



NIAS

**National Dialogue to Review and
Evolve Parameters for
Interstate
Transboundary
Water Sharing in India**

Edited by

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NATIONAL INSTITUTE OF ADVANCED STUDIES

Bangalore, India

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National Institute of Advanced Studies (NIAS),
Indian Institute of Science Campus, Bangalore

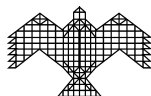
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Acknowledgement

We take this opportunity to express our immense gratitude to all those who made this National Dialogue a great success. We wish to thank all presenters for contributing papers, chairpersons for moderating the sessions and the participants for enriching the discussion. We are thankful to Global Water Partnership (GWP) and India Water Partnership (IWP) for providing both financial and technical support to the dialogue. We also thank Dr Kasturirangan, Director, for his continuous advice in shaping this dialogue. The NIAS faculty, staff and students have helped us in various capacities for the conduct of this dialogue, for which we are grateful to them.

Introduction

The sharing of river waters across political boundaries is a matter of conflict in many countries. India faces a large number of trans-national as well as inter-state conflicts on common water resources. Within India, 16 of the 18 major river basins cover two or more States. Though, 'Water' is listed as a state subject in the constitution of India, the Central Government is empowered to take measures to ensure integrated development of interstate rivers, establish mechanisms to resolve disputes between riparian states, and intervene in the interests of environment protection. There are also several national legislations such as the River Boards Act, the Interstate Water Disputes Act, and those relating to environmental protection, forest conservation, pollution control, etc. The legal framework consists of provisions regarding the powers of the state in relation to water resource development and their distribution, the nature of and basis for the rights of different claimants over common sources of water, and the principles, mechanisms and procedures for resolving disputes. However, they have not been effective in bringing about a satisfactory solution. Many of these problems are due to the fact that there are not enough effective guidelines, an accepted set of parameters and indicators to resolve conflicts in addressing transboundary river water sharing issues.

River waters dispute between States and the emergence of workable compromise formulae are often constrained by inadequate information and database, ineffective institutional mechanisms, hardened regional identities and loyalties and threat of economic hardship. The political boundaries that divide States, which is a political construct, often subsume issues that are human, common and social in nature.

Conflicts and disputes over water are pervasive. The Interstate Water Disputes Act of 1956 spells out the modalities of adjudication of such disputes. Negotiated settlements are also an option. However, both face problems arising from lack of guidelines, technical complexity and sanctions to ensure implementation. Creating spaces for encouraging non-judicial avenues of arbitration, mediation and negotiation are desirable. None of them will be effective unless there is a general agreement on the principles of 'fair' water sharing and a willingness to abide by the results of an agreement arrived at after due process.

The nature and sources of conflict are diverse and context specific. The tactics used by contesting parties also vary, as do the factors facilitating or impeding solution. Lack of objective and validated facts on the quantum and patterns of water use make rational discussion and decision-making difficult. In this context, this two day multi stakeholder dialogue was proposed as a modest attempt towards evolving a set of agreeable parameters and guidelines for inter-state transboundary water sharing using the Cauvery Basin as a case in point.

The participants were drawn from diverse disciplines representing Government organizations, Non-Governmental organizations and Academics from Natural & Social sciences, Law and Policy and Engineering. There were thirty six participants from eight states in India and one participant from Stockholm, Sweden.

Cauvery River as the Pilot River Basin

The river Cauvery is an Inter-State river in Southern India. It is one of the major rivers of Peninsular India whose basin covers the four South Indian political units of Karnataka, Kerala,

Tamil Nadu and Pondicherry of which the last one is a union territory and the first three are states. It arises in the Western Ghats and flowing east empties into the Bay of Bengal. The Cauvery river basin, traversing four provincial states, will form the pilot basin for the dialogue to test the parameters and indicators identified, evolve reforms and institutional mechanisms to address the issues of transboundary water sharing.

The Cauvery River Basin has been selected as among the major interstate water disputes in India, the oldest and most contentious one is Cauvery river dispute. The other major river disputes in India are in relation to rivers Krishna and Godavari, Ravi Beas and Narmada. In all this cases, for dispute resolution, legal course is taken with the formation of Tribunals.

Cauvery dispute is around upstream-downstream allocation of water sharing, with downstream Tamil Nadu taking early lead in irrigation development and upstream Karnataka catching them in the development since 1960. The agreements between the disputants were signed as early as 1892 and another in 1924. The tribunal was appointed in 1990, which passed an interim order in 1991. The final tribunal order was delivered in 2007, which remains unsatisfactory for all the parties.

The Cauvery basin encompasses a total drainage area of 81555 sq km with 42 percent of the area in Karnataka, 54 percent of the area in Tamil Nadu, 4 percent of the area in Kerala and a small percentage of area in Pondicherry. The river flows for a length of 802 km, running 381 km in Karnataka, 351 km in Tamil Nadu and 64 km as a common boundary of both the states. Kerala contributes as a catchment area to three of the Cauvery tributaries. The branches of Cauvery irrigate areas in Pondicherry before

reaching the sea. The basin at source region (Karnataka and Kerala) receives rain from South West monsoon (June – September) and delta region (Tamil Nadu and Pondicherry) receives North East monsoon (October – December). The rainfall varies from 700 mm to 2500 mm across the basin.

According to an estimate in 1999, about 32.6 million people live in Cauvery basin with 70 percent of the population from rural areas. About 1.51 million hectare area is considered to be net irrigated area of Cauvery basin. Rice is the dominant crop grown in this area.

The following districts fall either partially or wholly under Cauvery basin

Karnataka: Chikmagalur, Tumkur, Hassan, Kodagu, Mysore, Mandaya, Chamraja Nagar, Bangalore Urban and Bangalore Rural.

Tamil Nadu: Dharmapuri, Salem, Nilgiris, Namakal, Erode, Coimbatore, Dindugul, Karur, Tiruchirapalli, Pudukottai, Perambalur, Ariyalur, Tanjavur, Thiruvavur and Nagapattinam.

Kerala: Wynad, Palghat and Idukki.

The main objectives of the dialogue

- ❁ Understand the existing principles and guidelines on which the sharing of water between states is based from a theoretical, hydrological, political, social and legal perspective.
- ❁ Assess and critically examine the parameters and indicators employed that impact transboundary water sharing

- ❁ Identify and evolve a set of parameters and indicators that impact transboundary water sharing.
- ❁ Generate standardized data and information across the Cauvery river basin for testing their application in efficient transboundary water sharing between states.
- ❁ Publish the proceedings of an edited volume consisting of the papers presented in the dialogue.

Workshop Proceedings

Proceedings of 26th June 2007

Dr. K. Kasturirangan, Director, NIAS gave the welcome and keynote address. He formally welcomed the participants to the NIAS and to the workshop.



(L to R) Mercy Dickito Wachtmeister, L.C. Jain, Kasturirangan, and Shanta Mohan

Keynote Address: Dr. K. Kasturirangan, Director, NIAS, Bangalore.

Disputes related to water have a long history. These range from conflicts of access to attacks on water sources during wars. Sources of water supply have been foremost amongst reasons for nationalist military expansionism. Many a times, inequities of water use have been the cause for regional and international conflicts and tensions. Increasing water stress is generally occurring in regions like the Middle East and South Asia that are politically volatile, it may be the case that in any future conflict, water will have a role to play because of disputes of ownership and access. Pollution by upstream users in the case of international waters might also become a reason for conflicts. Other potential reasons for conflict include complications over managing multiple uses across multiple users in an international water body and the difficulties in sharing hydroelectric generation on international rivers.

Water scarcity might not have led to wars and widespread international conflicts yet, but it has been the cause of civil strife and political instability worldwide. Although tensions surrounding water have not led to wars directly, they have fuelled tensions and thwarted plans for regional development. More ominously, if one looks close enough one can see other patterns surface in the geography of water related tensions. Large-scale disputes are emerging within nations with an increasing frequency. The disputes between the States of Karnataka and Tamil Nadu in India over the waters of the Cauvery River or those in Pakistan between the States of Punjab and Sind over the waters of the Indus are burning examples of these kinds of conflicts. These conflicts (are large-scale, yet sub-national) cannot be dismissed as unrelated,

isolated and regional. They are not much different from ‘international’ conflicts over water. Some of the conflicts in the former Soviet Union may be considered as international conflicts now due to the break up of the Soviet empire and the changed political status of the constituent political entities. Thus, nations use water as a tool in battle as well as fight (if not go to war) over access to water. There seems to be a pattern between increasing population, economic growth, increasing water stress and conflicts (both large scale and small scale) over water.

“Water” and “war” are two topics being assessed together with increasing frequency. The 261 international watersheds, covering a little less than one half of the land surface of the globe, affect about 40 percent of the world’s population. In the international realm, the problems of water management are compounded by the fact that the international law that governs it is poorly developed, contradictory, and unenforceable. The emerging writings on “water wars” point to the arid and hostile Middle East as an example of a worst-case scenario, where armies have in fact been mobilized and shots fired over this scarce and precious resource.

One lesson that can be drawn from an overview of such tensions is that it’s not actual scarcity that leads to conflicts but unilateral action by a regional power to appropriate resources. Examples abound from the actions of India, Jordan and Egypt in appropriating the waters of the Ganges, the Jordan and the Nile Rivers respectively. But the development of conflicts after such unilateral actions is contingent upon the absence of an institutional framework for dispute resolution.

The basic argument for “water wars” is as follows: Water is a vital resource and the scarcity of water in an arid and

semi-arid environment leads to intense political pressures, often referred to as “water stress,” a term coined by Falkenmark. The actual history of armed water conflict is somewhat less dramatic than the “water wars” literature would lead one to believe: a total of seven incidents, in three of which no shots were fired. As near as one can find, there has never been a single war fought over water. This is not to say there is no history of water-related violence - quite the opposite is true-only that these incidents are at the sub-national level, generally between tribe, the various water-use sectors, or the state. So, while no “water wars” have occurred, there is ample evidence that the lack of clean freshwater has led to occasionally intense political instability and that, on a small scale, acute violence can result. What we seem to be finding, in fact, is that geographic scale and intensity of conflict are inversely related.

The history of water dispute resolution, in contrast to that of international conflicts over water, is much more impressive. Since 1814, approximately 300 treaties have been negotiated which deal with non-navigational issues of water management, flood control or hydropower projects, or allocations for consumptive or non-consumptive uses in international basins. The historic reality has been quite different from what the “water wars” literature would have one believe. In modern history, only seven minor skirmishes have been waged over international waters. But invariably other inter-related issues were also a part of the dispute.

Shared interests along a waterway seem to overwhelm water’s conflict-inducing characteristics and once water management institutions are in place, they tend to be consistently resilient. The patterns described in this paper suggest that the more valuable lesson of international water is a resource whose characteristics

tend to induce cooperation and incite violence only in the exception. While “water wars” may be a myth, the connection between water and political stability and political conflicts certainly is not. It must be clear from the above discussion that the most persistent disputes surrounding water are not at a national level, rather, more often than not, they have been of a sub-national level. This is borne out of the experience of India in which the most intractable disputes surrounding river waters have been surrounding inter-state rivers like the Cauvery and the Ravi-Beas system. These disputes have also raised pertinent questions surrounding Indian federalism. Most of the larger Indian rivers are inter-state and therefore with the growing intensity of water usage such conflicts have the possibility in erupting in other river basins as well. The problem is compounded by the lack of clear legal and institutional mechanisms available for water-sharing and dispute resolution at the national level. Irrigation is in the State List under the Indian constitution. The primary entry relating to water is entry 17 in the state list. But this is subject to provisions of entry 56 of Union list that gives extensive powers to the Central government to legislate regarding interstate rivers. Therefore, water is potentially as much a Central subject as it is a State subject. Article 262 of the Union List of the Constitution deals with disputes relating to waters of inter-state rivers or river valleys. Thus, the role given by the Constitution to the centre with regard to inter-state rivers and river valleys is an important one. This role is reinforced by the provisions of Entry 20 in the concurrent list.

In the absence of prior water sharing arrangements upstream, riparian states have a hydrological advantage in developing a river. In the absence of political constraints to the contrary, these upstream states can occasionally abuse this advantage. However

in the Indian context this also has to be contextualized within the differential rates of growth of water usage in various riparians and the interests of both the upper and lower riparian states that need to be protected. But this also has to be seen in the context of prioritization of usages.

One of the greatest gaps in river water dispute resolution is the lack of a recognized authority. The National Water Resources Council is an important element in Indian federalism in relation to water resources. It was established by the government of India in 1983. But it has no statutory backing. Its work profile includes the formulation of policies and coordinating all matters related to irrigation at the level of the centre. Since it does not have any statutory powers, its effectiveness is often questioned. There is an urgent need to establish a central authority to streamline laws and constitutional mechanisms that can effectively address the issues of equity and efficiency that can act as a body having statutory powers for conflict resolution, and at the same time act as a facilitator of technical and social research in the water sector in the country.

