to plan, construct and implement this inter linking of rivers program for the benefit of the nation as a whole."

## 3. Socio-Economic & Environmental Impacts of Floods

Over 40 million hectares of the area of the country experiences periodic floods. The average area affected by floods annually in India is about 7.5 m. ha of which crop area affected is about 3.5 m.ha. Floods have claimed on an average 1529 human lives and 94000 cattle ever year. Apart from loss of life and domestic property, the devastating effects of floods, sense of insecurity and fear in the minds of people living in the flood plains is enormous. Crops grown in the flood plains suffer from congestion of water on the farmlands. Management of the surface water becomes a very tricky operation in the flood prone areas during periods of heavy rainfall. Floods also affect the vulnerable aquatic and wild life, forests, mangroves and precious bio-diversity in the flood plains. Large-scale damages to forests, crops & precious plants and deaths of aquatic and wildlife, migratory and native birds in various National Parks, Delta region, low altitude hilly areas and alluvial flood plains of Assam, Arunachal, Utrakhand, U.P., Bihar, Orissa, West Bengal, have always been the matter of serious concern. Almost all river valley projects (RVPs) moderate the magnitudes as well as frequencies of floods. While some projects are specially designed to provide flood cushion in the reservoirs, others also

help in reducing the magnitude of floods with proper operation and control of gates.

#### **4. Socio-Economic & Environmental Impacts of Droughts**

It is estimated that around 263 million people live in drought prone area of about 108 m. ha., which works out to 1/3<sup>rd</sup> of the total Indian geographical area. Thus, more than 26% of total population of the country face the consequences of recurring droughts, on a wide spectrum of social concerns. RVPs are designed to provide 'carry-over' storage in the reservoirs to help in mitigating the droughts. During the drought years, there is a marked tendency of intensive exploitation of ground water, resulting in abnormal lowering of ground water table thus accentuating the distress. Grave adverse impacts are borne by flora, fauna and domestic cattle and the very life itself fights against nature for its survival. Droughts affect rural life in several ways. This accentuates problems in cities in the form of mushrooming of slums and pressure on the existing civil amenities thereby adversely affecting urban life.

#### **5. Rehabilitation of Displaced Families**

The controversies concerning the rehabilitation of persons displaced by dams have muddied the entire debate on the utility of water resources projects and caused much harm to the national economy and well being of the population at large. As per the broad assessment made by Central Water Commission through the review of data of 2784 dams spread in 14 States, the total affected persons may range between 6-7 Million. The exaggerated claims by the opponents of large dams blow up this figure up to 70 Million by taking the average of the recent few mega dams and multiplying the same by 4291.

It has to be borne in mind that most of the high dams (by definition every dam having height of more than 15m is classified as high dam mainly for safety concerns) did not displace persons, firstly due to very thin population in the submergence in earlier dams during construction, secondly very few dams having the height greater than 50m would have the submergence impacts on the upstream habitation. The crucial problem is that of physical and psychological suffering of the displaced people from the submerged area of reservoirs. There are now-a-days efforts for provisions for more liberal compensation, amenities, land and employment for the displaced population, while constructing river valley projects. Some projects have been shelved on this account alone. There is a strong need to formulate a strong monitoring group for dealing with rehabilitation of project affected families (PAFs). People argue that the tribal people should not be displaced at all, as they cannot live in a different environment. This approach is not correct, especially when it results in perpetuation of their backwardness for times to come. No efforts should be spared to expedite the process of improving their lot.

Experience in the North-Eastern region indicates that the tribal people definitely want water storage projects for bringing in overall economic prosperity to them. Awareness and persuasive approach are needed to tackle this problem. At the same time, the rehabilitation packages with scope for more than one option should be made more attractive so that project affected people are induced to accept them. The construction of multi-purpose projects like Sardar Sarovar and Tehri Dam attracted attention of a large number of NGOs –perhaps many of them funded by

developed countries, either on the issue of R&R or many shifting unjustified issues.

