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Inter State Water Disputes in India: Institutions and Policies*

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Abstract

In this paper we argue that Indian water-dispute settlement mechanisms are ambiguous and opaque. We distinguish analytically between situations where cooperation is possible, and situations of pure conflict, where the initial allocation of rights is at stake. In the latter case, a search for a negotiated solution may be futile, and quick movement to arbitration or adjudication may be more efficient. However, in India, the process is slow, and effectively binding arbitration does not exist. The entanglement of inter-state water disputes with more general center-state conflicts and political issues compounds problems. We argue that these impacts can be reduced by a more efficient design of mechanisms for negotiating inter-state water disputes: some of the possibilities include a national water commission independent of daily political pressures, a federated structure incorporating river basin authorities and water user associations, and fixed time periods for negotiation and adjudication.

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1. Introduction

Because large areas of India are relatively arid, mechanisms for allocating scarce water are critically important to the welfare of the country's citizens. Water contributes to welfare in several ways: health (e.g. clean drinking water), agriculture (e.g., irrigation), and industry (e.g., hydroelectric power). Because India is a federal democracy, and because rivers cross state boundaries, constructing efficient and equitable mechanisms for allocating river flows has long been an important legal and constitutional issue. Numerous inter-state river-water disputes have erupted since independence. A recent dispute over use of the Yamuna River among the states of Delhi, Haryana and Uttar Pradesh, was resolved by conferences involving three state Chief Ministers, as well as the central government. This approach was adopted only after prior intervention by the Supreme Court had failed. Not all disputes have happy endings, however: for example, the larger dispute between Karnataka and Tamil Nadu over the waters of the Cauvery rages on. Inter-state water disputes continue to fester. Such disputes are a persistent phenomenon in India.

Part of the difficulty is the plethora of actors and the complexity of the institutional environment within which the various parties reach (or fail to reach) agreement. Actors include state governments (which in turn must be decomposed into professional politicians, political parties, and interest groups), the national parliament, central ministries, the courts, and *ad hoc* water tribunals. These actors negotiate within a rich institutional setting. In general, river-water disputes have involved state and central politicians, as well as the courts and special tribunals and commissions set up to arbitrate disputes. Although fairly explicit constitutional provisions

govern inter-state river waters, it is unclear whether existing mechanisms for adjudicating interstate water disputes are efficient. Indeed, there is growing consensus that existing institutions are increasingly fail to generate outcomes which contribute to economic growth and national welfare. Our research seeks to determine which arrangements for conflict resolution are more effective (i.e., more likely to yield an acceptable outcome) and more efficient.

The Economics of Water It is widely recognized that water has a number of features that create potential market failure. These may include non-rivalry, non-excludability, externalities, merit good features, and significant transactions costs. The presence of these factors means that although increased reliance on market forces (e.g., one state selling water to another) can contribute significantly to resolving water issues, there is no escaping from the need for parties to agree upon a set of rules, an enforcement mechanism, and a prior distribution of property rights. Property rights have been claimed on the basis of historical use, as well as on the basis of the "Harmon Doctrine", that "what falls on our roof is ours to use, without regard to any potential harm to downstream parties". Historical use can work against trading water rights, while the Harmon doctrine ignores externalities as well as past investments connected with water use. A third approach, that of the social contract *a la* Thomas Hobbes, holds more promise. A deal must be struck among the existing decision-making entities, such as Indian states, which 1) decides on an initial allocation of property rights and 2) creates a mechanism to trade these rights, to regulate uses that generate externalities, etc. Consequently, institutions that support efficient bargaining and can enforce binding agreements are essential.

The obvious starting point for thinking about bargaining over water is the Coasian perspective (Coase, 1960). Coase's ideal bargaining solution provides a benchmark against which one can compare reality. The main lesson of Coase is that one should not presume that central intervention is desirable or necessary in inter-state water disputes. However, there are situations in which bilateral or multilateral bargaining among concerned state governments may not be efficient or equitable on its own. One example is that the center can affect starting positions or threat points in the bargaining game between states. Another is that, when there is incomplete information, even imperfect central intervention can be better in expected terms than bilateral bargaining. A third case is when there are multiple issues to be bargained over, that may also involve spillovers to non-riparian states: the Punjab-Haryana dispute is an example of such a situation.

India's Federal Water Institutions The relevant provisions of the Indian Constitution are

- Entry 17 in the State List,
- Entry 56 in the Union List, and
- Article 262.