In light of water's growing role in the high politics of most water scarce regions, research and development efforts geared at exploring emerging innovations in water technology should be regarded as a national security priority. Possible innovations could include the initiation of "water harvesting" efforts through the construction of micro-scale dams and aquifers to gather rainfall and storm water run-off. Effective Joint Inter-Basin Management between states sharing river basins for sustainable economic growth dependable on sources of fresh water is critical. Access to water, in turn, will depend upon region wide comprehensive management of the shared major rivers and ground water basins.

Making hydrologic remote sensing and other geographical data freely available to all parties should be a major priority.

The discourse on water resource management seems to have problematized the notion of conflicts. Water is not consumed by nations or regions in abstraction. Water is used, abused and conserved by individuals, communities, groups and institutions that are situated in particular historical and social contexts. Global and national scarcities are locally produced and then experienced. Therefore one needs to de-problematize conflicts and unbundle them in the context of broader socio-economic and cultural contexts. Due to unequal access to water, inefficient usage and changes in the global climate that increasingly affect the availability of water, the actual, absolute water scarcity can only increase. Multi-pronged strategies need to be followed to increase the absolute availability of water. These can include cost pricing, reforming water bureaucracies, policy and legal changes that promote efficient water use and technological innovations. But still these might not remedy absolute scarcities totally. In this case one has to remember that absolute water scarcities lead to conflicts only when mechanisms to mitigate them don't exist. Hence building international and national water conflict resolution institutions might be the key to prevent future conflicts.

Taking the example of the Cauvery river dispute between the states of Tamil Nadu and Karnataka the Supreme Court of India has recently recommended that experts need to come together to discuss and debate about these issues surrounding interstate water sharing. It is timely that NIAS has initiated this national dialogue to bring various experts and other stakeholders together to critically analyze the contemporary situation in India surrounding interstate water sharing, to identify primary and non-negotiable

parameters that can become the basis for dialogue, generate data and provide a forum for informed debate.

Introductory Remarks by Dr. Mercy Dikito-Wachtmeister, GWP, Stockholm

We need to give attention to the importance of inter-state water sharing as an area and the need to have collaborations. An operational guideline for understanding the issue of inter-state water sharing is the need of the hour. Water is an important sector within the Millennium Development Goals (MDGs) of the U.N. and is central to any strategy for poverty reduction.

Global Water Partnership (GWP) is a global network that has been created to support countries in the management of their resources for the promotion of integrated water resources management. Global Water Partnership works through water partnerships based world-wide at the country and regional level. It is operating in many regions of the world including Africa, Latin America, Europe and Asia. The GWP is providing support to many countries to carryout dialogue in water resources management in challenge areas that are different and specific to various countries.

Water is an issue that underpins all those matters that are central to millennium development goals (MDGs). It is related to issues such as eradication of extreme poverty and hunger, the achievement of universal primary education, the promotion of gender equality and women's empowerment, the reduction of child mortality, the improvement of maternal health and the development of the global partnership for development. Global Water Partnership concerns thus cut across all the issues relating

to MDGs. An integrated approach to water resource management is therefore key for maximizing benefits and addressing tradeoffs. Within the context of MDGs, countries must elaborate the coherent water resources development and management plans that will support the achievement of the MDGs.

This dialogue to review and evolve parameters for interstate transboundary water sharing in India is therefore a very important dialogue that is taking place in the network. It is an area which is largely neglected though increasingly it is becoming evident that this is an area which needs close collaboration between the academia, practitioners and a whole range of stake holders. It is an area which desperately requires some operational guidelines. It is an area that is crying for coherent instrumental change, in terms of institutional role, creating necessary enabling environment and creating the necessary management instruments. This dialogue therefore aims to critically examine the current environment and institutional roles with respect to interstate river water sharing with a view to stimulate and develop appropriate instruments to govern the interstate river sharing and conflict resolution. There is a need for innovative mechanism to promote equitable and fair water partnership between the states.

Dialogues are important mechanisms for policy change at the national, state and river basin levels through participatory, consultative processes involving all stakeholders. Dialogues should therefore be seen as catalyst for change. They facilitate the participation of the stake holders in constructive dialogue in effecting changes in the way water is managed at various levels. Dialogues are the basis for consensus arrival on contested sensitive issues where rational discussions in decision making are extremely difficult. The dialogue process can therefore be a very useful

mechanism to review and evolve useful guidelines for interstate transboundary water sharing and conflict resolution. Dialogues are also useful mechanisms for generating knowledge for river sharing and conflict resolution strategies.

It is necessary to draw attention to the fact that the situation within and across countries are heterogeneous. At the same time Integrated Water Resource Management as a possible approach for locating water related interventions is relevant. Central to the conception forwarded by the Global Water Partnership (which is an international collaborative initiative to advocate sustainable and equitable practices in the water sector) is the idea of partnership building on a democratic basis. There has been some progress made in this regard, but a lot more still needs to be done.

The GWP as an initiative has also focused on dialogues as an instrument for facilitating desirable change in the sector by being vehicles for advocacy for major policy changes. They can also be used as tools for consensus building, for reviewing and evolving guidelines for water sharing and conflict resolution.

Special Address by Mr. L.C. Jain, freedom fighter and social activist

It is water that can be described by the one word Universal. It is elementary for life as a whole and not for 'A' life, 'B' life or 'C' life but for all life forms be it human, animals or plants. Though all efforts have been made, including legal and institutional, they have not been effective in bringing about a satisfactory solution to interstate disputes arising out of trans-boundary water sharing. How long this search can go on and what is the right track? We are not as disarmed and helpless as we were 40 or 50 years ago

specially with the advent of various technologies including space technologies. This was not the case years back when the space department was still immature and growing and it was felt then that irrigation engineers know the best because of their qualification and dedication. But that we still have not found a solution point out that just a catalogue of praise of all past activities is not sufficient.

Most often, when we develop our water resources, the people are nowhere in the picture. Since all of our planning is to serve human welfare, the least we can do is to consult people and factor in their views. That water has to be available locally for all the diverse users is one recommendation which the World Commission on Dams made after three years of going over all the continents, evaluating over 100 large irrigation projects across the world. Initiatives like the South Indian Farmers Association provide a common platform and help bring together farmers from neighboring states sharing water. Their perception is important as they are in the field and they do not know from where the political boundaries come. Therefore they at once recognize the commonality of mutual interest and that both scarcity and surplus must be shared. Water, floods and recedes on its own free will and will even disappear one day if we only quarrel over it and then we will have to live with the consequences of that. The farmers realize this and therefore start by looking at the uses of water in their area. For example, in South India where rice cultivation is dominant and is the most important utilitarian of water, the farmers are adopting new technology of cultivation like System of Rice Intensification (SRI) where only half the quantity of water is used. The water use has therefore gone down but the yield has increased. Therefore it is not a question of conserving water as a separate issue. The challenge is to minimize

the usage. All the water related projects submitted to the Planning Commission begin by saying that the population is growing and therefore, to meet it we must immediately tame the rivers and supply water. But these solutions are a burden on investments and the time that is required to develop these and bring in water supply is really huge. But water is essentially a local problem that only the farmers and other local users can find an answer to since they value it the most. One needs to give up the idea that the state can have all the answers. In this context the need for the present dialogue is significant where the various aspects of the issue can be debated from a multi-disciplinary perspective in an institution like the NIAS. It is important to understand that water is a fundamental human need, and therefore the urgent need for finding solutions to the present crisis in the water sector. It is relevant to highlight the failure of water resource development strategies to address the needs of the masses and the huge social and environmental costs by big dams. One needs to advocate the need to prioritize 'local' needs.

Background of the Workshop by Prof Shantha Mohan, NIAS

There is a need for evolving guidelines to consider parameters and indicators which are acceptable to stakeholders. The information available to evolve such parameters using public domain data is limited at present. In this context the two day multi stakeholder dialogue is an important attempt to evolve parameters and indicators for transboundary water sharing. The wide spectrum of participants with their varied experiences representing all stakeholders will create a platform for evolving parameters and indicators, testing and validating them using Cauvery River Basin as a case in point and adopting them for an

informed discussion on transboundary water negotiation between states.

Session - 1 : Understanding trans-boundary water sharing

Chair : Prof. Settari, NIAS



Session-I: Vijay Paranjpe, S. Settari, Narendar Pani, and Ramaswamy R Iyer

Presentation - I

Speaker : Prof. Narendar Pani, Professor, School of Social Sciences, NIAS, Bangalore.

Topic : Boundaries of trans-boundary water sharing

In order to understand boundaries of trans-boundary water sharing and issues pertaining to the same it is important to look into other disputes nationally or internationally to gain insights. Both commonalities as well as uniqueness of the situation are to

be explored. Commonalities such as geographical positions, stakeholder participation, nature of stakes, riparian issues, using common trends to identify a framework of possibilities etc. and uniqueness of each case such as degree of violence, specific mechanisms operating etc. have to be considered, which vary between international and interstate issues. These trends are crucial to identify frameworks. Overall trends identified are water scarcity with 700 million people in 43 countries world over living below the prescribed minimum standards and water withdrawals across the world increasing from 80 cubic km in the year 1900 to 380 cubic km in 2000. The possibility of war over water is also posited arising due to scarcity. However, the issue is not just limited to scarcity as conflicts are often found to be not in areas where there is water scarcity. Therefore it is important to look beyond scarcity. The likelihood and intensity of the disputes rises as the rate of change within a basin exceeds the institutional capacity to absorb that change. Cauvery issue is an example enough which shows us the intractability and inadequacy of institutions and also the failure of institutions. For this, we will have to identify the boundaries of conflicts which may go even beyond basins.

Looking beyond the basin boundaries, the methods by which pressures on the river can be reduced, the nature of agricultural technology tools, the effects of globalization taking population away from the basins thus bringing down area under agriculture etc. have to be taken into consideration. We have to learn to see change as conflict as well as an opportunity. While examples from Central Asia, Turkmenistan and Uzbekistan pertaining to water sharing, hydel power and timing of water release etc. reveals the conflicts in change, the Greater Mekong basin example displays the ways in which change can also be an opportunity. The meetings for river water negotiations in Mekong continued throughout the

Vietnam war and through these not only was China getting linked to richer parts of the world, but poorer nations such as Laos and Cambodia were also being linked to the world market through opening of Mekong for navigation, trade and as ports to cater to a globalized world.

We then need to look into what an institution is defined as and how these institutions capture change. The size of the institution with respect to regions associated with the river, nature of stakeholders and flexibility of these institutions in identifying and prioritizing stakeholders are important if we are to use the opportunities thrown up by changes in resolving conflicts. Herein lies the challenge

Presentation - II

Speaker : Prof. Ramaswamy R Iyer, Honorary Professor, Centre for Policy Research, New Delhi

Topic : Critique of legal and policy frameworks

Critiques of the existing legal policy framework in India for the resolution of interstate river water disputes make the unstated assumption that the existing system is unsatisfactory and needs an overhaul. That is a very widely held view but one need not subscribe to it. The conflict resolution machinery is creaking badly not because it is badly designed but because State and Central governments, politicians, lawyers, water users, media and intelligentsia and the general public have wrecked it.

Further, one tends to be excessively preoccupied with details of particular disputes, and fail to see river water disputes as a subset of the larger set of water related disputes in general and ask what the root causes of such conflicts are.

Existing legal frameworks in India

The principal component of the framework are (a) entry 17 in the State List which is the primary entry relating to water in the Constitution, (b) entry 56 in the Union List which gives a potential role to the Central Government in relation to inter-State rivers to the extent of parliamentary legislation for the purpose, and the River Boards Act 1956 which Parliament has enacted is under this entry, (c) Art. 262 which provides for the adjudication of inter-State river water disputes, (d) the Inter-State Water Disputes Act 1956 enacted by Parliament under that Article, and (e) the amendments to that Act enacted in 2002. There has been a long-held view that the present configuration of entries in the Constitution relating to water are not appropriate, that they do not enable the Central Government to function effectively, and that in order to enable the Central Government to play a proper role, water should be shifted to the Concurrent List. When the Constitution was being drafted, it was perhaps possible to put water into the Concurrent List, but such a shift at this stage seems very difficult as it would go against the whole trend of decentralization which we have been seeing for the last decade. It is also quite unnecessary. What an entry in the Concurrent List implies is that both the Centre and the States can legislate on the subject. But the Centre can legislate now under entry 56 and it has failed to do so. The Centre has not made enough use of that enabling provision, and the River Boards Act, 1956 enacted under it remains a dead letter. So instead of pursuing the chimera of a constitutional amendment to shift water to the Concurrent List, the Centre could usefully explore the possibilities of legislation under entry 56 and reactivating the River Boards Act.