Many positive aspects recently noticed in the resettlement & rehabilitation of PAFs in Tehri, Sardar Sarovar, Upper Krishna Dam Projects have been overlooked by self-acclaimed environmental experts, having neither professional background nor acumen in highly complicated dose response functions of complex environmental issues. In the Upper Krishna Project (Karnataka), a reputed NGO, Maryada, was associated in preparing the Action Plan for the rehabilitation of PAFs. Similarly, in the Upper Indravati Project (Orissa), a voluntary agency viz. M/s Agragamy was entrusted with the work of preparation of rehabilitation master plan for the PAFs.

NGOs by adopting a constructive approach can play an important role in proper rehabilitation & resettlement of PAFs. Considering crucial importance of R&R, Government of India undertook a major policy level initiative to streamline the R&R associated with infrastructure projects. National Policy on Resettlement and Rehabilitation for Project Affected Families has been notified on 17<sup>th</sup> Feb, 2004. Comprehensive National Land Acquisition and Rehabilitation Policy is presently under active consideration of Parliament.

In recent river valley projects under construction, very liberal provisions and comprehensive plans for implementation are being kept in recent water resources projects so as to ensure that the PAFs are rehabilitated properly with adequate civic amenities so that their economic conditions improves after rehabilitation.

Most of such PAFs originally reside in areas of extreme environmental fragility and largely deprived of nutritional food, potable water and productive employment. The Author very strongly feels that those NGOs and activists, who oppose river valley projects, must also fight to ensure minimum reasonable living standards to those vulnerable people even the absence of those projects.

#### **6. Objectives Inter-Basin Transfers (ILR)**

The broad objectives for inter-basin transfers could be envisaged as follows:

*Equitable distribution of the available water resources within a nation or a region; Increased Economic Efficiency; Self Sufficiency in Basic water related outputs such as food and hydro-energy; Providing livelihood and employment opportunities in situ, in various parts of the nation so that migration of population, seasonal or permanent, short distance or long distance, in water distress situations, a distress large scale migration of population is avoided through a balanced regional economic development.*

National Commission for Integrated Water Development has shown that the per capita availability of waters varies widely from around 300 m.cu per person per year in basins like Sabarmati to very large quantities in the Brahmaputra, with a National average of about 2000 m.cu per person per year. *Self sufficiency in food grains could again be an important driver for planning of inter-basin transfers.* A nation of the size of India cannot afford to be not self sufficient in food requirements. The world trade in food grains is not large enough to meet the needs of a large country like India. World trade in rice for example is only 18 million tonnes at present. Large imports by India would affect the price stability. Infrastructural bottlenecks like port facility, shipping, roads, railways etc. are other constraints on increasing trade in food grains. Thus food self- sufficiency

should be an explicit objective of inter-basin transfer of water projects (ILR).

Precipitation is the main source of water availability in India, which has a very uneven distribution, with an annual rain fall of more than 10m in parts of Meghalaya to less than half a metre in semi arid parts of Rajasthan and Gujarat. In arid regions it could be less than 10 cm. Much of the water is received in a few months of the monsoon, and that to within around 100 hours of the rainy days. As per International standard the limit of 1700 KL of water per person per year is considered satisfactory; if it falls below 1000 KL, it creates conditions of stress. Indian requirement of agriculture for producing food alone is 700 KL. Other requirements like that of domestic use, industries, ecological requirement, hydro power etc. requires further above 1000 KL. Most of the basins in India have availability below 1000 KL, whereas in Brahmaputra availability is around 10000 KL and in Narmada, Mahanadi above 2000 KL. Indian Ministry of Water Resources (MoWR), had recognized need of interlinking of rivers (ILR) and prepared a National Perspective Plan (NPP) in 1980 after studying all major basins of the country. National Water Development (NWDA) Agency was set up in 1982, to work on preparation of feasibility reports. Thus, about 30 years have passed, since need for Inter-basin transfer of water was recognized. If effective actions are not taken quickly, the country would face serious water crisis. Food requirement by 2050 is estimated as 450 Million tons. If prompt actions are not taken, the country may have to face serious food crisis and may have to start importing food grains. Similarly if hydro power is not developed very fast, it would result not only in acute shortage of power particularly in peak hours but, the country will have to go for more expensive options, which will make our products highly less competitive in international market. In order to be self sufficient in food, increased irrigation through long distance water transfers may be required. Investments in long distance water transfers may be economically less efficient as compared to say industrial and other commercial investments. It may not be prudent to make investments to achieve complete food sufficiency through long distance transfer of water. Countries like Japan, England, Saudi Arabia etc. depend on imports to meet a large part of their food requirements. How-ever a nation of the size of India cannot afford to be not self sufficient in food requirements. The world trade in food grains is not large enough to meet the needs of a large country like India. World trade in rice for example is only 18 million tonnes at present. Large imports by India would also affect the price. Thus food self-sufficiency is an explicit objective of ILR.