The first provision makes water a state subject, but qualified by Entry 56 in the Union List, which states: "Regulation and development of inter-state rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by parliament by law to be expedient in the public interest." Article 262 explicitly grants parliament the right to

legislate over the matters in Entry 56, and also gives it primacy over the Supreme Court. As documented by Iyer (1994), parliament has not made much use of Entry 56. Various River Authorities have been proposed, but not legislated or established as bodies vested with powers of management. Instead, river boards with only advisory powers have been created.

Hence, the state governments dominate the allocation of river waters. Since rivers cross state boundaries, disputes are inevitable. The Inter-State Water Disputes Act of 1956 was legislated to deal with conflicts, and included provisions for the establishment of tribunals to adjudicate where direct negotiations have failed. However, states have sometimes refused to accept the decisions of tribunals. Therefore, arbitration is not binding. Significantly, the courts have also been ignored on occasion. Finally, the center has sometimes intervened directly as well, but in the most intractable cases, such as the sharing of the Ravi-Beas waters among Haryana, Jammu and Kashmir, Rajasthan, and Punjab, central intervention, too, has been unsuccessful.

In summary, an unambiguous institutional mechanism for settling inter-state water disputes does not exist. Nevertheless, water disputes are sometimes settled. Economic analysis is necessary to illuminate whether and how water disputes get resolved in India.

2. India's Experience

The Inter-State Water Disputes Act seems to provide fairly clear procedures for handling disputes. At the same time, however, the law permits considerable discretion, and different disputes have followed diverse paths to settlement, or in a few cases, continued disagreement. In this section, we discuss some of the major disputes.

The central government has given substantial attention to water disputes, which began to emerge soon after the framing of the Constitution. Some common features of the easily settled disputes involved sharing costs and benefits of specific projects, or relatively specific disagreements over smaller rivers, mostly over well-defined projects or project proposals. Most settled disputes were characterized by specificity and well-defined technical and cost issues. Other disputes took much longer to resolve, and some remain unsettled.

While smaller, more specific disputes may be settled more easily, this may still not be ideal. In particular, while river basins seem the natural unit for dealing with issues of water sharing, investment and management, they have been the focus of conflict rather than cooperation in the Indian case. As noted in the introduction, the Indian Parliament has not made much use of the powers vested in it by Entry 56 of the Union List. No river board has been set up under this Act.

With regard to water projects, India has often adopted project models used by other countries for its own execution. The Damodar Valley Corporation was modeled on the Tennessee Valley Authority of the USA. After its creation, tensions and conflicts developed between the corporation and the participating governments, which hampered its work. So it never became an autonomous regional river valley development corporation. This lack of clear delegation of authority, away from politicians, is another theme to which we shall return.

In order to give a better flavor for the nature of the bargaining process, we briefly discuss three cases:

(1) The Krishna-Godavari water dispute

(2) The Cauvery water dispute

(3) The Ravi-Beas water dispute

These cases involve important disputes, and illustrate well the variety of paths that disputes can take in the Indian institutional context. In the first case, relative success was achieved through negotiations and through the working of a tribunal. In the other two cases, the institutional process has been relatively less successful: while these two disputes have both gone to tribunals, neither one has yet been successfully resolved. The Cauvery Tribunal is still deliberating, while the Ravi-Beas Tribunal gave its judgment, but it was not made official by the central government.

Krishna-Godavari water dispute The Krishna-Godavari water dispute among Maharashtra, Karnataka, Andhra Pradesh (AP), Madhya Pradesh (MP), and Orissa could not be resolved through negotiations. Here Karnataka and Andhra Pradesh are the lower riparian states on the river Krishna, and Maharashtra is the upper riparian state. The dispute was mainly about the inter-state utilization of untapped surplus water.

The Krishna Tribunal reached its decision in 1973, and the award was published in 1976. The Tribunal relied on the principle of “equitable apportionment” for the actual allocation of the water. It addressed three issues:

(1) The extent to which the existing uses should be protected as opposed to future or contemplated uses.

(2) Diversion of water to another watershed.

(3) Rules governing the preferential uses of water.

The Tribunal's rulings were as follows:

- On the first issue, the Tribunal concluded that projects that were in operation or under consideration as in September 1960 should be preferred to contemplated uses and should be protected. The Tribunal also judged that except by special consent of the parties, a project committed after 1960 should not be entitled to any priority over contemplated uses.
- On the second issue, the Tribunal concluded that diversion of Krishna waters to another waterline was legal when the water was diverted to areas outside the river basin but within the political boundaries of the riparian states. It was silent regarding the diversion of water to areas of non-riparian states.
- On the third issue the Tribunal specified that all existing uses based on diversion of water outside the basin would receive protection.