Policy frame work

The National Water Policy 1987 was an outcome of the first attempt to bring about a consensus among the States on a minimum set of basic statements about water. That exercise was difficult enough without being complicated further by trying to incorporate a statement about the contested issue of inter-State river water disputes. So the Water Policy of 1987 steered clear of the subject. Much later, the new National Water Policy 2002 also confined itself to generalities on Inter-State river-water sharing. Separately, the Ministry of Water Resources attempted to draft a statement on water-sharing principles. The draft went up to the National Water Resources Council once or twice in the 1990s but widely divergent views among the States made it a non-starter; it remains in limbo. There seems to be little likelihood of an agreed statement emerging in the foreseeable future. Meanwhile, disputes cannot be put on hold. They have to be dealt with, and successive tribunals have referred to various sources of principles—such as case-law, Court decisions in other countries, the Helsinki rules and earlier tribunals' reports and so on. By and large, the principle adopted by the tribunals is that of equitable apportionment for beneficial uses. Even if a National Statement on river-water sharing had been agreed upon, it could have hardly laid down any principle other than that of equitable sharing, and it would necessarily have been a very general statement which would need to be elaborated in detail in each particular case. A National Inter-State Water-Sharing Policy Statement would have been wonderful if it had existed, but its absence is not a serious constraint. There are enough principles to guide us.

Now let us now consider the common criticisms of the adjudication process.

Common criticisms of the adjudication process

Broadly speaking there are four main criticisms – (a) Adjudication is not the appropriate means of settling such disputes; a negotiated agreement assisted by conciliation or mediation if necessary is the best way. (b) The adjudication system under the ISWD act is dilatory and cumbersome; there are delays under every stage. (c) The proceedings are adversarial and divisive. Each side engages eminent counsel for arguing its case strongly, makes maximal claims, and fights every inch of the way. The procedure precludes a problem-solving approach or any effort towards the composition of differences. Under this system the parties have to play the role of disputants and the responsibility for resolution is left to the judge. (d) When the final decision is given, there are no effective means of enforcing compliance with it. Moreover, one or more parties may be left with a sense of grievance and injustice, for which there is no remedy.

a) Agreement is certainly better than adjudication. However, article 262 and the ISWD Act do not force adjudication upon us nor do they preclude recourse to negotiation, conciliation or mediation. But when all these fail, disputes have still to be resolved and a last-resort mechanism is needed for the purpose. That is what Art. 262 and the Inter-State Water Disputes Act provide. We are not compelled to invoke them, but they are available if all else fails. Such a mechanism is necessary and I think we should be grateful that we have it. In the Cauvery case, two decades of negotiation failed to produce any results. It was only thereafter, and under the directions of the SC, that the tribunal was set up. After that we have to try and make adjudication work better rather than keep repeating that agreement is better than adjudication.

b) Delays at every stage: This has been a serious problem in the past. The Sarkaria Commission made recommendations in this regard, and after prolonged consideration, they were implemented in 2002 through amendments to the ISWD Act. Now the Central Government has to establish a tribunal within a year when an State makes a request. The tribunal has to give its report within three years, but this can be extended by two years. With the amendments of 2002, the delays at various stages are likely to be substantially diminished.

c) Adversarial proceedings: This is a characteristic of all litigations in the courts. As ISWD tribunals function as courts, their proceedings are also subject to this malaise. However there is no law against a constructive, cooperative approach to adjudication. The proceedings can be substantially different.

d) The problem of non-compliance: Though the award of the final ISWD is said to be final and binding, there are no means of enforcing compliance with it. If a State Government refuses to obey the award of the tribunal, there are not many courses open to the other parties or to the Central Government. The Centre can give directions but if these too are not being complied what sanctions are available? Article 356 exists, but it is too a measure which cannot be lightly invoked. And even if central rule is imposed, what will happen when a popular government comes back to power? The Sarkaria Commission recommended that the words “final and binding” in the Act should be buttressed by conferring upon a tribunal’s order the status of an order or decree of the Supreme Court (SC), and this has been done through the 2002 amendment. But this seems to have had no perceptible effect.

In the light of this analysis some changes are necessary. One suggestion made by the National Commission to Review the

Working of the Constitution, and repeated by the eminent lawyer Fali Nariman, is that the Inter-State Water Disputes Act should be repealed, and that such disputes should go straight to the Supreme Court in the exercise of its original jurisdiction. This arises largely from a sense of exasperation with the manner in which adjudication under the ISWD Act has been functioning. But will the SC be able to cope with the enormous burden that this will cast on it? At the moment, there is a possibility of several such disputes being dealt in parallel by different tribunals. If all of them have to be dealt by the Supreme Court, will it deal with them sequentially, or will it create a number of benches to deal with them simultaneously – is the latter course feasible? Besides this may well become the principal work of the SC, crowding out most other cases. It is not clear that the proceedings of the SC will be speedier than the tribunal's. Time-limits have been set for the tribunals. Can any one impose time-limits on SC? We cannot be sure that if the dispute takes five years in the tribunal process, the same would be resolved by the SC in two years. Even on the question of better compliance with the final decision, there are grounds for a degree of scepticism. It may be recalled that a former CM of a State at one stage was prepared to defy the SC and take the chance of contempt proceedings. Punjab passed an Act terminating all past water accords, seeking to destroy in the process the very basis of the directions of Supreme Court (SC). In the former case, the CM pulled back from the brink. In the Punjab case, the Centre has referred it to the SC for an opinion, which is still awaited. Implicit obedience to the SC's Order cannot be taken for granted, though it is less likely to be defied than a tribunal's Order. The suggestion that such disputes should go to the SC is based on the position that prevails in the US. But when such a dispute goes to the SC in the US, the SC immediately appoints a Master. The Master then proceeds to go into the dispute

in great detail, holds hearings, arrives at findings and recommendations, and places them before the SC. The role that the Master plays in US is somewhat similar to that of the Tribunal in our system, though the style is different. Some such machinery is clearly necessary. The repeal of the ISWD Act and going back to the original jurisdiction of SC is a counsel of despair that is not called for. Our system seems better suited to our conditions than the US system. It can be made to work better. The most important deficiency is the bar on the jurisdiction of the courts provided for article in 262 and enacted in the ISWD act, which makes the tribunal's verdict a single non-appealable verdict. If one or more parties are left with grievances, they can appeal only to the tribunal within 3 months. In the partial modification of the bar on jurisdiction, the Act should be amended to allow for an appeal to the SC. The argument against this is that every case will go to the SC and get delayed, but this happens anyway. Most cases do go to the SC and the SC rarely asks the parties to go back to the tribunal. Parties do wish to go to the Apex Court, and it seems better to accommodate that wish. As for delays, the 2002 amendments will cut down the time taken at different stages. An appeal to the SC might also improve the prospects of compliance. Another possibility is the setting up of a permanent ISWD Tribunal with multiple benches, with other features remaining the same.

As for the adversarial nature of the proceedings, Tribunals are not obliged to adopt the style of the courts. Instead, they could adopt a consultative, fact-finding, solution-exploring, committee style of functioning and procedures, while retaining their final judicial role, as suggested by Fali Nariman.

We can make existing system work, but we should respect the system. Now adjudication is deprecated and resisted, an Order

of the Tribunal is nullified by an ordinance until SC intervenes, aspersions are cast on the members of the Tribunal, a reconstitution of tribunal is called for at an advanced stage, the SC is defied, resolutions are passed rejecting the Final Order of the Tribunal, lawyers go on strike, an organization represented by a distinguished legal luminary calls for a quashing of the Final Order, a former Prime Minister lambasts the Tribunal's Order and the grievance against the Tribunal's Order leads to a negative attitude towards a people and their language.

Negative attitudes may not have caused much harm but the underlying attitudes are disquieting. If we are ready to flout the laws of land, have no respect for constitutional mechanisms, no regard for federalism and no concern for good relations with neighbouring States, neither the tribunal system nor any alternative conflict-resolution mechanism will work.

By way of contrast, the decisions of the Neutral Expert under the Indus treaty on the Baglihar differences were not wholly in favour of either India or Pakistan, but neither side denounced the decision as unfair or biased. The responses were muted, civilized and responsible. Compare that with the State Governments' reactions to the Final Order of the Cauvery Tribunal. There are avenues for the expression of dissatisfaction, i.e., a petition to the Tribunal, but the kind of reactions mentioned earlier are not the right course.

At present, Special Leave Petitions (SLP) have been submitted by all the States concerned to the SC. Governments and their Counsel, have failed to observe the bar on the jurisdiction of the courts, provided for in article 262 and enacted in the ISWD Act. One would have expected that the bar would be taken note of and the question whether the SLPs can be admitted would be discussed. But the SLPs were admitted forthwith as if the bar did not exist.

Inter-State water disputes are only a subset of the larger set of disputes over water or other natural resources. The root cause is a competitive unsustainable demand for water. The demands of parties cumulatively add up to more than the water available in the river. This leads to conflict, as also to proposals for bringing water from external sources. Moreover, supply creates demand and necessitates more supply. The availability of water leads to water-intensive cropping patterns. More water is needed even for continuing with this agriculture; but the continuation leads to demands for growth and expansion, which needs still more water. The demand becomes unsustainable. Where will the 'more water' come from? Big dams, canals, etc, are proposed. This in turn generates more conflicts. Agreements accords, treaties, adjudication, etc, temporarily brings peace, but the conflict will erupt again unless we redefine development. However, that is a larger issue.

Presentation - III

Speaker : Prof. Vijay Paranjpe, Gomukh, Pune.

Topic : Negotiation as an approach to river basin management

A better term to use in the present context would be principle rather than parameter since parameter suggests something quantifiable, definable and static whereas what we are dealing with are societal processes of negotiation and mediation which are dynamic in nature.

The universally accepted principle of water sharing is equitable sharing in the light of availability and the principle of priority. The talk is based on experience from an international study across

seven basins and sub basins to find out the nature of issues and nature of conflicts, the solutions achieved and not achieved and draw out approaches to deal with the situation. Another equally vital experience has been that of putting into practice these principles in a small sub-basin of Kolwan valley in the Bhima sub-basin of Krishna basin. The refusal to comply can only be resolved through cultural, societal and attitudinal change. The concept of sharing does not imply sharing of surpluses only but that of scarcity also. Integration is an important element as conflicts could be due to lack of understanding or due to misunderstanding of the science.

The experts take their own different legitimate views. The legislators take broader societal view points. Reconciling these viewpoints requires a long run, long drawn out detailed process. There are no short cuts. Whenever a system goes wrong, the solution suggested is always top-down.

What was presented is a negotiated approach to conflict resolution taking examples and cases that have worked in Kolwan valley of Bhima river basin instead of the conventional top down approach. The first step is to put together all the scientific knowledge available and identify the different conflict issues in the basin. Upstream down-stream issues, sectoral issues between the various government departments such as forest department, soil conservation department etc., water quality and pollution issues, integration between voluntary organizations to help in resolution of conflict are some of these. The solution and indicative paths therefore has to be sought at the local level where processes have succeeded to work. Within a period of 6 months, the conflicts between the various government departments were sorted out without dragging them to the Ministry of Environment and Forests

(MoEF) with the negotiator role being played Gomukh. Within the same period of six months, the upstream downstream conflicts were also sorted out by putting together round table negotiations between irrigation engineers, villagers and the NGO as mediators.

The requirements therefore are of the presence of a neutral and fair negotiator, availing and utilizing complete information and promoting an inclusive process. It has been agreed in the basin that no tube wells will be used for agriculture thus ensuring compliance to the Maharashtra Ground Water Act which till then had been lying obsolete. People should know about the issue and the rule of the law without which people should not be labeled as having disregard for law. Since the entire process is dynamic parameters need to be assigned as situation changes.

The Godavari water sharing issue revealed that the major conflict is due to a lack of understanding of the terms of the Award itself. It is not sufficient that well-intentioned engineers and scientists exist, information has to be made publicly transparent by legislators and adjudicators etc. since people are neither stupid nor foolish. But information is not available on both the sides of the border and put in the framework of the micro-basin. These processes are dynamic in that after 20 years the requirements of conflict resolution might be entirely different. Scaling up of these efforts is also possible as has been evident from the efforts of Gomukh in the Bhima sub-basin.

Session - I Conclusions

Cauvery issue has shown us the need for reforms in the way we look at institutions, legal frame works and policies and individual perceptions. The paper on 'Boundaries of Transboundary' brought

out the need for identifying boundaries of conflicts beyond basins. The paper on 'critique of legal and policy frameworks' clearly brought out good mechanisms available as legal and policy frameworks, but which are inadequately applied to resolve the issue. The legal style of functioning need not be strictly a court style of functioning, but there should be room for consultation, fact finding and solution exploring. The paper on 'Negotiation as an approach to basin management' showed the role of negotiation as an important process as any other mechanism to resolve conflicts successfully.

Session - II : History, Politics and Relevant Science and Technology in Understanding Water Issues.

Chair : Dr. Jasveen Jairath, Coordinator, CAPNET – South Asia.



S. Settar, Arvind Kumar, Jasveen Jairath and Rama Prasad

Presentation - I

Speaker : Prof. S. Settar, S. Radhakrishna Visiting Professor,
NIAS.

Topic : Cauvery in a Historical Perspective.

Cauvery originates at Tala Cauvery in Karnataka and empties itself through two principal mouths into the Bay of Bengal in Tamil Nadu. The total length of the river is around 820 kilometres out of which 380 kilometres lie in Karnataka and 352 kilometres lie in Tamil Nadu. The origins of the river are very inconspicuous. The main tributaries of the river in Karnataka are the rivers Harangi, Hemavati-Lakshmanatirtha, Kabini, Svarnavati, Shimsha, and Arkavati. In Tamil Nadu the important tributaries of the river are Bhavani, Noyil, and Amaravati. Around 42 percent of the drainage area lies in the state of Karnataka, 3.5 percent in Kerala, 54 percent in Tamil Nadu and the rest in Pondicherry.