#### **7. Inter-Basin & Intra-basin Water Transfers Projects (ILR)**

When there are no serious inter-state problems involved and where the water divides between basins do not constitute insurmountable ridges, inter-basin transfers are planned and executed in a routine manner. To give a few examples, both the Krishna and Godavari delta irrigation systems cover and irrigate the small basins in between, the Nagarjunasagar Right Bank Canal irrigates areas beyond the Krishna basin. The Krishna Cuddapah canal in Andhra Pradesh transfers the waters of Krishna to the Penna basin, the Mahi Right Bank Canal irrigates large areas in the Sabarmati basin.

Rajasthan Canal Project diverts waters from the Himalayas to the deserts of Rajasthan. The Project comprises of a huge multi

purpose project constructed across the Beas river at Pong, a barrage at Harike and a grand canal system. Other important inter basin water transfer schemes in the country are the Parambikulam- Aliyar Project, Telugu Ganga, Sardar Sarovar etc. Sardar Sarovar canal transfer the Narmada water to various basins of Gujarat and also into Rajasthan which is a non-co-basin state. The waters of the Indus basin (Bhakra) are transferred to the Yamuna basin and in particular to the Delhi urban area through the inter-connected canals of Bhakra and Yamuna.

In United States, California's State Water Project, first phase of which was completed in 1973, provides for the diversion of 4 cubic km of flow from better watered northern California to drier central and southern parts of the state. Conveyance system comprises of 715 Km California Aqueduct, a complex system of lined and unlined canals, pumping stations, siphon-s and tunnels. The lift involved is nearly 1000 m. Texas Water Plan envisages redistribution of water in Texas and New Mexico to meet the needs of the year 2020. Similarly waters of the Colorado river (an international river between USA and Mexico) are being supplied outside basin to the Imperial valley in the California. Major existing and under construction inter-basin transfers in Canada include Kemano, Churchill Diversion, Weiland Canal, James Bay, Churchill Falls, Bay d'Espoir etc. Proposed inter basin transfers in Canada include Ogoki, Long Lake (for transfer within Canada) and North American Water and Power Alliance (NAWAPA), Grand Canal Concept, Canadian I Water, Magnum Plan, Central North American Water project (CeNAWP), Smith Plan for transfer from Canada to USA.

For Mexico city water supply, transfer of ground waters from the Lerma basin was completed in 1958. Water Plan for the North Western Region (PLHINO) conceived a set of inter basin transfers within the Noroeste region. Mahaveli-Ganga Project of Srilanka includes several inter basin transfer links. Inter-basin transfer projects have also been planned and implemented in China and former USSR. A notable scheme executed in the USSR is the Irtysh Karganda scheme in the central Kazakhstan. Link canal is about 450 km long with a maximum capacity of 75 cumecs. Lift involved is 14 to 22 m. There is another plan to transfer 90000 M cu m on the north flowing river to the area in south. Other proposals include partial redistribution of water resources of northern rivers and lakes of European part to Caspian sea basin involving 2 M.Ha.m of water.

Lingua Canal was completed in China in 214 BC and the Grand Canal was completed in 605 AD. Recently completed projects in China include Biliuha-Dalian inter basin water supply system, Trans basin transfer of Luhana river to Tiajian and Tengshan, Inter basin diversion of Guanglong province and Inter basin diversions in Fujian province. Diversion of Quiantang river water, diversion of Yellow river surpluses and South to North transfer projects with the West route, Middle route and East route are other proposed projects. China has already started the execution of its massive water transfer projects.