The Godavari Tribunal commenced hearings in January 1974, after making its award for the Krishna case. It gave its final award in 1979, but meanwhile the states continued negotiations among themselves, and reached agreements on all disputed issues. Hence the Tribunal was merely required to endorse these agreements in its award. Unlike in the case of other tribunals, there was no quantification of flows, or quantitative division of these flows: the states divided up the area into sub-basins, and allocated flows from these sub-basins to individual states – this was similar in approach to the successful Indus agreement between India and Pakistan. Another difference was that the agreement was not subject to review, becoming in effect, perpetually valid.

The Cauvery dispute The core of the Cauvery dispute relates to the re-sharing of waters that are already being fully utilized. Here the two parties to the dispute are Karnataka (old Mysore) and Tamil Nadu (the old Madras Presidency). Between 1968 and 1990, 26 meetings were held at the ministerial level but no consensus could be reached. The Cauvery Water Dispute tribunal was constituted on June 2, 1990 under the ISWD Act, 1956.

There has been a basic difference between Tamil Nadu on the one hand and the central government and Karnataka on the other in their approach towards sharing of Cauvery waters. The government of Tamil Nadu argued that since Karnataka was constructing the Kabini, Hemavathi, Harangi, Swarnavathi dams on the river Cauvery and was expanding the *ayacuts* (irrigation works), Karnataka was unilaterally diminishing the supply of waters to Tamil Nadu, and adversely affect the prescriptive rights of the already acquired and existing *ayacuts*. The government of Tamil Nadu also maintained that the Karnataka government had failed to implement the terms of the 1892 and 1924 Agreements relating to the use, distribution and control of the Cauvery waters. Tamil Nadu asserts that the entitlements of the 1924 Agreement are permanent. Only those clauses that deal with utilization of surplus water for further extension of irrigation in Karnataka and Tamil Nadu, beyond what was contemplated in the 1924 Agreement can be changed. In contrast, Karnataka questions the validity of the 1924 Agreement. According to the Karnataka government, the Cauvery water issue must be viewed from an angle that emphasizes equity and regional balance in future sharing arrangements.

There are several reasons why the negotiations of 1968-1990 failed to bring about a consensus.

1) There was a divergence of interest between Karnataka and Tamil Nadu on the question of pursuing negotiations. Karnataka was interested in prolonging the negotiations and thwarting the reference to a tribunal, in order to gain time to complete its new projects.

2) The Cauvery issue became intensely politicized in the 1970s and 1980s. The respective governments in the two states were run by different political parties. Active bipartisan politics in both states made an ultimate solution more difficult.

3) Between 1968 and 1990, there were three chief ministers in Karnataka belonging to three different political parties, while in Tamil Nadu, there were four chief ministers belonging to two parties. There were two long periods of President's Rule in Tamil Nadu. At the center, there were six changes of Prime Minister, spanning four political parties and eight different Union Ministers of irrigation. So, consecutive occasions when the same set of ministers from the same state and the center met were rare.

4) The ministerial meetings were held at regular intervals, but no attempt was made to generate technical options to the sharing of Cauvery waters. Expert engineers were not able to work together for a common solution; rather they got involved in party politics.

The Ravi-Beas dispute Punjab and Haryana, the main current parties in this dispute, are both agricultural surplus states, providing large quantities of grain for the rest of India. Because of the scarcity and uncertainty of rainfall, irrigation is the mainstay of agriculture. An initial agreement

on the sharing of the waters of the Ravi and Beas after partition was reached in 1955, through an inter-state meeting convened by the central government.

The present dispute between Punjab and Haryana about Ravi-Beas water started with the reorganization of Punjab in November 1966, when Punjab and Haryana were carved out as successor states of erstwhile Punjab. The four perennial rivers, Ravi, Beas, Sutlej and Yamuna flow through both these states, which are heavily dependent on irrigated agriculture in this arid area. Irrigation became increasingly important in the late 1960s with the introduction and widespread adoption of high yielding varieties of wheat.

As a result of the protests by Punjab against the 1976 agreement allocating water from Ravi-Beas, further discussions were conducted (now including Rajasthan as well), and a new agreement was accepted in 1981. This agreement, reached by a state government allied to the central government, became a source of continued protest by the political opposition, and lobbies outside the formal political process. Punjab entered a period of great strife, and a complex chain of events led to the constitution of a tribunal to examine the Ravi-Beas issue in 1986. Both states sought clarifications of aspects of the award by this tribunal, but the center has not provided these. Hence, the award has not been notified, and does not have the status yet of a final, binding decision.