References to the river are found in the Sangam Literature in Tamil that can be dated between the third century B.C. and fifth century A.D., in this literature it is called Kaviri or Ponni. Around twenty Sangam poets hail from the Cauvery basin in Tamil Nadu. The early Chola capital was located on the banks of Cauvery and was called Uraiyur. Poomppattinam at the mouth of the river was also one of the most important ports of ancient India. Cauvery attracted construction of a large number of Temples and towns in its banks. The earliest references to the river are to be found in Tamil literature and not in Kannada literature. This hints at the relative importance of the river to the two states from the earliest times. The Sangam literature refers to the first dam/bund built by Chola Karikala (2nd century A.D). This is confirmed by a couple

of later inscriptions and literary works. In the 15th century, one of the Nayaks of Tanjore, a subordinate of Vijayanagara dynasty, built an *anekat* across Kaveri at Srirangam and established stepways along Kaveri not only at Srirangam but also at Mayavaram, Kumbhakonam, Tiruvidai Marudur.

The earliest Kannada poet who makes reference to the Kaveri river forming the southern border of Kannada in the 9th century was Nrapunga, the author of *Kavirajamarga*. Earlier poets of Kannada land, beginning from the 7th century, make references to the wars fought by Karnataka army in Tamil Nadu. The first of these is *Ravikirti*, who recalls Kalidasa and also follows his poetic tradition. Ponna, a poet of the 10th century, refers to a battle fought by Karnataka army against the Cholas on the banks of Kaveri. This also expounds Kalidasa in the *Raghuvamsa*. The first poet of Karnataka who refers to at the utilization of Kaveri water by Tamils is a Kannada grammarian of the 13th century – Kesiraja, the author of *Sabdamanidarpana*. He throws a question at the Tigulas whether they were using the Kaveri outflow borrowing it [from Karnataka] or paying an “interest” on it. Kannada sources call Kaveri as Kabera, Kamera, Kavera, Sahyadri. Two early dynasties (4th-9th century A.D) ruled with their capitals established on the banks of Kaveri; they were the Punnatas at Kirtipura on Kabbini-Kaveri and the Gangas at Talakadu near Tirumakudalu.

History of the Dispute

Four phases in the history of the dispute can be identified. The first phase of the disputes surrounding the waters of Cauvery lasted from the earliest times till the end of the 19th century. This was concentrated primarily round the regulatory and diversionary

issues and was minor in character. The second phase lasted from 1892 to 1934 with 1924 as a land mark and it centered round the construction of Kannambadi and Mettur Dams. The third phase lasted from 1934 to 1990 and centered on issues relating to anekats and ayacuts. The fourth phase lasted from 1990 to 2007 and in this phase the dispute shifted to the legal arena with the site of action shifting to the Cauvery Tribunal and the Supreme Court. The landmark agreements surrounding the river are the Madras-Mysore Agreement signed in 1892 and the Kannambadi-Mettur Agreement signed in 1924.

Till the beginning of the 20th century, the upper Kaveri region (Karnataka) was considered not conducive for irrigations because of the steep descent of the river, the undulating terrain and the soil condition. The Cauvery flows here through wide valley and at angles. In Tamil Nadu, the gently sloping terrain, watered by the N-E monsoons, and good soil condition, were considered conducive for irrigation. The major problem of the time was of Floods. To restrain this, anecuts were constructed during 1836-39 by Arthur Cotton. Floods, however, occurred in 1858, 1896, 1906, 1911, 1920 and 1924.

In the period 1800-1810 under Dewan Poornaiah tank restorations and irrigation works were taken up. In the period 1831-1881 under British administration, Public Works Department was established (1856) and irrigation projects were continued. Under Col. R.J. Sankey (1866) The Department of Irrigation was created. In 1870 the Madras Government first expressed its concern over the developments in the Mysore region. This led the two States to negotiate in 1890 at Ooty. In 1892 The Madras-Mysore Agreement on irrigation works in Mysore State was signed.

The main features of the agreement were:

- ❁ A list of Kaveri and Major Tributaries (excluding some), Catchment areas and minor schemes were prepared and the work in progress was noted.
- ❁ Laid down that Mysore should not take up neither fresh irrigation reservoirs nor new anecuts or attempt to restore old ones not in use for more than thirty years, without the consent of Madras Government.
- ❁ New projects were to be taken up only after obtaining the consent of the Madras Government after supplying all details of the projects.
- ❁ If disputes were to arise, they should be referred to an Arbitration Commission or to the Government of India.
- ❁ Neither the Mysore nor the Madras State was satisfied with this agreement.

Between 1892 and 1934 the main developments were:

- ❁ 1900: The Hydro-Station project at Sivanasamudram was approved.
- ❁ 1906-1910: Kannambadi dam (of Visvesvaraiya) was proposed.
- ❁ 1906-1910: Kaveri-Mettur Projects, also called 'British-Kaveri' a 'Madras-Kaveri' was proposed.

- ❁ Madras insisted that without clearing the Mettur project, the Kannambadi project should not be cleared.
- ❁ 1913-14: This was referred to the Arbitration Committee. It went again to the Madras government.
- ❁ 1915: Madras made appeal to Government of India. it was rejected.
- ❁ 1919: Madras Government went on appeal to the Secretary of State and won the case.
- ❁ 1920-24: Negotiations between Mysore and Madras Governments were resumed and in 1924 an agreement was reached on KRS Dam, whose foundations had been laid in 1911. This dam was completed in 1931. Mettur Dam, begun in 1926, was completed in 1934.

Significance of the 1924 Agreement

The 1924 agreement provided a frame work for a long term irrigation development of Kaveri basin to both States. It also helped to implement KRS and Mettur Projects. After fifty years, this agreement was to be reviewed (in 1974). The Government of Karnataka viewed that this agreement lapsed in 1974 if it was not renewed. The settlements made under 1924 Agreement are being argued to be final by Tamil Nadu.

Developments after 1934

There has been a significant expansion of irrigation facilities in Karnataka after 1934. The net irrigated area in Karnataka irrigated

from the waters of the Cauvery was one lakh acres in 1900. It had increased to nearly 4.4 lakh hectares by 1971. Expansions also took place in irrigation in Tamil Nadu. This started putting a lot of strain on the river and led to increasing tensions. To resolve these tensions negotiations were held during 1968-1990 between Karnataka and Tamil Nadu with Kerala (1970) and Pondicherry (1978) joining in later. During this period twenty six Ministerial level meetings took place out of which twenty one meetings were presided over by the Union Minister of Irrigation.

In 1970 the Tamil Nadu Government for the first time asked for the constitution of Tribunal under the Water Dispute Act 1956. In 1971 Tamil Nadu and Kerala appealed to the Supreme Court. In 1972 the Cauvery Fact Finding Committee (CFFC) was constituted. In 1975, 1989, and 1986 Tamil Nadu again asked Government of India for a Tribunal Enquiry. In 1986 the farmers of Tanjor moved the Supreme Court. In 1988 the Supreme Court directed bilateral meeting of Tamil Nadu and Karnataka. In 1990 the Cauvery Water Dispute Tribunal was established on the direction of the Supreme Court.

Presentation - II

Speaker : Dr. V.S. Hegde, ISRO, Bangalore.

Topic : Remote Sensing Applications in Water Resources Management

India is a very heterogeneous country in terms of water availability. The total availability in the country is 420 Million Hectare Metres (MHMs) out of which 135 million hectare metres is surface water. India accounts for nearly 2.5 percent of the earth's geographical area, 16 percent of the population, 16 percent of its livestock and

only four percent of the world's fresh water resources. There is uneven distribution of water resources in the country. There is acute water shortage in 5.5 percent of the geographical area of the country that affects nearly seven per cent of the country's population. There is large scale evaporation in arid and semi arid areas and the soil moisture is low for eight months in a year for most parts of the country. Eighty percent of the water in the country is used for irrigation, 10 percent for industry and 5 percent for the rest. Forty percent of the arable land that is irrigated produces around sixty per cent of the food grains of the country. There are limits to the further expansion of irrigation. The annual rate of sedimentation of Indian reservoirs is 1.5 to 3 times the designed rate and there is a declining quality of surface water due to pollution.

There is immense scope for space technology to have many applications in the field of water management. These include command area development, preparing surface water inventories, managing sedimentation of reservoirs, preparation of snow and glacier inventory, watershed development, groundwater targeting, rainfall estimation, inter-basin transfer, flood and drought management and the creation of Water Resources Information Systems. The country already has a sophisticated satellite network in place with geo stationary satellites and sun synchronous remote sensing satellites having significant imaging capability that can feed into scientific water management.

There is an urgent need to improve overall project efficiency, to reduce the gap between potential created and utilized, and to prevent land degradation at the same time improving productivity. To address these issues, space technology can help in providing baseline information for planning new water resource

development projects, in the modernization of irrigation schemes, and in the performance evaluation of irrigation command areas.

There are works, already done by the ISRO for interventions in the water sector. A National Action Plan for Sedimentation Assessment of 124 reservoirs is being implemented under NNRMS – SC – W. The ISRO is an integral part of the National Drinking Water Mission. Under the mission 200,000 wells have been drilled with a 90 percent success rate and 8000 recharge structures have been implemented. Groundwater prospects maps have also been prepared. Monitoring of glacial retreat has also been an important part of the activities of the ISRO. The organization has also been giving input to the river interlinking project from the beginning.

Floods and droughts remain perennial problems in India. ISRO has been trying to strengthen the country's capabilities surrounding disaster management. It has been involved in the preparation of the National Agricultural Drought Assessment and Monitoring System - (NADAMS) for fourteen states in the country, in flood relief and rehabilitation and cyclone monitoring. Satellite data has also been used for watershed developments by providing inputs for assessments for land use, geomorphology, geology, soils, forest cover, and ground water prospects. ISRO has also been involved in the creation of a National Water Resources Information System (NWRIS). Remote sensing layers like, landuse / landcover, soil, geomorphology, geology etc can be input to a GIS water balance model to calculate potential evapotranspiration which in turn can be fed as a input to model water availability in the basin.

Presentation - III

Speaker : Arvind Kumar, Associate Fellow, International and Strategic Studies Programme, NIAS.

Topic : The Politics of Water: How Hostile Nations Bind Together Through Water Sharing–Indus Water Treaty as a Case In Point.

Water can become a source of tension as it is increasingly becoming a scarce strategic commodity. It may become a driver of conflict and regional tension if not properly managed. But it can also be a vehicle for bringing nations together as is evident from the Indus River Treaty between India and Pakistan.

The Indus river basin extends from the Himalayan mountains that form the northeastern boundary of Pakistan to the alluvial plains of Sindh near the Arabian Sea coastline. Tarbela Dam is part of the Indus Basin Project, which resulted from the Indo-Pak treaty signed in 1960. Tarbela dam completed in 1997 is primarily designed for water storage rather than for power generation. With a volume of 142, 000,000 cubic meters, it is the largest earth and rock fill dam in the world and stands 147 meters above the Indus riverbed. Its reservoir occupies an area of 37 square kms. The Indus river system consists of seven rivers - the Indus itself; a tributary in the west - the Kabul river and five tributaries on the east - the Jhelum, Chenab, Ravi, Sutlej and the Beas. The Indus, the Jhelum and the Chenab flow primarily through Pakistan and carry some 80 percent of the Indus system, while the Ravi and Sutlej flow mainly - and the Beas wholly through India.

The problem of the utilization of the waters of the Indus and its tributaries by India and Pakistan turned into a dispute soon after

the partition. It took twelve years for the resolution of the dispute through the mediation by the World Bank. The dispute began on 1st April 1948 when India cut off water supplies for the canals in Pakistan on the ground that the water dues had not been paid by Pakistan. The fundamental question arose - Has one riparian state the right to cause, by its action, injury to another riparian state of the same river system by diversion including storage. The question over the flow of the Indus is a classic case of the conflicting claims of up-and down-stream riparians. India agreed to the resumption of flow, but maintained that Pakistan could not claim any share of those waters as a matter of right. This position was reinforced by the Indian claim that, since Pakistan had agreed to pay for water under the Standstill Agreement of 1947, Pakistan had recognized India's water rights.

The broad issues were:

- ❁ Negotiate an equitable allocation of the flow of the Indus river and its tributaries between the riparian states. Develop a rational plan for integrated watershed development
- ❁ The water supply to India and Pakistan from the rivers should be made independent
- ❁ Alternative sources of supply of water to Pakistan - not depending on the eastern rivers, the Ravi, the Sutlej and the Beas - should be developed

Development of the Indus basin by a joint Indo-Pakistan authority was suggested and the financing was to be done by the World Bank. The idea was turned down because of the then political

climate. How to utilize the water of the Indus basin was a crucial question before the experts. The World Bank in 1954 formulated its own proposals for developing the Indus basin. The entire flow of the western rivers, the Indus, Jhelum and Chenab, except for a small volume to be used in Kashmir was to be made available for Pakistan and the entire flow of the three western rivers, the Ravi, Sutlej and Beas was to be made available for India.