59 schemes of inter-basin water transfers have been completed in various countries mainly in Canada, USA, Iraq, Czechoslovakia and these involve a transfer of upto 246 Km<sup>3</sup> annually in Canada, 37 Km<sup>3</sup> per year in the USA and 45 Km<sup>3</sup> per year in Iraq and 6 Km<sup>3</sup> per year in Czechoslovakia. In addition, about 19 schemes for future inter-basin transfers have been proposed mainly in Canada, USA, China, Russia and Germany. The proposals in USA involve an annual transfer of 348 Km<sup>3</sup> while those in Russia involve 37 Km<sup>3</sup> and those in China involve 14 Km<sup>3</sup>.

Thus, inter-basin and intra-basin transfer of water projects is not new, either in India or in other countries. Given the techniques and expertise in India for detailed planning and implementation base, there is every reason to believe that an overall sustainable regime can be built around ILR projects and it is expected to be an unprecedented venture amongst developing countries, marrying development and ecological management through scientifically – planned strategies, in tune with the over-arching decision of Hon'ble Supreme Court of India. Environment is either Science or Engineering, so novelist(s), celebrities and self-acclaimed ecological experts and activists should be restrained from creating fantasies blocking projects of such national importance. Without ensuring adequate qualitative water and power availability, India may become a dooming civilization rather than becoming an economic superpower.

#### **8. Constitutional Position in India**

In our constitution, Article 262, deals with the adjudication of disputes relating to waters of inter-state river or river valleys and Entry 17 of List II and Entry 56 of List I of Seventh Schedule deals with items that fall within the purview of the state legislation and the parliament respectively.

##### **Article 262: Adjudication of Disputes Relating to Waters of Inter-State Rivers or River Valleys**

Parliament may by law provide for the adjudication of any dispute or complaint with respect to the use, distribution or control of the waters of, or in, any inter-State river or river valley. Notwithstanding anything in this Constitution, Parliament may by law provide that neither the Supreme Court nor any other Court shall exercise jurisdiction in respect of any such dispute or complaint as is referred to in clause (1).

##### **Entry 17 -List II:**

"Water, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power, subject to the provisions of entry 56 of List I."

##### **Entry 56 -List I:**

"Regulation and development of inter-State rivers and river valleys to the extent to which such regulation and development under the (control of the Union is declared by Parliament by law to be expedient in the Public interest." We need to examine the concept of "in-basin" and "inter-basin" use of waters in the context of these constitutional provisions.

Indian constitution and the Central laws use the term 'river or river valley' which could perhaps taken to be synonyms with the concept of "water course". However, the term "river or river valley" does not directly involve the concept of a "common terminus" so essential to make it a "unitary whole". This seems to have enabled the central legislative for example, to take under its control to a specific extent, the regulation & development of the Betwa River valley (Betwa River Board act, 1976) even though it is only a part of a whole basin. The policy documents use the term "basin" & this term appears to be interchangeable with "river & river valley".

At national level the case law on the subject through the decisions of the various tribunals have treated the basin as a "unitary whole" more or less in agreement with the international practice when dealing with water allocations. When it was put forth to the Ravi and Beas water Tribunal (Eradi Tribunal) that after formation of Pakistan the various rivers like Ravi, Beas, Sutlej etc. flowing into Pakistan could be considered as separate systems (and not part to the Indus basin as a whole), the Tribunal

seems to have rejected such a claim. Consideration of basin up-to the sea as a "unitary whole" flow has not been strictly considered in the personal law created by states through Inter-state agreements. For example, inter state agreements on Sone of 16th September, 1973 and Yamuna agreement of 12th May, 1994 tend to consider these sub-basins as if these were basins forming a unitary whole. Former allows utilization of all utilizable water, whereas latter allows a small volume of water to be left for ecological purpose downstream of Okhla. However, in both these agreements at least had all the "co-sub basin states" as the partners. A earlier draft agreement (dated 12th March 1954) on Yamuna was signed only by the then Punjab and Uttar Pradesh for distribution of flows up-to Tajewala without involving all co-sub basin states of Yamuna sub-basin.