3. Bargaining and Investment

When the essential problem faced by states or groups within a state is that the initial allocation of water is suboptimal due to changing circumstances, cooperative bargaining will lead

to an optimal allocation. The outcome of bargaining is not necessarily the same as the outcome of market trading of water, but the existence of competitive markets may require more stringent conditions to be satisfied, as Coase (1960) pointed out. A bargaining solution will depend on threat points or disagreement payoffs. With multiple layers of decision-makers, bargaining may have to occur at different levels: states bargain with each other, and groups within a state also bargain. It is possible in some cases to reach the same outcome regardless of the sequencing of the bargaining Richards and Singh, 1997).

A significant complication is that the productivity of a given quantity of water depends on the level of complementary investments. These may be dams, irrigation projects, or even more general complementary investments in agriculture. The first thing to note is that as long as the benefit from a given amount of water is dependent on the amount of investment, it implies that the optimal allocation of water depends on the investments in *both* states. Hence, even though there are no direct externalities as a result of the investment, the conditional optimum of water allocation involves a linkage of both states. What state A does with its investment will affect the optimal amount of water that state B should receive.

Now suppose that both investments and the allocation of water are the subject of inter-state negotiations. The outcome of the negotiations will include a joint agreement on the allocation of water between the states, as well as a joint agreement on the levels of investment within the two states. This part of the outcome will be invariant to the specific form of the negotiations, as long as the cooperation on both dimensions is possible. While investments such as dams may plausibly be the subject of inter-state negotiation, it is less likely that states are

willing or able to negotiate broadly over general investments that affect the utility or productivity of water in the state economy. If investments are chosen noncooperatively, externalities and strategic considerations both create nonoptimalities.

The strategic motive for investment to affect subsequent bargaining implies that there is a strong case for avoiding delays in negotiations and agreements, as well as for making agreements permanent, or not subject to review, provided that the information is available is relatively complete. This will tend to force efficient investments. Unforeseen changes in costs and benefits can then be dealt with by trading water, rather than reallocating quantities *de novo*.

4. Property Rights, Politics and Information

One can view much of the conflict or disagreement over inter-state river waters in India as an attempt to influence or determine the initial allocation of property rights over water, by methods such as lobbying. The initial quantities of water are not given, but are precisely the main subject of negotiations. In many cases, there is some *de facto* allocation of rights based on historical usage, but there is a surplus of currently unutilized water that can be used (often only if appropriate investments are made) once it is unambiguously allocated. It is important to recognize that in such cases, the situation is one of pure conflict: more for one party means less for another when there is a given total amount of the resource. It is conceptually important to separate out this sort of situation, therefore, from one where initial property rights are well defined, and cooperation is potentially feasible. In particular, there is no presumption that negotiation among the parties attempting to share water from a particular river basin will lead to an agreement, and there is a clear

role for a higher-level authority. Thus the suggestion by some analysts of Indian cases that tribunals or courts create an adversarial situation seems to miss the point: tribunals become necessary when the situation is inherently adversarial.

Consider the case of a tribunal allocating initial rights to water. From one perspective, the case of a tribunal is not that different from a political lobbying model. States expend effort to influence the tribunal, which makes its award accordingly. The difference is in the nature of the states' efforts, the public nature of the process, and the objective function of the tribunal. It is the differing nature of accountability and transparency that distinguishes the use of a tribunal.

Political objectives Models of lobbying implicitly include some political considerations for the center, beyond maximizing the joint welfare of the two parties to the dispute. It is possible to incorporate such objectives, as well as self-interested behavior, more explicitly. Rather than the rather passive role assigned to the center in the standard rent-seeking model, we can think of it having its own objective function, and bargaining with the two states: the states have political support to offer the center, in return for a favorable decision on the water issue. This seems to be a key feature of the Indian institutions for settling interstate water disputes.

Clearly, each state will prefer the process--political negotiations or a tribunal--that will favor it. There is no guarantee that the states will have unanimous preferences in this regard. Thus, while each mechanism is designed to overcome the problem of resolving conflict in the absence of property rights, the presence of alternative mechanisms raises the problem of conflict over which mechanism to use. The problem is simply pushed back one step further, and delays occur. Of

course, in India it is specified that if negotiations fail, a tribunal must be appointed. However, this is done at the discretion of the center and, in the above situation, the center would actually prefer a political solution, where it barters an award for political support. Reducing discretion, such as specifying short time limits for negotiation, with a tribunal to take over thereafter, is essential in such a situation. Such a recommendation is an old one: our analysis helps to make a more formal and transparent case for it.