Worked out on the basis of the time required to complete the link canals necessary to replace the supplies to Pakistan from the eastern rivers, India would supply water to Pakistan from the eastern rivers and each country would construct works located on its territories, but the cost of Pakistan's link canals to substitute the waters of the western rivers to the eastern canals for those of the eastern rivers would be met by India. In other words, if Pakistan loses the existing flow from the eastern rivers and India benefits therefrom, India will, on that principle pay for the cost of those diversions. The cost to India was estimated to amount to between 40 and 60 crores of rupees.

India accepted the World Bank plan in 1954 through which India was to receive only 20 percent of the total flow of the Indus basin rivers for its 26 million acres cultivable area while Pakistan 80 percent for its 39 million acres. This was unique as for the first time, both India and Pakistan accepted third party mediation albeit Pakistan doing so with reservations. The draft of the Treaty was prepared by the World Bank that also mediated between the two states to reach a consensus. Both tacit and explicit bargaining was used.

Salient features of the treaty

The waters of the Indus, Jhelum and Chenab, except for essential uses in their own basins while they flow in India, are allotted to Pakistan; and the waters of the Ravi, Beas and Sutlej, except for a transition period, are allotted to India. India has guaranteed to let flow for all time to come the waters of the Indus, Jhelum and Chenab to Pakistan. India will also continue to give water from the Sutlej, Ravi and Beas allotted to it under the Treaty to Pakistan during the transition period only and on a diminishing scale. The transition period will be 10 years. This period may be extended for a further period of three years on request by Pakistan but the extension is subject to reduction in the Indian contribution towards Pakistan's replacement works. The Treaty provided for a permanent Indus Commission to serve as a regular channel of communication on all matters relating to the implementation of the Treaty. The Treaty terminated the Indo-Pakistan Water Agreement of 1948 under which canal waters were regulated from India to Pakistan.

There were provisions for three dams, eight link canals, three barrages and 2500 tube wells to be built in Pakistan. Additional provisions for data exchange and future cooperation were made and a consortium of donors to support development in the Indus basin was created. The initial Indian proposal was 29 MAF annually to India and 90 MAF to Pakistan. The initial Pakistani proposal was 15.5 MAF to India and 102.5 MAF to Pakistan. The World Bank proposed that entire flow of the Eastern Rivers to India entire and flow of the Western Rivers to Pakistan.

Relevance and Functioning of the Treaty

As a result of the treaty water problems have been viewed as "functional" rather than political; Water was separated out from other contentious issues between India and Pakistan. The most important issue has been the control by each state of its own resource Structural division of the basin, while crucial for political reasons, effectively precludes the possibility of increased integrated water management. The treaty has survived major wars and crises.

Presentation - IV

Speaker : Prof. Rama Prasad, IISc.

Topic : Cauvery Award from a Hydrology Perspective

The Cauvery Tribunal's final award fixes the river's water at 740 TMC at 50 percent dependability. Out of this, Karnataka's share is 270 TMC, Kerala's share is 30 TMC (21 in Kabini), Tamil Nadu's share is 419 TMC and Pondicherry's share is 7 TMC. The Cauvery Fact Finding Committee (CFFC) gave the yield at Lower Caleroon Anicut (LCA) as 740 TMC at 50 percent dependability and 670 TMC at 75 percent dependability, said to be based on data from 1934-35 to 1971-72. But the underlying annual flow series is not given and from the available data it is not possible to reproduce these numbers. The procedure described by the CFFC leads to some physically meaningless number. Nevertheless, the Tribunal adopted the CFFC's numbers and it ignored all the data prior to 1934 and later than 1972, a thing that no hydrologist would do.

The return flow from domestic use is taken as 80 percent and the return flow from industrial use is taken as 97.5 percent. No return flow from irrigation is considered. Ninety three percent of

allocated water is for irrigation and only 7 percent is for domestic, industrial and other uses. Some of the return flow in the upper reaches of the Basin would be reused at downstream abstraction points and some would get included in the measured flow. This complication does not arise at the last measurement-cum-abstraction points at Grand Anicut and LCA. The total return flow is 75 TMC.

For calculating water requirement of paddy, the Tribunal allowed percolation at 2.5 mm/day in the old Delta and 3 mm/day in other regions. Percolation also becomes return flow since it is in excess of evapotranspiration. Percolation provision is necessary only for three days in the head reaches of the Delta. Excess provision due to percolation is 32 TMC and therefore the total unallocated yield is $75 \text{ TMC} + 32 \text{ TMC} = 107 \text{ TMC}$.

Extensive studies, including by UNDP, have put the minimum amount of groundwater available in the Delta at about 30 TMC. The Tribunal has reduced it to 20 TMC. The hydrological basis for the reduction has not been revealed. Even the 20 TMC has been ignored altogether in the water allocation. However, the Tribunal has assumed half the drinking water supplies in the non-delta areas of the basin states to come from groundwater, although there are no studies to support that assumption.

Possible problems in Implementation of the Award

- ❁ Utilization and release problem
- ❁ Yield determination problem
- ❁ Reservoir operation problem
- ❁ Measurement error freezing problem
- ❁ Freedom-obligation conflict problem

Utilization and release

The Tribunal has ordered both allocation and release. Out of the 740 TMC, 483 is produced above the Karnataka border and 257 below it. Most of the 483 comes from June to October and most of the 257 from August to January. The two are not strongly correlated. If the yield in a year is 740 TMC or more, Karnataka has to release 192 TMC at its border. If in a year, 450 TMC is produced above the Karnataka border and 290 below, it is considered a normal year since the total is 740 TMC. Karnataka and Kerala can insist on utilizing 270 and 21 TMC respectively, and Tamil Nadu can insist on a release of 192 TMC. All three cannot be satisfied together.

Yield determination

Yield can be defined as the sum of the outflow at Lower Coleroon Anicut + Utilization in Tamil Nadu, Kerala and Karnataka, and utilization can be defined as the sum of utilization at major reservoirs + Anicut channels + tanks and barrages. There is no proper measurement of a large part of utilization (> 200 TMC in the basin states). Therefore yield cannot be determined with any amount of acceptable accuracy.

Reservoir operation

The Tribunal has ordered that in case of yield deficit, allocations are to be reduced correspondingly. The release of irrigation water as well as the 192 TMC has to start in June, but yield deficit if any will be known only a year later. Even rough indications of a major deficit will be available only in October. Indication of deficits of the order of 30 to 40 TMC will come even later. Tribunal has

ordered reservoir operation on 10-day basis, and deficits in 10-day flows to be shared by party states. No 10-day flows are available for comparing and deciding if there is a deficit (the flow series underlying the 740 TMC is not known). Only number available is 740. However, it's for only a year.

Measurement error freezing

At a large number of abstraction or flow measuring points, measurement is by discharge formulae with uncalibrated coefficients or unrevised discharge tables; they are therefore likely to have errors. An example is provided by comparing the flow at Mettur (computed with uncalibrated formulae) with that at Biligundlu (measured with current meter). These errors pertaining to the period from 1934-35 to 1971-72 are built into the 740 TMC assessments. Any improvement or deterioration in the accuracy of measurement would lead to yields that cannot be compared with the benchmark 740 TMC. Errors should therefore be frozen at levels obtaining in 1934-35 to 1971-72.

Freedom – obligation conflict

The allocations are *en bloc*. The states may utilize the allocated water anywhere they want. If Kerala utilizes all the 30 TMC in the Kabini basin and Karnataka utilizes 270 TMC in a normal year, then 192 TMC cannot be released at the border. Thus hydrologically there are too many loose ends in the Cauvery tribunal award.

Session - II Conclusions

The references to Cauvery in literature are as old as third century BC. The river has played a important role in the culture of people

of both Tamil Nadu and Karnataka. The dispute has gone through different phases from then on, with numerous irrigation structures coming along the river during the British rule necessitating treaties between the parties leading up to the present tribunal.

Space technology has big scope for water management and area development. It can play an important role in finding alternate ground water sources to the existing surface water availability. Also it can give timely inputs on resources during drought or floods. Among the international water conflicts the Indus treaty stands out from rest of them as an example for cooperation. The treaty has survived major conflicts like wars, but it still holds as a mechanism to share water between the disputants.

The procedures adopted by Cauvery Fact Finding Committee for annual flow series are inadequate and not reproducible from the basis of data on which it is based. Return flow from irrigation is not considered in allocation. Apart from there are problems in implementing Tribunal order from hydrology and hydraulic perspective of view.

Session - III : Critical Evaluation of Water Sharing Issues

Chair : B.V. Sreekantan, NIAS



Jagannath, B.V. Sreekantan, Janakarajan and Shanthamurthy

Presentation - I

Speaker : Prof. S. Janakarajan, MIDS, Chennai.

Topic : Farmers Dialogue for Interstate Water Sharing – An Approach.

Tamil Nadu has a much longer history of irrigation in the state – therefore claiming the protection of its historical and riparian rights. Karnataka developed its irrigation potential much later the watershed period being the 1970s. While Tamil Nadu claims it a historically developed - '*prior appropriation rights*', Karnataka calls it a '*historical blunder*'. The main issue is how do we protect the irrigation potential which was developed in Tamil Nadu delta over many centuries for *whatever* historical and political reasons.

Any denial of the hitherto access to this precious resource may result in *serious cultural setback* in the region. At the same time one also cannot ignore the irrigation potential already developed in Karnataka state. While the available water is hardly 740 TMC at 75 percent dependability, the total demand for both states is of the order of 1250 TMC ft. It is a well known fact that the dispute takes quite a serious turn whenever there is deficit rainfall – in *deficit years*. The issue is not one of *sharing* of the surplus water but *re-sharing* of the available water in an *already over-developed basin*.

Political formations in both the states have promoted enormous regional and linguistic chauvinism to gain political mileage. The net result has been the creation of the most contentious and the longest ever inter-state water dispute since independence that remains unresolved even after the declaration of the final award which came after 14 years of litigation. The way out could be Multi Stakeholder Dialogue (MSD) or in the language of the game theory, collective bargaining. Other forms of negotiation include spontaneous mass mobilization, expression of outrage and collective struggle, striking work, fasting, dharna, picketing and so forth. All these forms of negotiations are within a given political, *democratic* governance structure. All these forms are political and situation specific. In some cases, these forms of negotiations contribute to permanent results and in some *not*. The net result could be win-lose or lose-lose or win-win situation.

In the case of long standing disputes such as Cauvery, MSD may be a good solution. However MSD can be recommended as a conflict resolution strategy only if one seeks to resolve conflicts within a given governance structure. If one wants to go outside the given governance structure or if one wants to cross boundaries of given political system, then MSD loses its meaning.

The birth of the *Cauvery Family* has to be looked upon in such a context. The Cauvery Family was born in June 2003. In the family, farmers from all the sub-basins of the river are represented. The Committee of the Cauvery family has met so far nine times apart from the initial two big meetings – the first being April 2003. The Committee emphasized the absolute need for continuing the dialogue among farmers and to keep up the people to people contact. The Committee agreed to develop a long-term perspective and focus on optimizing use of currently available water. The Committee's deliberations have contributed to an atmosphere of mutuality, respect, and trust. The expectation is that such an environment is likely to be more conducive to the prospects of a resolution than one of mistrust, unilateralism, and potential violence. Arising from this, it has never been the intention of the Cauvery Family to supplant or substitute the efforts of other agencies engaged in a quest for resolving the Cauvery dispute.

The central issue for the Committee continues to be arriving at a formula for sharing of water both in normal and deficit years. The Committee has requested the Convener to prepare a paper on entire dialogue proceedings both in Tamil and in Kannada with a view to disseminating the message to farmers in respective States. The Committee is also preparing a visual CD on this issue as a part of the dissemination exercise.

The media and major political parties in both states supported this initiative – a few national news papers carried editorials and centre page articles have also come out covering the activities of the family. There is still a very long way to go and its outcome very much depends upon governments' support.

Lessons learnt:

- ❁ Sound research is necessary
- ❁ Degree of success or failure of dialogue initiatives depends upon active and sustained state support
- ❁ A threshold level of crisis will make dialogue initiative easier
- ❁ Need for an untiring facilitator
- ❁ Dialogues are never smooth; there will be lots of ups and downs
- ❁ Final outcome is uncertain; difficult to judge
- ❁ Any decision arrived at by means of farmers' dialogue could be put into practice only through due political process. Therefore, it is necessary that non-governmental/non-political initiatives of this kind get the recognition of political parties and government.

Post final award scenario

All contending states have approached the Supreme Court. The Tribunal itself was constituted as per the provisions of the Inter-State Water Disputes Act 1956, as amended in 2002, after considerable hearings in the Supreme Court. Now that the dispute is back in the Court, it may take some or many more years before whatever final verdict is announced. The legal course has already taken one full round without any prospect. The ongoing social dialogue gains more significance precisely under these circumstances. Thus the Cauvery family assumes more responsibility. It is important to note that even after the Cauvery tribunal gave its final award in 2007, the Cauvery family members neither issued any statement on an individual basis nor were there any 'incidents' of violence.