#### **9. Inter-Basin Diversion within co-basin States**

Wording of the Constitution or of the Central acts does not seem to place any restriction on the use of the waters of an inter-basin river, by a state having rights on it, in its territories outside the State. However, such cases have been dealt more directly in the case law. The question of inter-basin diversion outside the basin within the states of India was considered in detail by the Krishna water Dispute Tribunal. Karnataka (then Mysore) expressed that the diversion outside the basin is illegal and only inter-basin needs should be considered in deciding the equitable share. Andhra Pradesh felt that outside basin needs are a relevant factor but only irrigation needs should be permitted.

After reviewing the international experience etc. the Tribunal decided that (i) the diversion of water outside the river basin by a state are legally valid, (ii) needs for diversion outside the basin are relevant to equitable allocation and (iii) however, more weightage should be given to the intra-basin use. In its order the Krishna Water Dispute, Tribunal put considerable restrictions on inter basin diversions of the water towards the Arabian Sea for hydroelectric purpose, and also restricted diversions out of Krishna basin by Maharashtra.

However, except for such specific restrictions, it allowed the water allocated to any state to be diverted by the State outside the basin. In its order Krishna Water Disputes Tribunal allocated the dependable flows amongst the States. However, it gave to Andhra Pradesh, the most downstream riparian state, the liberty to use in any water year, the remaining water without acquiring any rights whatsoever. Karnataka had sought clarifications to indicate that the liberty given to Andhra Pradesh does not confer any right of diverting these remaining waters outside the basin. The Tribunal did not agree to give any such clarification. The Krishna Tribunal also considered the question of inter-basin transfers by the basin states from outside the Krishna basin to within the Krishna basin. Such possibilities of transfer from Godavari were attracting much attention at that time.

Both Maharashtra and Karnataka pleaded to the Tribunal for a direction that water of Godavari be diverted to Krishna, while Andhra Pradesh opposed this. Afterwards an agreement was reached amongst the basin states that each State would be at liberty to divert the Godavari water which may be allocated to it by the Godavari Tribunal, to any other basin. Maharashtra and Karnataka wanted the Krishna Tribunal to pass self executing order providing for equitable distribution for such diversion of water (from Godavari to Krishna). Alternatively they wanted that in case of waters of Godavari, the Ganga or any other rivers are diverted to Krishna they should have the liberty to claim the

benefits of the diverted water. Andhra Pradesh disputed this. The final order of Tribunal provided that in the event of augmentation of Krishna water by any source, no State shall be debarred from claiming before any authority or Tribunal, even before year 2000 that it is entitled to a share in the water of the Krishna on account of the augmentation, nor shall any State be debarred from disputing such claim.

Thus in short the Tribunal has recognized that diversion of waters from any other basin at any point by any basin State or others could give rise to another (subsidiary) dispute which would have to be settled amongst basin States. This issue immediately got considered both by the Godavari water Dispute Tribunal (which had the same membership as the Krishna Tribunal) as also by the Godavari basin States. Narmada Water Dispute Tribunal has not dealt exclusively with the issue of the legality of the waters by the basin states in their territories outside the basin areas. Gujarat govt. relied heavily on the use of Narmada waters in other northern basin in their territory and this formed the bulk of their use. Legal tenability of such a plan was not an issue in dispute.

#### **10. Inter Basin Transfers to Non Co-basin States in India**

In India, there are three main examples of inter-basin transfer to non basin states: The water of the Perriyar river of Kerala (which is not even an interstate river) have been diverted from the Mula Periyar dam located in Kerala across the western divide of Tamilnadu for hydropower and subsequent irrigation. This has been done through an old agreement based on the lease of land for 999 years. This agreement has come under a considerable stress in the recent times. After the finalization of the Krishna Water Dispute Tribunal Award, as a matter of an exemplary good will, the three basin States through an agreement sacrificed 5 TMC from each of their rights on the dependable water for water supply to Tamilnadu considering the acute water shortage faced by the city of Chennai. Although the combination of this proposal with the Telugu Ganga Project involving irrigation in Andhra Pradesh has caused considerable disagreement, the provision regarding water supply to Chennai has not been questioned. The third important case occurred in connection with the Narmada Waters and its allocation to Rajasthan which is clearly a non-basin State. The case of Madhya Pradesh and Maharashtra was that Rajasthan has no right to share Narmada waters as it was a non-riparian State. This was upheld by the Tribunal in a preliminary decision. Rajasthan appealed to the Supreme Court but later withdrew the appeal. However, subsequently the party States signed an agreement allowing the share of 0.5 MAF of Narmada waters for Rajasthan. The Tribunal opined that the right to Rajasthan is based on this agreement and not on the general law. On this basis Rajasthan was made a party to the dispute and its agreed claim was incorporated in the orders of the Tribunal.