The above framework can be used to analyze some additional problems with the political bargaining case, even in the absence of a tribunal as an alternative. These problems arise due to the uncertainty of political regimes (Richards and Singh, 1996). While water agreements are typically very long term, or should be, to permit efficient investments, governments change every few years. The relative value of political support from the two states becomes an important parameter, since one of the states may prefer to postpone the agreement.

Incomplete information. An important issue in water negotiations in practice may be that each party has private information. There are potentially two kinds of information: technical and subjective. In principle, technical information may be shared and verified, but in practice this can be an arduous task, as the lengthy proceedings of Indian water tribunals seem to indicate. Estimates of costs and benefits in general, as they enter the utility functions privately and subjectively, may not be objectively verifiable. This complicates matters further.

5. Water and Indian Federalism

State governments dominate the allocation of river waters. Since rivers cross state boundaries, disputes are inevitable. The Inter-State Water Disputes Act of 1956 was legislated to deal with conflicts, and included provisions for the establishment of tribunals to adjudicate where direct negotiations have failed. However, states have sometimes refused to accept the decisions of tribunals. Therefore, arbitration is not binding. Significantly, the courts have also been ignored on occasion. Finally, the center has sometimes intervened directly as well, but in the most intractable cases, such as the sharing of the Ravi-Beas waters among Haryana, Jammu and Kashmir, Rajasthan, and Punjab, central intervention, too, has been unsuccessful. An unambiguous institutional mechanism for settling inter-state water disputes does not exist. On the other hand, water disputes are sometimes settled. Economic analysis is necessary to illuminate whether and how water disputes get resolved in India.

The main features of India's legislation with respect to the inter-state allocation of water were reviewed in section 1. In section 2, we examined how disputes had progressed in practice, including some case studies. Some of the problems with dispute resolution in these cases were illuminated by the analytical discussion in sections 3 and 4. However, before turning to our conclusions, it is useful to discuss the issue of water disputes in the larger context of Indian federalism. The issue of inter-state water allocation, while it involves special legal and technical features, has been clouded by some of the general problems of Indian federalism. We consider these issues here, but also will suggest that the subject is specific enough for more effective institutions to be developed, without getting bogged down in the more general difficulties. Of

course, inter-state river water disputes in India have long been recognized as an important federal issue. The Sarkaria Commission on center-state relations (Government of India, 1988) devoted an entire chapter to the problem, and made a series of recommendations. We close this section with a review of the commission's analysis, and our additional perspectives.

India has been characterized as having a "quasi-federal" structure, because of the large degree of central discretion and control permitted by the constitution. The main illustrations of this are the power of the central government over state governments through dismissals and the appointment of politically motivated state governors, and the central government's greater command over resources, relative to expenditures (resulting in a "vertical fiscal imbalance"). While the former problem may be inherent, to some extent, in a parliamentary system with a strong executive-style parliamentary leader, fiscal federalism in India has been enhanced by a particular institutional structure, namely, the central Finance Commission. This body has provided a rule-bound or formulaic mechanism for sharing of revenues between the center and the states. Even though it has only advisory status, and has also been subject to political influence, it has established precedents, and conducted itself relatively independently of everyday political considerations. To the extent that the center is bound by such rules, such an institution reduces the control of the center over the states.

From a federal perspective, a key feature of India's Constitution is the existence of separate lists demarcating central (the Union List) and state responsibilities. This demarcation creates a broad framework of assignment of expenditure responsibilities, an essential feature of a federalist system. With respect to water, it has been extensively pointed out that water is in the

State List of the Constitution (Entry 17), but that the entry there is qualified, "subject to the provisions of Entry 56 of List I" (the Union List).

Essentially, Indian federalism, while marked by a relatively powerful center, has consistently involved coalition building to create such a center. This has meant a high level of explicit or implicit "horse-trading" among the center and states that are potentially key elements of a central coalition. One possible interpretation, therefore, is that the center wishes to preserve a system which allows it flexibility or discretion in bargaining over center-state issues in general, with water being one of them. A related feature of Indian political economy is the problem of multiple vetoes (Bardhan, 1984), which would help explain why, with discretion preserved, it may not be used decisively. This, too, seems relevant to the case of water, where negotiations have dragged on, and where the central government has sometimes prolonged them, by failing to speedily appoint a tribunal, even when asked.