Presentation - II

Speaker : Prof. Shanthamurthy, Institute of Parliamentary Affairs, Bangalore.

Topic : A Critical Analysis of the Final Verdict of the Cauvery Water Disputes Tribunal.

We appreciate the concept note that was circulated for the dialogue and found it precise and thought provoking. The final verdict of the Cauvery Water Disputes Tribunal is welcome precisely because it's a final verdict. It has to be appreciated that the tribunal takes cognizance of the environmental needs and has allocated some water for that purpose. The verdict also allows the parties to the case to reach agreements that might contravene the tribunal's judgment. The award provides an impressive data base and is a document of immediate academic relevance.

But the document takes the treaties of 1882 and 1894 surrounding the waters of Cauvery as the point of departure. This is a matter of concern as this can be seen as an unnecessary act of legitimizing the history. The tribunal decided on the water allocation with a dependability ratio of 50 percent. It is not clear how this ratio was arrived at. The tribunal also took an inordinate amount of time, nearly seventeen years, to give its award. The tribunal was also heavily dependent upon the assessor's report. On the whole the demerits outweigh the merits.

One has to recognize the need for evolving acceptable parameters for sharing water between Karnataka and Tamil Nadu over the waters of the Cauvery River as well as the need to be able to generalize these parameters for water sharing in the basins of other inter-state rivers. Contribution of water to the river should be a factor. Other parameters like drainage area, length of the

river passing through the states etc is also important. Actual needs of the states also need to be factored in. What has to be noted in this context is that all the states hiked up their needs in the representations made to the tribunal. Availability of other sources of water like ground water facilities and existing cropping patterns should also be taken into account. There is a need to try and resolve the issue in a non-partisan and non-political spirit. If consensus cannot be reached then under article 56 of the union list water can be nationalized under a new Act. One of the possible ways of addressing the water crisis in the Cauvery River basin is the National Waterways project. There are also suggestions to cut down the water usage in the irrigation sector.

Presentation - III

Speaker : Mr Jagannatha, ISRO.

Topic : Strategies and Case Studies for Alternate Water Resources to river Sources.

It is an important need to chart out a feasible plan of action that ends up in “win-win” situation for all the parties. Sustainable water management practices have to be seen as integral to the solution of issues surrounding sharing the waters of inter-state rivers. One has to learn from the existing set of good practices that work on the principle that “a sustainable community protects itself without harming others”.

There is a need for evolving holistic frameworks that take into account both interstate and intrastate issues. Equity is also proposed as another principle, not merely at the level of states, but also at the level of micro-basins. Technological solutions like desalination are also proposed.

Session - III Conclusions

Multi-stakeholder Dialogue participation to resolve issues can be used within a governance structure. 'Cauvery family' represents farmers from across states and all sub-basins of Cauvery. Optimizing water use in a mutual trust, respect and not acting unilaterally and in isolation would bring long term benefits.

The tribunal's decision has come after much delay, and has depended much on assessors report. There is a need to resolve issues adopting non-partisan and non-political approach.

Decentralized governance should be given importance to sustain alternative modes of development. UN and other Nations has documented such good alternative approaches and such good practices could be looked through for conflict resolution.

Proceedings of 27th June 2007

Panel discussion - 1: Government technical advisors

Chair: Prof. Rama Prasad



Raghuram, Rama Prasad, Sivaraman and N.J. Rao

Presentation - I

Speaker : N.J. Rao, Professor, Former Chairman of CEDT and
Department of Management Studies, IISc

We require a framework that enables us to understand, analyze, identify possible interventions, and explore policy options for a complex issue like river water sharing which is multidimensional and multi-disciplinary in nature. Systems view and particularly 'system dynamics' provides such a framework. A river basin system is characterized by widely varying geographical conditions, uneven rain fall over different regions and years, different terrain and soil conditions, diverse cultures and histories of different groups of people along the river, technologies used to impound water and utilization for different purposes, institutions created to manage the water resources, and continuously changing interrelationships among all the stakeholders. There are several variables that change with time (dynamics), time delays, balancing loops and reinforcing loops of relationships. System dynamics provides an ideal framework to address such complex socio-technical systems.

All the stakeholders and the experts concerned operate with bounded rationality, and decisions are taken based on mental models and their immediate concerns. Besides humans are incapable of decision making that requires simultaneous consideration of several variables. Systematic studies indicate that even experts anchor their decisions on a single variable, and justify their conclusions with respect to other variables. Humans are not capable of estimating the future of systems with feedbacks, more so of systems with multiple feedbacks. In addition, we are not trained to appreciate the causal relationships where the cause

and effect are not proximate in time and space. All these human limitations lead to event oriented view of the world, which results in sequential decision making. Hence, we need descriptive modeling framework that is based on feedback view of the world. System dynamics (SD) provides such a framework. Such SD models are in use for the past forty years, the most important example of SD being the world model created by Club of Rome to identify limits to growth. Such modeling has been applied to study water issues in Sri Lanka. However, such models are created through the participation of all stake holders. Once a simulatable SD model acceptable to stakeholders is created with all the numerical values incorporated, it can serve several goals. It can be used for policy exploration, to study the effect different interventions, to understand the impact of technologies, to identify the structural bottlenecks (institutional mechanisms), and to explore desirable structures.

An SD model should be created to answer a specific question. The question enables us to identify the problem boundary and the important variables. It also allows us to identify the system, its transactional environment and contextual environment. Most importantly it allows us to identify the indicators, interventions, constraints and process variables.

Indicators are natural, everywhere, part of everyone's life. Indicators arise from values (we measure what we care about), and create values (we care about what we measure). When indicators are poorly chosen, they can cause serious malfunction. The choice and use of indicators are processes full of pitfalls. The choice of indicators is a critical determinant of the behavior of a system.

The first stage in developing a systems model is identification of indicators. It is suggested that the focus question may be chosen as “how to share water resources of a river basin by all its stakeholders in sustainable manner?” This requires identification of stakeholders, water resources, needs of stakeholders, and sustainability requirements. The institutional mechanisms and politics belong to the transactional environment, and they act as either facilitators or impediments.

Presentation - II

Speaker : Raghuram, Technical Advisor to Government of Karnataka

The factual aspects of the tribunal award is covered and not any controversies. The basin area is 42 percent in Karnataka and 54 percent in Tamil Nadu. Before independence, Kabini and Bhavani tributaries were part of the erstwhile Madras presidency and there was not much development of these sources in Kerala. Coorg was separate and Mysore had only eight districts under it. The development of a river always starts from the mouth of a river. Therefore the irrigated area by Cauvery was 16 lakh ha in Tamil Nadu in 1900 whereas in Karnataka it was only 3 lakh ha.

Two agreements were entered into in 1892 and 1924 between Mysore and Tamil Nadu that consolidated the irrigation efforts between the two states. Mysore’s progress was slow till 1971 due to various hindrances raised by Tamil Nadu. All Karnataka projects are non-planned projects executed from state funds due to objection to the 1924 agreement by Tamil Nadu. Therefore, negotiations started between Tamil Nadu and Karnataka in 1972 and continued till 1990. Twenty six rounds of talk took place but

no solution was arrived at. While the talks were going on, in 1983, Tamil Nadu farmers filed an application in the Supreme Court supported by the Tamil Nadu government and the Supreme Court gave orders to set up a tribunal in 1990. The tribunal award came in 2007. Half of Bangalore city is in the Cauvery basin whereas the other half is not. The tribunal says no trans-basin transfer of the Cauvery water is allowed. But Cauvery water has been the life line of the whole city.

The tribunal framed fifty issues. The group I issues are on the agreement; group II on the availability of surface and ground water and Group III on the equitable allocation. It is the group II issues that is an addition to the final order than what is there in the assessor's report. The 740 TMC award is at 50 percent dependability though Tamil Nadu had argued for 75 percent dependability.

Ground water in the delta region as an additional alternate source was another contentious issue with Tamil Nadu refusing to admit that ground water is an additional source. But Karnataka feels that the delta ground water is also to be taken into account while making apportionment. The tribunal recognized 20 TMC of conjunctive use of groundwater by Tamil Nadu but this 20 TMC is missing from the final calculation of the Award.

The irrigated area has been calculated under the heads of area developed before 1924, area developed outside the agreement of 1924 and surplus areas that can be developed. This has worked out to be 24.70 lakh ha for Tamil Nadu and 18.85 lakh ha for Karnataka.

System efficiency is insisted to be 65 percent in both the states. Although 18.85 lakh ha of irrigated area has been approved, of this only in 7 lakh ha is paddy allowed which had been previously 8.65 lakh ha.

That only one-third of Bangalore city is considered as part of Cauvery basin and that 50 percent of the drinking water requirements of the city is to be met by ground water can lead to social problems in the future. Since concession was made to include Tamil Nadu delta region outside the basin a similar concession should have been made in the case of Bangalore also. Allocation for environmental protection (10 TMC) has been slotted as the responsibility of Tamil Nadu and the unused waters of Kerala also to be given to Tamil Nadu until Kerala develops it. Monthly delivery of the water is still a problem as the Award has just given the guidelines.

Presentation - III

Speaker : Mr. Shivaraman, Formerly Chief Engineer, Irrigation Department, Tamil Nadu

None of the mission statements will be effective unless fair water sharing is agreed upon. The parameters can be classified into two categories: those before the settlement and those after the settlement. Cultural, social, legal and technical parameters will have to be evolved. A cultural revolution itself might be needed to free people from a political prison mentality. Since information available is inadequate there is a need to work on the lines of generating data, evolve and strengthen alternate strategies, promote participatory management, strengthen institutional mechanisms, enhance transparency and accountability, etc. Referring to model presented by Prof. Vijay Paranjpye's, in my view it is a good social model that could be adopted. However, it is important to also take cognizance of the views expressed by experts' as they contribute to an informed discussion. I also refer

to the model of participatory approach adopted by the Cauvery family. In all, multi stakeholder dialogues provide an enabling environment and a forum for informed discussion.

Panel - I Conclusions

System Dynamic models give a framework for feedback of cause and effect relationships. With all stakeholder participation, a river basin also can be modeled to understand the dynamic processes.

Only one-third of Bangalore City is considered as part of Cauvery basin as per the Tribunal Order, which means the city has to depend on ground water sources which are already declining. Provisions should be made for cities like Bangalore to have trans-basin transfer of river water.

Panel Discussion II: Civil Society Panel

Chair: Prof. Janakarajan, MIDS



Rangathan, K.C. Basavaraj, Janakarajan and Smita Mishra Panda

Presentation - I

Speaker : Dr. K.C. Basvaraj, Professor of Economics, Mysore University and Vice President, Karnataka Rajya Raita Sangha (KRRS)

KRRS is a civil society organization which is both influential and strong. In terms of Cauvery river water sharing, we initiated some processes. But after the disastrous experience with the interim award, the reactions were negative from civil society. It took a violent, ethnic turn. Civil society action was initiated in 1992 as a dialogue between stakeholders including farmers of all concerned states, technical people etc. but this did not get too far. Meanwhile, KRRS was trying at the grass roots level to educate the farmers. It was in 2003 that MIDS invited KRRS to Chennai. During the initial meetings we were extremely chauvinistic. The second meeting of the imitative was held in NIAS. After nine such meetings of the Cauvery family, we have developed a relationship. In terms of dialogue we do have reached some directions, but since the issue has been politicized too much, it is very difficult. Justice as a parameter is very important and it has been made amply clear in our Constitution also.

Karnataka is the second drought prone state in India. Drought is a vast deprivation of livelihood. The Cauvery family has not met after the Verdict though KRRS has been prepared to meet.

Agreed that in irrigation Karnataka is a new entrant, but our entry has been blocked at all levels. The tribunal has upheld the principle of prior appropriation, but we say that prior appropriation cannot be the basis of resolution of river water conflicts. It has to be natural justice to provide livelihood security.

There was agitation in Karnataka for sixty four days after the Award was declared. But there was not a single violent incidence reported. The principle of non-violence adopted by the farmers of Karnataka during the period of agitation is the example of strength and success of the Cauvery family. We have also been interacting with our irrigation engineers though on the Tamil Nadu side the engineers do not seem to be so forthcoming. Karnataka has responded very positively to the Cauvery family. Now that the Award is there in front of us, we have to negotiate within the limits set by it.

Presentation - II

Speaker : Ranganathan, Secretary, Tamil Nadu Cauvery delta farmers welfare association

Between 1972 and 1983 bilateral talks between Karnataka and Tamil Nadu were held many times at the ministerial and Chief Ministerial levels with no tangible outcome. In fact, there was lack of political will to come to any understanding by either state for fear of reduction in their respective demand. It was more explicit in Tamil Nadu, as the outcome of bilateral negotiation may result in a substantial reduction from their existing usage. Between 1930s and 50s, Tamil Nadu was able to increase its irrigation potential and it was almost cent percent by seventies.