While doing so the Tribunal made the following observations: "It may perhaps, be open to Parliament to enact a law in exercise of its authority under item 56 of i list I of the seventh Schedule not only apportioning the waters of the Narmada river between the riparian States of Gujrat, Madhya Pradesh and Maharashtra but also give a share to Rajasthan. The Constitution may also perhaps be amended so as to expand the scope of Entry 56 of List I so as to include apportionment; control and use of waters of all inter state rivers which are declared by Parliament by law to be expedient in public interest. If the Constitution is so

amended and the appropriate law is enacted by Parliament, the rights and interests of the riparian States of Narmada under item 17 of list II would be superseded and the law enacted by Parliament would prevail". The opinion of the Narmada tribunal quoted above raises an important issue about the scope of the entry 56 which as we saw uses the words "regulation and development" of interstate rivers.

Tribunal has perhaps not taken a firm view as to whether these wording allow the apportionment of waters of a river to a non riparian state or whether the constitution may have to be amended to include specifically the word apportionment. If one takes a view that the sense of the present wording "regulation" automatically includes "apportionment", then, it could be argued that the Union Parliament already has the necessary powers to allow inter-basin transfer of waters of interstate rivers to non co-basin states. However, if regulation does not include apportionment, a constitutional amendment to add this word may become necessary. Thus, if through an enactment under Entry 56, part of these powers are vested in the Union, Union can also utilize these power in allocating the waters to any part of the union. Difficulties in interpreting the wording of the constitution, perhaps need to be resolved, if necessary by making a presidential reference to Supreme Court. The availability of ground water as an alternate to the use of surface water would play a significant part in deciding the demands and transferability of basin waters as a whole. The international conventions clearly consider the flues part of the groundwater as a part of the system of water courses and thus they treat the fuel ground water exactly in the same way of the other waters of the basin. Indian National Water Policy recognizes water as a unitary resource. Thus, it seems to recognize that the surface and the fuel ground water are parts of the same hydrologic cycle and to represent merely two sources of utilizing the same resource. However, in law the position seems to be somewhat ambiguous. The Indian easement act 1882 considers groundwater as an easement connected to the land and refers to the right of every owner of land to collect and dispose within his own limits of all water under the land which does not pass in a defined channel.

All ground water existing and found beneath private property is fully under the control of owner of the land, who is free to extract and use it as he or she deems fit. This has led to a 'defacto' right at the field level, where affluent farmers with higher pumping capacity and deeper tube-wells have disproportionate claims over the resources than others. Inadequate regulatory restrictions on the exercise of private property rights in ground water resulted in excessive withdrawals in many areas. Further, uncontrolled disposal of industrial wastes, sewage effluents and excessive use of chemical fertilizers have affected the quality of ground water and the problem is acute in some states like Gujarat. The Indian Easement act seems to link the access to ground water with land ownership, thus ignoring both the fluvial nature of the ground water as also the concept of "Negative community" in general adopted in regard to waters.

Krishna, Godavari and Narmada Tribunals did not include ground water in the coverage of their awards, except to the extent of regeneration of irrigation which may become part of the ground water. They have however not expressed any opinion about the legal issue involved. National Water Development Agency in its studies of water balances which form the basis of

further prefeasibility and feasibility studies have worked out a water account of the surface water alone, but have not worked out the overall water balance through quantification of the major elements of the hydrologic cycle. This point, it is understood, was discussed repeatedly in the Technical Advisory Committee of NWDA and a strong view was expressed that both the surface and ground water phases of the hydrologic cycle be considered as the total resource available. However, for want of unanimity only surface water accounting was resorted to.