In the context of the above analysis, we next discuss the institutions that have, in fact, been created since 1980. The central ministry of irrigation published a document that year, outlining a proposed study of India's national water resources (Government of India, Ministry of Irrigation, 1980). This led to the formation of the National Water Development Agency (NWDA) in July 1982, to "carry out the water balance and other studies...for optimum utilization of water resources..." (National Water Development Agency, 1992). This agency is a Government of India Society in the Ministry of Water Resources, and not a body with any statutory backing. Furthermore, its scope is technical, and separate from the institutional realities of water allocation. In 1983, the National Water Resources Council (NWRC) was created by a central

government resolution. Its composition includes chief ministers of states, lieutenant governors of union territories, several central government ministers, and the prime minister as chairman. This group met first in October 1985, and adopted a National Water Policy in 1987. This policy emphasizes an integrated and environmentally sound basis for developing national water resources, but provides no specific recommendations for institutions to achieve this. Though the council was created out of disenchantment with the adjudicatory process for inter-state river disputes, it has not provided concrete proposals to improve that process, nor has it provided the useful alternative that was hoped for, as the persistence of the Ravi-Beas and Cauvery disputes indicates. Our discussion and analysis above indicates that this should not be a surprise. The NWRC does not meet any of the required criteria required: it does not provide specific mechanisms for dispute resolution, it does not delegate sideways to achieve commitment possibilities, and it does not have any statutory force. While it may provide a useful talking shop for long range planning and information exchange, its usefulness otherwise has been limited

We finally turn to the issue of enforcement of tribunal awards. This issue was given some attention by the Sarkaria Commission. It noted that section 6 of the ISWD act of 1956 provides that

> the Union Government shall publish the decision of the Tribunal in the Official Gazette and the decision shall be final and binding on the parties to the dispute and shall be given effect by them. (Government of India, 1988, Chapter 17.4.18, p. 491)

The commission's report goes on to suggest that the center cannot enforce the tribunal award if a state government refuses to implement the award. It notes that the amendment of the act in 1980, inserting section 6A, which provides for an agency to implement a tribunal award, is not sufficient because such an agency cannot function without the cooperation of the states concerned. The Sarkaria Commission's recommendation is, therefore, that a water tribunal's award

> should have the same force and sanction behind it as an order or decree of the Supreme Court. We recommend that the Act should be suitably amended for this purpose. (Government of India, 1988, Chapter 17.4.19, p. 491)

This has not been done, but it should be noted that water tribunals already have such court-equivalent powers for a narrow range of issues, including gathering of information, requiring witnesses to testify, and recovering the costs of the tribunal (Section 9 of the ISWD Act, reproduced in Ramana, 1992, p. 60). Furthermore, the ISWD Act, Section 11 states that

> Notwithstanding anything contained in any other law, neither the Supreme Court nor any other court shall have or exercise jurisdiction in respect of any water dispute which may be referred to a Tribunal under this Act. (Ramana, 1992, p. 90)

One possible interpretation of this provision is that it does implicitly give water tribunals broadly an equivalent status to the Supreme Court, and their decisions must have the same force. Hence the center can theoretically deal with a recalcitrant state by dismissing the state government. However, this penalty, the only one seemingly available, is so great that it is hard to imagine its being used solely for a water dispute, although it has been used extensively under other pretexts.

Once again, the resolution of water disputes is complicated by being tangled in the general difficulties of center-state federal issues. Thus the recommendation to amend the act might not get to the crux of the problem.

The Sarkaria Commission's other recommendations were based on the same kinds of difficulties in resolving past disputes as have been described in this paper. Two recommendations related to placing time limits on constituting tribunals and having them deliver decisions. These merely echoed the recommendations of the Administrative Reforms Commission (1969, Chapter V) nearly 20 years before. Another recommendation was that the center could appoint a tribunal without being asked to do so by a state government. A final recommendation was for the establishment of a national level data bank and information system. None of these recommendations has been carried out. However, we would like to suggest that this failure partly reflects the fundamental nature of the problem, that water issues are tangled with broader difficulties in the federal structure. The solution, while including all the above recommendations, must include the creation of a quasi-independent hierarchy of institutions to manage the allocation of water. This will insulate the process from political uncertainties, and permit a greater degree of commitment and cooperation. The central point to be emphasized is that appropriate institutions can play a vital role in shaping and constraining the incentives of the actors in inter-state water allocation. We expand on this in our final section.

6. Recommendations

In this section we summarize some of the salient issues, the implications of our analysis, and recommendations. While our focus is on institutions for the resolution of inter-state water disputes, our analysis and recommendations carry over more broadly to issues of water allocation more generally, and we discuss this briefly, also.