Failure to agree to any norm of sharing, in spite of several rounds of bilateral talks spread over several years, combined with an ambitious programme to increase the irrigation potential in Karnataka, inspite of objections from Tamil Nadu and non-clearance of projects by the Centre, the Delta farmers had to approach the Supreme Court for justice and for the constitution

of a Tribunal. Even after the case was numbered and argued upon, the Apex Court extended several chances to re-negotiate. Failure to come to any understanding resulted in the constitution of the Tribunal in 1990. What happened after, every one knows. It is tragic.

Cauvery is a deficit river and cannot satisfy the needs of the respective states in full. Whatever is available in the basin it should be shared and effectively managed. To satisfy the entire needs of the states, we have to seek alternative sources, which include (a) modernisation of the irrigation system; (b) linking of the Peninsular rivers and (c) diversion of the west flowing water into the basin. To achieve this, the dispute has to be resolved. It is strange that while our needs are in excess of 150 TMC, we are fighting for a meager 20 and 30 TMC of water! It is high time, that we stopped our fight for water, and seek avenues to supplement the deficit. We can achieve it in the next ten years. The farmers of Tamil Nadu and Karnataka should join together for a common cause.

Presentation - III

Speaker : Dr. Smita Mishra Panda, Professor, KSRM, Orissa

Two issues have clearly emerged. One is the legal policy framework of conflict resolution and the second is the process of negotiation, dialogue etc. All these are to aid us in coming to consensus as to how we are to share our surpluses or deficits. It is important to analyse the role of Civil Society Organisations (CSOs) in this regard. How far can the CSOs act as facilitators? There is also the clear and present danger of guarding of private interest in the name of CSOs. Gender has not been explicitly discussed anywhere. It is also important to discuss how to bring smaller,

local communities together. I strongly feel irrigation has been given more importance than drinking water and since it is the women of the household who have to struggle for drinking water, the issues of women have also been sidetracked. There is also the need to be vigilant against the sensationalisation of the issues by the CSOs which is disastrous in the long run.

Discussion following the presentations

The Chair of the session initiated discussions after the presentations, on civil society organizations and their role in conflict resolution in trans-boundary water sharing issues. He noted that though the country is on the path to development, it has led to degradation elsewhere. Development in one sector and degradation elsewhere do not go well together creating tensions. This has led to the recent increase in the number of Civil Society Organizations. So it is important to discuss the definition, role and importance of these CSOs in the evolving of parameters for conflict resolution.

An immediate demand was raised to de-link discussions on water from irrigation due to which all the other sections of the society including women, small farmers, landless labourers etc. get swiped off from these deliberations. Farmers constitute the larger share of water use, but there is a need to widen the participation base which will lead to inclusion of other stakeholders such as women also. It is important to bring in women to the fold since they have been the managers of scarcity and have a different experiential perspective to scarcity and its management.

Another important distinction that came up was between civil society and civil society organizations. Whose agenda is being

represented by the CSOs? The CSOs are deeply rooted in the funding agencies and these in turn may control the strings. Therefore only those CSOs who maintain financial independence can maintain political independence. This is true regarding internal governance also. There could be a pressure as in traditional families to abide by the family head. It is important to bring in small framers and landless labourers. The family should be a reflection of all the differentiated categories of the Karnataka and Tamil Nadu population rather than a homogenous representation of the populations as Tamil Nadu and Karnataka for which political mobilization at the grassroots is required. The participant also expressed that women should be included as their democratic right and not due to consideration of any inherent virtues of scarcity management.

Several of the participants voiced that CSOs should be inclusive organizations and not primarily a pressure group. Creating new partnerships should be an important parameter. Likewise building of new mindsets and willingness to engage has to come in as important parameters. The CSOs are important with respect to all these parameters, both in their initiation and their monitoring. Everyone from the region, living on and enjoying the resources of the region will have to be member of the CSO. Therefore what we need is a resource-based approach to CSOs.

One of the discussants observed that there is a danger of outliving the purpose for which the CSOs were initially set up for. In such cases, keeping the issue alive might be to their benefit. The participant felt that CSOs have to be pressure groups but not parochial. The tillers, who did not have any voice in the history, now have both voice and power for which the CSOs are to be complemented partly.

CSO's role as a political forum was also raised. It was observed that CSOs should be serious in its role of working in tandem with the government. One should respect the role of politicians also. It was pointed out by another participant that it would be important to know what are the issues taken cognizance of by the state are and whether there is any inclusion of CSOs in the government procedures. One of the participants wanted to know the efforts made at the Cauvery family level, after the Award, to arrive at an alternate/ modified award.

Another issue that came up in the discussion was that even within the CSOs there is isolation. There is an urgent need to network and link up the working of various CSOs and look at issues in a larger framework rather than take an issue specific approach. The need to bring in Kerala and Pondicherry farmers into the Cauvery family and also to include non-farmers in the family was raised by another participant.

Dr. Basavaraj of the Cauvery family clarified that even though the Cauvery family has no direct links with the governments, the Karnataka government sees the family very seriously. Dr. Janakarajan explained that there is no alternate or parallel Award prepared by their organization.

The Chairman of the session concluded the panel discussion by flagging the major arguments and comments that came up during the discussions:

- ❁ CSOs are inclusive and not exclusive
- ❁ CSOs have to be seen in long term perspective of maintenance of ecological balance in the basin

- ❁ Willingness to engage with other CSOs, government, engineers etc. is important to diffuse exclusivity and forge new partnerships
- ❁ Cauvery family should not become a landlord's lobby
- ❁ CSOs should have an identity with a broader scope

Open House

Chair: Prof. Ramaswamy R Iyer, CPR



Special Remarks by Prof Ramaswamy R Iyer to the Open House

Given below are clarificatory comments on some of the points that came up during the several sessions of the Dialogue.

1) The 1924 Agreement

I wish that the question of the validity of the 1924 Agreement had never been posed to the Tribunal, and I wish that the Tribunal had the good sense to refuse to answer that question. The Tribunal

could have said: “We refuse to enter into the debate whether the old Agreement was fair, and whether it continues to be valid, and waste our time. There is a current dispute about the sharing of the Cauvery waters, and this has to be resolved with reference to the principle of equitable apportionment for beneficial uses. We shall proceed to do so.” Unfortunately, the issue was posed to them and they have considered it necessary to answer it. Having put a legal question to a judicial body and got a judicial pronouncement, there is not much point in getting angry with that body because the answer is not to our liking. If the Tribunal had pronounced the Agreement dead or invalid, Tamil Nadu might have accused the Tribunal of prejudice and injustice. Where does that take us? If either party feels that the answer given by the Tribunal is wrong, it can ask for a review or a clarification by the Tribunal, or go to the Supreme Court. Both these things have been done. There is perhaps no need to discuss this further.

However, Karnataka has a very strong sense of grievance on this matter, and there seems to be unanimity in the State on this. Without entering into the question whether that sense of grievance is well founded, and conceding for the sake of the argument that the 1924 agreement was unfair and unjust, what we should question is whether that is of any significance now. After 1924, Karnataka proceeded to construct not merely the KRS Project, but also Kabini, Hemavati and Harangi Projects. Whatever their legality or their conformity to the 1924 Agreement, they exist. Through the construction of these dams Karnataka as the upper riparian has acquired substantial control over Cauvery waters, thus totally changing the position that prevailed at the time of the Agreement. Whatever the justification for the sense of grievance on the part of Karnataka earlier, the basis for that grievance disappeared with these dams. Control passed into the

hands of Karnataka; Tamil Nadu as the lower riparian became weaker and vulnerably dependent on Karnataka's goodwill; the grievance shifted from Karnataka to Tamil Nadu; Tamil Nadu became the aggrieved party. That has been the position for some decades now. During the course of the discussions one heard the expression 'threat to livelihoods' the context of criticisms of the Tribunal's allocations; threats to livelihoods are exactly what Tamil Nadu farmers have been complaining about in recent years, rightly or wrongly.

The current situation is that there is a riparian dispute and it has to be resolved on the basis of equitable apportionment for beneficial uses. This is what the Tribunal has tried to do. Even if the 1924 Agreement had never existed, the principle of equitable apportionment would require the allocator to take many criteria into account, and established existing use is one of them, though it is not the only one or the decisive one. There is a long history of irrigated agriculture based on Cauvery waters in Tamil Nadu, and it has provided the basis for a way of living and a culture. While prior appropriation does not confer a vested right to the waters and historical flows cannot be protected forever, existing ways of living should not be cavalierly or drastically disrupted. At the same time, as upstream uses develop, adjustments by the lower riparian are inescapable. The equitable apportionment principle will have to balance these conflicting criteria and work out allocations. This is quite independent of any view that we may take about the fairness or continuing validity of the 1924 Agreement. All the parties to the dispute had argued their claims on Cauvery waters before the Tribunal and submitted massive documentation in support. The Tribunal's allocations are based on a study of these and not on the legality or the contents of the 1924 Agreement.

2) Hydrology

In this meeting, the Tribunal's hydrology has been questioned as seriously deficient and flawed. This is a technical matter, but I should observe the following. The Tribunal was assisted by two Assessors. It had the benefit of the work done by the Central Fact finding Committee of the 1970s. It had before it the extensive arguments and massive documentation submitted by all the Governments during the course of the adjudication process which had gone on for 17 years. If there were serious deficiencies on the hydrological side, what were all the State Governments and their technical and legal advisers doing during these 17 years? At this late stage, after the Tribunal has taken all the material before it and given its decision, are we to write off 17 years' work, go back to the starting point, question the fundamentals and re-start the adjudication process? If in fact the position is as bad as has been made out, all that one can say is that one hopes that the State Governments have raised the issue in their clarificatory petitions to the Tribunal.

3) Bangalore's Water Requirements

The argument is that the Tribunal has under-estimated Bangalore's requirements. If so, one presumes that the issue figures in Karnataka's petition to the Tribunal as well as in the SLP to the Supreme Court. In any adjudication, each party may get less than what it thinks it needs, and has to do the best it can with what it gets. If Bangalore does need more water, and if Cauvery is the only source, the Karnataka Government will doubtless sub-allocate its 270 TMCft to give a little more to Bangalore and a little less to other users. To mention an example, the Narmada Tribunal had rejected Gujarat's case for giving Narmada waters to

Kutch, but left the State Government free to sub-allocate its allotted share of 9 MAF as it deemed fit and the Government decided to give some water to Kutch. Karnataka could deal with Bangalore similarly.

However, there is another aspect to be kept in mind, and this has nothing to do with the Cauvery issue. All metropolises, Bangalore or Mumbai or Delhi or Chennai, tend to make heavy drafts on the natural resources of their rural hinterlands. While the State Governments concerned must undoubtedly ensure that the metropolises' reasonable and legitimate needs are met, it must also ensure that this does not cast an undue burden on the other and less privileged areas of the State.

4) The Allocations

Karnataka is dissatisfied with its allocation of 270 TMCft, Kerala wants more than the 30 TMCft allocated to it, and even Tamil Nadu seems not wholly satisfied with its allocation of 419 TMCft. May I venture to suggest that these allocations have no great significance and are not worth quarrelling about? That may seem a strange thing to say. Here is the explanation. A large part of these 'allocations' are natural flows. Kerala does not 'release' Cauvery waters to Karnataka or Tamil Nadu, because it has built no control structures; Cauvery waters merely *flow* from Kerala to Karnataka and Tamil Nadu, and that flow is not determined by the Tribunal's 'allocations'. Similarly, rain just falls on Karnataka and the flow so generated is not determined by the Tribunal's allocation of 270 TMCft. Again, out of the share of 419 TMCft 'allocated' to Tamil Nadu, a substantial part is natural flow unmediated by human intervention. In a year of heavy rainfall, the actual availability to the two States may exceed the Tribunal's

‘allocations’; and in a year of less than normal rainfall, the availability to the two States may fall short of the ‘allocations’ of 270 and 419 TMCft respectively, but nothing can be done about that. Rainfall cannot be asked to comply with the Tribunal’s allocations. It follows that the only numbers of real operational significance in the Tribunal’s Final Order are the 192 TMCft to be *released* by Karnataka to Tamil Nadu and the 7 TMCft to be *released* by Tamil Nadu to Puducherry (Karaikal).

(Incidentally, these ‘releases’ become necessary and possible only because both Karnataka and Tamil Nadu have intervened in the natural flows with structures; if those structures had not been built, the river would have naturally flowed to Tamil Nadu and to Karaikal. Far from ‘releasing’ waters, Karnataka and Tamil Nadu have in fact obstructed the flows with dams, and are under an obligation - not just because of the Tribunal’s Order but because of general principles - to ‘release’, i.e., ‘de-obstruct’ the flows to the lower riparian, with a view to refraining from causing harm or injury.)

Leaving that aside, and ignoring the 7 TMCft share of Karaikal as too small to argue about, let us look at the 192 TMCft that Karnataka has to ‘release’ to Tamil Nadu. This is not problematic at all in a normal year; much more flows down. (Some adjustments of schedules *within* a year may be needed; we are not discussing that here.) It is only in a ‘difficult’ year when the rainfall is deficient that the release of 192 TMCft might become difficult or impossible. The problem therefore is not one ‘allocations’ but of ‘distress sharing’ in a difficult year.