#### **11. Special Socio-Economic Impacts of ILR Projects**

Over years, the awareness about such concerns and the methods for dealing with the adverse impacts caused by such concerns have changed considerably and an acceptable methodology of evaluating and meeting such concern through legal policy related and management measures has evolved more as less in a satisfactory manner. In this context, views have been expressed that ILR may cause socio-economic and environmental impacts much different from those caused by in-basin developments. These differences could be both due to the large size of the project and due to the different nature of the project which involves long distance water transfers through large and long canals. For example, large storages and long links could involve a much larger resettlement problem than nation is used to. The link canals may involve large scale interruption of natural drainage and also a large barrier between neighboring communities. These are problems created by size.

But, the very nature of inter-basin transfers could also lead to inadvertent introduction of flora and fauna alien to the recipient basin from the donor basin. This introduced flora and fauna could theoretically grow to a proportion, where it becomes a menace to the ecology of the recipient area and can disturb the ecological balances. In India, the planners are familiar with the social and environmental concerns caused by small, medium, major, mega and large intra-basin water transfer projects.

Social and environmental concerns associated with these inter-basin transfers would mainly on account of the largeness of the totality of the measures in the region in which the system of links passes. Each individual storage dam such as the Ichampally, the Polavaram, the Manibhadra/ Tikarpara etc involved in the peninsular links would not be much different in its storage or in its displacement from the large reservoirs like Gandhisagar, Sardar Sarovar, Srisaillam, Nagarjunasagar etc which are existing. Similarly, we already have experienced about large canals exceeding discharge capacities of 1000 m<sup>3</sup> /sec and the link canals would be not of much larger magnitude through these would be of much larger links.

The issue of inadvertent introduction of alien flora and fauna is important since it could cause a very serious ecological problem. While this needs a detailed study, preliminary verbal enquiries have not brought out any such possibilities. The existing inter-basin transfers in India do not seem to have experienced any such problem. Perhaps the ecology of the various regions of India are not dissimilar. The Himalayan regions with their tundras and tigas could perhaps have a markedly different ecology and transfer of waters of these regions to the peninsula may require a more detail study of these aspects. The Author has also authored/edited/compiled 5 reputed publications, through M/s Tata Mc-graw Hill, Oxford & IBH and Concept Publishers. Each of those 5 publications contain over 30 each articles giving

intricate details and numerous case studies from most reputed experts in Indian Context.

#### **12. Broad Economic Objectives**

In general, water resources projects are designed on the basis of two broad economic objectives namely: Economic efficiency of the national economy and Redistribution efficiency in targeting benefits to a particular region or to a particular group of persons, and thus improving equity. Two broad consideration would hold good for the economic analysis of inter-basin transfers also. However, the self sufficiency in food grains and provision of livelihood to the rural population in the water deficient areas of India could become additional specific objectives which would have to be catered in the economic analysis. Suitable methodologies and an information base needs to be created to allow these changes in the analysis.

#### **13. Global and Incremental Analysis**

Conventional water projects are normally subject to a global analysis for deciding the economic feasibility. For example, all costs involved in an in-basin development such as the construction of the reservoirs and canals, the cost of the tertiary distribution system to be made by the farmers' organizations, the cost of land leveling met by the farmers etc are all considered as costs and the benefits accruing to the farmers and others are considered as the benefits. Such a global analysis would of course be required for the total system of inter dependant links within the plan of inter-basin transfers. The marginal economic analysis of adding or subtracting the last link in a system of link and correspondingly subtracting or adding to the capability of the first link by changes in storages etc would also be required.

The methodologies for such analysis also would have to be evolved carefully eg., assume that the surpluses in Mahanadi and Godavari can be effectively used only upto Cauveri and that further transfer to Vaigai requires interlinking of Subarnarekha and Mahanadi. Under these assumptions, it could perhaps be logical to consider the full cost of the Subarnarekha Mahanadi Link, the incremental cost of widening all the links between Mahanadi and Cauvery and the full cost of transferring and distributing the water from Cauvery to Vaigai and on to the proposed area to be irrigated against the benefit from this additional area irrigated in Vaigai basin. Although such a formulation may be logical, it may be too harsh for the Vaigai basin and may limit the scope of the transfers. A balance between global and incremental analysis or a better suited methodology for incremental analysis needs to be worked out.