Dispute settlement procedures Constitutionally and legislatively, Indian inter-state river dispute settlement procedures involve either of two processes: negotiations and compulsory legal adjudication. Furthermore, there is room for voluntary processes such as mediation, conciliation and voluntary arbitration, often by the prime minister or other members of the central government. Such processes do not foreclose arbitration or adjudication on specific areas of conflicts that remain unresolved after mediation and conciliation. Guhan (1993) suggests that mediation and conciliation do not have enough scope in resolving water disputes, and that "adjudication inevitably leads to adversarial positions and maximal claims" (Iyer, 1994b, p. 195). Iyer observes that this criticism of adjudication misses the point, since the difficulty of reaching an agreement may be structural, and assisted negotiations (that is, conciliation and mediation by a third party) may be as problematic as unassisted negotiations. He emphasizes the importance of goodwill, and willingness to accept an "objective settlement", but does not really come to grips with the structural issues. We emphasize the difference between situations where property rights are well defined (possibly *de facto* rather than by formal legal mechanisms), and situations where the dispute is over the property rights themselves. In the former case, there is room for a

mutually beneficial exchange, and one can think of several different ways of implementing or facilitating a cooperative outcome through bargaining, which also incorporate some elements of fairness, a major component of "objective settlements". On the other hand, legal adjudication under the ISWD Act, is a non-voluntary imposed procedure, but it, or some similar externally imposed procedure, may be necessary in situations where the dispute is conflictual in nature, and not over sharing the potential gains of a mutually beneficial exchange. The real issue in such cases is setting up adjudicatory processes or institutions that all parties can agree *ex ante* to be bound by *ex post*; in these cases, focusing on voluntary negotiations may be somewhat misguided.

A key insight of our analysis and discussion is that the existing processes and institutions for resolving inter-state river disputes are not sufficiently well defined or definite. There are too many options, and there is too much discretion at too many stages of the process. Since water is being more and more fully utilized, the possibility of disputes of the conflictual nature arising increases. It is therefore crucial that the dispute resolution mechanism be better defined, in terms of the order of the steps to be taken. Of course, parties to a negotiation can continue to bargain in such cases, and even reach an agreement, as has happened in the case of the Godavari dispute. In fact, the existence of an expected outcome from adjudication may provide a somewhat definite disagreement point, and help to convert a conflictual situation to one of bargaining over (expected) mutual gains. Given this option, a possible recommendation would be the automatic and immediate referral of any dispute to a tribunal if requested by the center or any party to the

dispute, with the tribunal bound to ratify any agreement reached by negotiation before it had delivered its decision.

Delays Extreme delays have been a very costly feature of the process of resolving inter-state water disputes in India. There have been three components or dimensions of delay.

1) There has been extreme delay in constituting tribunals. Under Section 4 of the ISWD Act, the Union government is required to set up a tribunal only when it is satisfied that the dispute cannot be settled by negotiations. The center can thus indefinitely withhold the decision to set up a tribunal on the ground that it is not yet satisfied that negotiations have failed. Examples of delay include all the major disputes. The Narmada Tribunal was constituted in 1969 while Gujarat had lodged a complaint in 1968 but the dispute itself dates back to 1963. The Godavari and Krishna disputes started around 1956. The states began formal requests for reference from 1962 onwards. Ultimately the Godavari and Krishna disputes were referred to tribunals in 1969. In the case of Cauvery dispute, two of the basin states, Tamil Nadu and Kerala had asked for reference to a tribunal back in the 1970s. The tribunal was constituted only in 1990, after the Supreme Court mediated.

2) Tribunals have taken long periods of time to give their awards. It took nine years from reference in the case of the Narmada Tribunal, four years in the case of the Krishna Tribunal and ten years in the case of the Godavari Tribunal. Such delays may be attributed to two factors: first, the time taken for assembling facts and hearing arguments and second, abortive attempts to bring about solutions at a political level, which delayed the functioning of constituted tribunals.

3) There have been delays in notifying the orders of tribunals in the Government of India's official gazette; this has resulted in delays and uncertainty in enforcement. The process took three years in the case of the Krishna Award and one year in the case of the Godavari Award. These delays naturally tend to complicate the dispute settlement process.

The kinds of recommendations with respect to delays are old ones, going back to the Administrative Reforms Commission report of 1969, and repeated by the Sarkaria Commission in 1988. To reduce delays, the center as well as any state that is involved in a dispute should be able to request adjudication. The process of adjudication should began within a prescribed time (for example, six months or one year) and conclude within a prescribed time (for example, three or five years). Unlike the Sarkaria Commission, we would not recommend an escape clause, whereby a tribunal could ask for an extension. While there can be no absolute guarantee that a tribunal will reach a decision in the prescribed time, making it easy to extend the time seems self-defeating.