If we look at the matter this way, it becomes clear that the fight over allocations or even releases is entirely pointless. The problem

narrows down to distress-sharing in difficult years – perhaps in one year out of four or five. The Tribunal has laid down the principle of proportionality, and this may seem to bring in the allocations, but no rigid formula has been laid down in the Tribunal’s Report; this has been left to the Cauvery Management Board. When the CMB is established and becomes functional, it can work out in collaboration with the States a practical method of dealing with low-flow situations. Such a practical arrangement need not even be based on the proportionality principle.

(A word of explanation about Kerala seems necessary. Though we observed earlier that it has no control structures, but it may build some in the future and thus acquire the power of stopping or releasing the flows of waters to Tamil Nadu and Karnataka. However, this may not happen to any significant extent in the foreseeable future. It will be a long time indeed before Kerala’s use of Cauvery waters will go up from the present level of 6 TMCft to the 30 TMCft allocated to it; and even that will not significantly affect the flows to Tamil Nadu and Karnataka.)

It does seem that a relatively simple problem (not easy, but manageable) – that of distress-sharing in difficult years – has been unnecessarily complicated by the quarrel about allocations.

5) Plea to Cauvery Family

Having regard to all this, a plea to the Cauvery Family is twofold:

- (a) It is in everybody’s interest that the present negative feelings should disappear and that there should be constructive inter-State cooperation in the actual operation of the Tribunal’s Award. For this purpose, something needs to be done about

the sense of grievance in Karnataka, whether that is warranted or not. If the Cauvery Family can reach agreement on a minor adjustment of the allocations, that may go a long way towards that objective. This will be as much in Tamil Nadu's interest as in Karnataka's.

- (b) Without waiting for the clarificatory/ supplementary Report/ Order of the Tribunal and the establishment of the Cauvery Management Board, the Cauvery Family should quickly work out a practical method of water-sharing in periods of low flows.

Open house other proceedings

The open house session helped streamline the discussions of the meet and lay the path towards arriving at the parameters. The session took off by discussing the details of the Cauvery Award and the role of Cauvery family in conflict resolution. River basin approach as a long term strategy was suggested as one course of action. On the other hand, it was also suggested to concentrate on deriving the parameters specifically rather than arrive at it through river basin approach.

The discussions opened with concerns raised about Bangalore's growing water needs and the Cauvery Award being insensitive to it based on the argument that only 1/3 of the Bangalore city is entitled to Cauvery water as the rest of the city falls in a different basin. The Cauvery Award specifically prevents any inter-basin transfer of water. One of the discussants noted that though the Award says that only 1/3 of the city of Bangalore is in the Cauvery basin, it is entirely up to Karnataka to decide how it is going to allocate its share of the water. The state can decide to give

Bangalore more water out of its allocated share. But what was raised as a larger concern is that giant metro centers are taking water away from rural areas. The discussant also noted that in reality, there are only two operative numbers in the whole Award: 192 TMC to be released by Karnataka to Tamil Nadu and 7 TMC to be released by Tamil Nadu to Pondicherry. For these operational releases, there is going to be an actual stress only once in 4 or 5 years in years of shortage. So the issue boils down to sharing the water during these difficult years. It was hoped that at the Cauvery family level, some mutual agreements can be arrived at regarding these numbers so that the whole atmosphere will change regarding the acceptance of the Award. The need was identified to sit down and work out how in difficult years both the states will work out an arrangement so that grievances are reduced and the disputes will come to an end. Another participant noted that even in the normal years, June-July release of the stipulated release will be difficult. Out of 13 out of 16 years there was a shortage during June-September months. It was also noted that the actual figure is not 194 but 212 including the Kerala apportion. It was pointed out that the period of June –July is also a distress period for Tamil Nadu. But farmers in the delta have started using water conservation practices and therefore they are able to manage without releases upto July 15th.

This led the discussion into identifying the need to address the issues one step backward and start with asking as to how the disputes arose in the first place. What is clear is that disputes arise when we start interfering with the natural flow of the river. For example, Kerala's present utilization is only 6 TMC. They can actually go upto 30 TMC. When they do it, Karnataka will have a problem with her releases. The need is to address the root cause of the disputes itself. In all these water disputes, be it interstate

or international, there is allocation and segmentation of the river. Therefore a river basin approach may be best suited to address these issues. Even though there is a slight danger of centralization, River Boards seems to be a better option rather than have tribunals to solve disputes as and when they arise. But clearly, state governments do not want it because it threatens existing administrative boundaries. There are detailed recommendations on setting up of River Basin organizations in the National Commission report so that it will be a local and representative organization having wide representation. It was felt that a bottom-up approach is required which will legitimize a forum for settling problems at a local level. On the institutional side, there is plenty of material on RBOs. It is an elaborate cumbersome procedure but needs to be looked at carefully and compared with what is happening in Mekong. At the same time we should look at the bottom end at the micro-watershed level and also seek to integrate it with non-official initiatives like the Cauvery family. The general principles that are available are the old Helsinki rules, Berlin rules 2004, Agenda 21 etc. We also have the Government of India draft. But beyond a certain point we may not be able to apply them to specific cases where the details are important. There is a Cauvery family already existing. There are also the water users associations both in Tamil Nadu and Karnataka. Maybe an organization federated from bottom-up in this manner can serve as a model. The discussant noted that the ministry of water resources has already approached the Water Council twice to have primary non-negotiable parameters for equitable distribution of interstate waters but no agreement has been reached so far due to divergent views of the states.

Another participant also supported the institutional course of action on the lines of river basin organizations. It was observed

that Cauvery family can form the benchmark of all organizations working in the Basin and sub-basins. He noted that we should be taking steps to identify stakeholders to get a realistic picture of a river basin and bring in an identity of the river basin as a complete unit. There is a need to review existing state policies. Karnataka state has water users institutions at 4 levels; Tamil Nadu also has an act emphasizing participatory irrigation management. According to the discussant, what we need to address is the water management issue rather than the conflict per se. The example of Murray Darling basin in Australia was cited as an instance of a good institutionalized structure.

But there was an opinion that the river basin approach for dispute resolution may be the course of action only in pristine basins but not in developed basins. The fear that specific objectives of the dialogue will get diluted when river basin organization level approach is taken was also voiced. It is true that water sharing depends on all these aspects but single most important issue here is the water sharing at the interstate level. It is not as simple as local level water conflict. We need to have standardized and definite methodologies to take in stakeholders views. The discussant noted that it is unfortunate that 53 years old techniques such as dynamic system modeling are not used in dealing with real cases.

On concerns over bearing the cost of releasing the water, it was clarified that cost sharing for releasing of water will not stand by Helsinki rules. Upstream state is entitled to use water without causing significant harm to downstream riparian state. On the legal and policy issues front 2 alternative suggestions were made. One is to repeal interstate water disputes Act and the other is to retain it and include an appeal to the Supreme Court.

Through the discussions emerged three distinct strands to action: parameters, mechanisms and operational strategies. It was felt that strategies and mechanisms are easier since there are experiences with these but yet the conflicts arise. What we lack is a set of normalized variables. For arriving at the parameters, the need was felt to first identify 5-6 categories and ask people to suggest indicators arranged under each category. A methodology for arriving at the ranking and ordering of the indicators under each category was found necessary. Equal importance to gender sensitive social and environmental indicators along with technical indicators was stressed upon.

Conclusion

The intensive two-day presentations and panel discussions brought together the various perspectives on the parameters for the resolution of interstate trans-boundary water conflicts and helped generate a comprehensive list of indicators. The importance of bringing together all the stakeholders involved, including farmers, other beneficiaries, engineers, politicians and the imperativeness of an informed debate formed the backdrop against which the parameters were explored and discussed.

A broad consensus as to evolving parameters based on the legal, hydrological, institutional, historical, political and policy related aspects of the issue was arrived at, after presentations and exhaustive discussions to draw out the complexities of each of these indicators. The discussions on legal and institutional aspects of interstate water conflicts recognized the need to bring in changes in existing laws, the need to build in grievance redressal adjudication, the requirement for new institutional mechanisms that would address the changed scenarios of water utilization in

a river basin and also the increased role of civil society organizations in any such endeavors. Hydrological and other technical indicators for conflict resolution were recognized as essential for more reliable water availability calculations and alternate best practices in increasing water use efficiency.

The discussions also focused attention on the importance for the parameters to reflect gender concerns and small, marginal and landless farmers/laborers and non-farmer stakeholder concerns. The dialogue also brought to the fore, important methodological issues involved in the generation of the parameters taking into consideration the multidimensional and multidisciplinary nature of the problem. The need to include social and environmental parameters along with technical parameters was felt strongly. Importance of a river basin approach to the issue and the role of civil society organizations in both the conceptualization as well as implementation of the parameters formed a consistent thread throughout the dialogue.

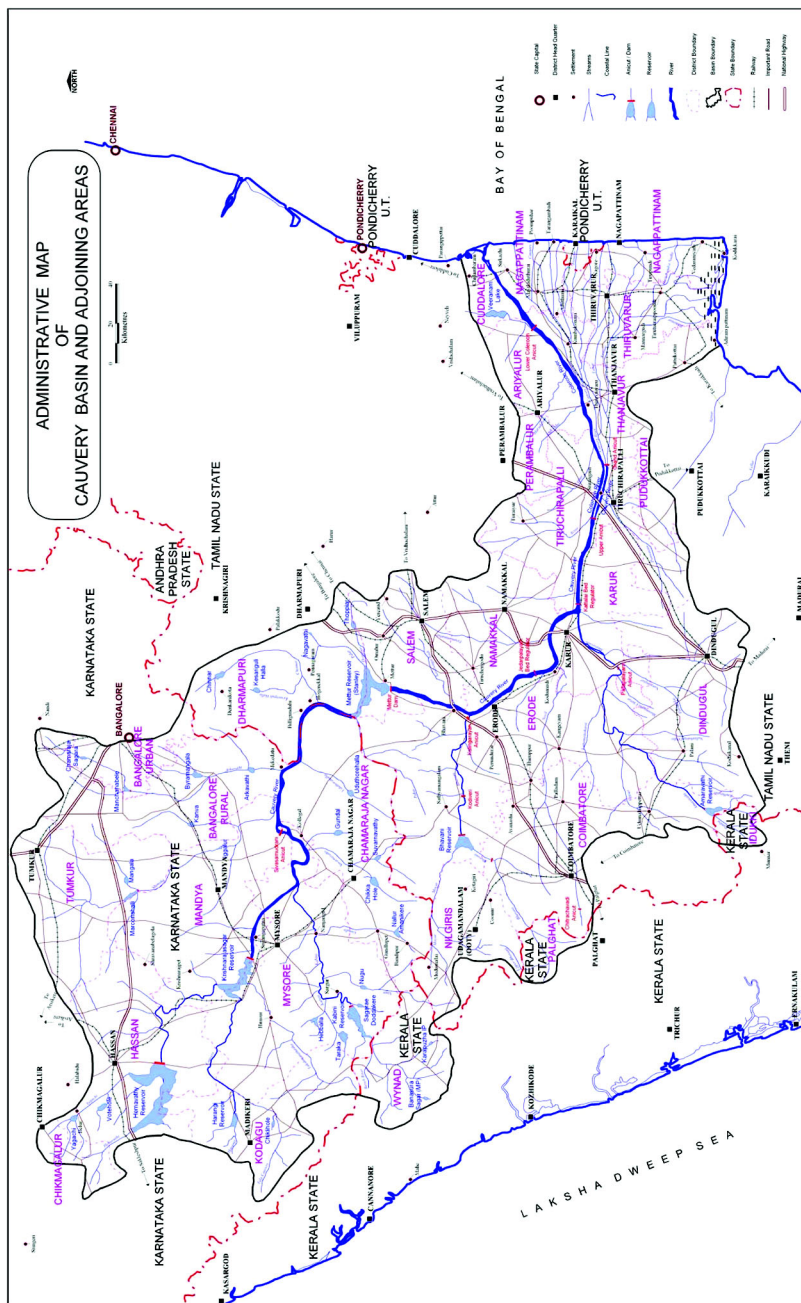
There was also a strong consensus to explore other alternatives to water usage. Desalination of sea water near Chennai was suggested as one way of meeting the city's burgeoning water demand. Reuse of water polluted through domestic and industrial usage was strongly urged by a few participants to meet the growing urban demand for water. The conjunctive use of ground water along with surface water was also urged. Need for better efficiency in terms of irrigation water usage was suggested as a way of minimization of the usage of a scarce resource. Better utilization of already created potential in terms reservoir capacity was also suggested.

Therefore, a consensus seemed to emerge that the reasons for conflicts though supply driven have solutions primarily in the

demand side. Better demand side management clearly emerged as a potential strategy for reducing the pressure on this scarce resource. But what should not be forgotten is that all such decisions are embedded in institutional systems and reforms in these systems are key to any step forward in the efficient and equitable management of inter-state river waters.



Participants of the Dialogue in a Group Photo at NIAS



Annexure I: Map of the Cauvery Basin (Courtesy the Report of the Cauvery Tribunal Award)

Annexure II : List of Participants

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