#### **14. Participation of Media, NGOs and Professionals**

Media plays most important role in shaping the thoughts of the people. It is essential that electronic and print media should set its focus right to set the agenda and making the society conscious through balanced scientific public awareness. It is imperative that conservation, recycle, reuse of precious water and proper treatment of waste water is given very serious attention. Integrated management of water is crucial to eliminate poverty since poor peoples' lives are closely linked to their access to water and its multiple uses. Availability of water is bound to improve sanitation, safe hygienic practices and better health standards. Accelerated water storage development, water conservation through reuse, wastewater recycling, aquifer recharging and rainwater harvesting as well as positive

partnership of community are important aspects for sustainable infrastructure development in India.

Interlinking of rivers in India is highly essential and we should soon overcome obstacles in this national task. Professional societies and voluntary organisations should play a vital role in water resources management with due care of environmental management. They may provide constructive criticism for timely correction and should side by side provide complimentary role by creating balanced scientific public awareness, informal educational and public participation.

Hon'ble Prime Minister while releasing the document 'Vision for Integrated Water Resources Development & Management' at the eve of inauguration of Fresh Water Year, 2003 very clearly encouraged the professional societies to channelize their pool of expertise and vast network for dissemination, documentation of various case studies, generating technically sound options with well-defined limitations and assumptions in Indian peculiar situations for taking informed decisions.

This document particularly highlighted the role of Institution of Engineers (India) and its fora like Water Management Forum, Rural Development Forum etc. NGOs could utilise their infrastructure, professional expertise, library, publications and documentation services. The services of thousands of young men and women - highly qualified, with professional knowledge and commitment - who, presently, do not fit in the existing governmental structure, can be utilised for the cause of water resources management. Modalities of involvement and limitations of NGOs, educational, professional and voluntary organisations must be worked out to streamline their participation in ILR projects & water resources management.

### 15. Conclusion

This article briefly summarizes basic objectives, drivers, concepts, projected controversies, likely conflicts and concrete suggestions to overcome the blockades in the most important Indian Project- Inter-linking of Rivers. Non-development of water storage projects is not a viable or available option; due to the large temporal variations in river flows in Indian monsoonic climate. India is familiar with the social and environmental concerns caused by inter-basin projects like BSL, IGNP, Pambikular Alyar projects as well as small, medium and large in-basin projects. Acceptable methodology of evaluating and meeting such concerns through legal policy, related guidelines and management measures has already been evolved. There are large inequities in the availability and demand scenario amongst the various basins. Broad objectives of the inter-basin transfers are equitable distribution of available water resources within a region or the nation, increased economic efficiency, self-sufficiency in basic water related outputs such as food and hydro-energy and providing livelihood & employment opportunities in situ; so that large scale migration of population (seasonal or permanent, short distance or long distance, in water distress situations) is checked. The benefits accrued from large RVPs are so immense that they substantially outweigh the costs of immediate human and environmental disruptions. On the other hand, long-term adverse effects of not utilising the water resources would be catastrophic due to recurrence of floods, droughts and the resulting unemployment, which further the backwardness in the society. The controversy of the large versus small dams is irrelevant. Basic fact remains that the ILR projects

are site and requirement specific depending upon the hydrological, geological, topographical and regional conditions.

It is highly essential that needed environmental safeguards are properly implemented in a coordinated manner by various agencies. Water requirements of the country would continue to grow due to the abrupt population growth, industrialization, urbanization and improvement in the quality of life. Social tensions, political instability and street fights are already being experienced in India, on account of fast deteriorating situation of availability of water in adequate quantity and of acceptable quality. The Author sincerely hopes that this overview presentation would help the policy planners, administrators, professionals, media, NGOs and public at large to understand spectrum of concerns and conflicts of inter-basin transfer of water to obtain their positive participation in this giant project of prime national importance.

(7549 words)

**Er. Radhey Shyam Goel** is Triple Masters all with Ist class Honours in Water Resources development (Roorkee), Hydrology (Ireland) and PG Diploma(hydropower) besides PG diploma in Public Administration (IIPA), M. Phil in Social Sciences (Uni. of Punjab) and Diploma in Environmental Law (Indian Institute of Law). He is National Convener of Indian Coordination Committee of Water & Hydro-power Related National Professional Societies.