It is worth noting that delays can be extremely costly. They can result in beneficial projects being delayed (the World Bank, for example, has declined to fund projects related to disputed river basins), and it can lead to inefficient investments being undertaken. This problem can arise even when property rights are not the issue, and bargaining parties use this to strengthen their bargaining positions: this was discussed in section 3. The problem is compounded when the initial rights are themselves contested. This seems to have characterized some of the actions taken by Karnataka in the Cauvery dispute, for example. The issue of investment related to water

use will become more and more important as the Indian economy continues to grow, and delays will become increasingly damaging, highlighting the importance of dealing with this issue.

Enforcement We noted the problem of enforcement in section 5. State governments have sometimes rejected tribunal awards, as in the case of Ravi-Beas Tribunal and the Punjab government. In this case, the central government avoided notifying the tribunal's award, to prevent further deterioration of the conflictual political situation in Punjab. In the case of the Cauvery dispute, the Karnataka government sought to nullify the tribunal's interim order through an ordinance. Though the Supreme Court pronounced that the ordinance was unconstitutional, the Karnataka government showed no inclination to implement the tribunal's interim order, until a compromise was reached through political negotiations behind closed doors. The Sarkaria Commission was of the view that in order to make tribunal awards binding and effectively enforceable, the ISWD Act should be amended to give these awards the same sanction as an order or decree of the Supreme Court. However, as noted in section 5, tribunals seem to have this force in theory: the problem is of penalties to be imposed for noncompliance. We suggested that the solution would require decoupling water disputes from more general problems of Indian federalism and center-state relations. This brings us to a discussion of alternative institutions.

Institutions Current institutions do not do a good job of resolving inter-state water disputes. To some extent, the lack of well-defined procedures, the endemic delays and the weak enforcement of decisions are all linked to a deficiency in the design of the relevant institutions. A key feature

of this deficiency is the subsuming of inter-state water disputes into the general political process. In India, federalism, and perhaps the political economy in general, has been characterized by an over-reliance on discretionary allocation; high influence costs have followed. The pattern of inter-state water disputes is a prime example of this problem. The solution we propose is the creation of specialized permanent institutions to regulate the allocation of water across states, including the resolution of water disputes. These institutions would themselves respect the federal structure of the country, as we will elaborate below, but will have a greater degree of independence and transparency than the current situation. The idea of such institutions is not far-fetched. The Finance Commission has done a relatively good job of handling central-state financial transfers, including making allocations across states according to public and rational criteria. This mechanism is in the process of being extended to the level of state-local transfers (Singh, 1997). Other examples of such sideways delegation are the creation of an independent body to regulate financial markets, and the operation of a relatively independent central bank. In such cases, the government gives up some of its direct powers as a way of precommitting itself, and insulating certain types of decisions from political pressures. While these examples all involve financial issues, whereas water is a physical resource, water is also an economic asset that can be allocated according to rational principles. Our analysis in sections 3 through 5 suggests that the process of resolving inter-state water disputes, and of allocating water more generally, has been made inefficient by being entangled in more general political issues, including the nature of Indian federalism in general. This inefficiency is the central concern.

The kind of institutions we propose would incorporate the specific recommendations to clarify and streamline procedures, reduce delays, and improve enforcement that have been made above and by numerous others. However, they would be quite different from the NWRC, which is very much a political creature. A possible guide for specifics of organization is the Murray River Commission (MRC) in Australia, where the states and the central government have equal representation, and each state typically has drawn its representative from a major rural water management authority, while the central representative is a senior civil servant[1]. This is not to suggest that the MRC is a perfect model. However, a permanent institution, with rotating membership weighted towards technically knowledgeable administrators, seems a feasible improvement over the current situation.

It is, of course, important to keep in mind that the MRC is a single river basin management authority. We are proposing at the national level an institution that will provide an umbrella for actual river boards or river basin authorities. The legislative framework for such bodies exists, of course, but, as discussed above, it has not been effectively used. Even when such entities have been proposed or created, they have not functioned well. The problem, again, has been the concern of state governments that they would be ceding too much power to such bodies, and, indirectly, ceding control of their water resources to the center. The solution we propose would uniformly remove a set of decisions with respect to water sharing and use from the general political orbit, without tilting power towards the center. It should, therefore, be easier for states to accept. Thus, we envisage a hierarchy of water management institutions, with river basin authorities being the next step down from the national commission. One can then think of

[1] See the articles by David Constable and John Paterson in Eaton (1992).

membership at the national level being drawn from experienced members of individual river board authorities.

The idea of developing a hierarchy of specialized water management associations is not new, but the main discussion of this has come in the context of local water user associations, and federations of such associations. Several different models of such federations exist[2]. We can think of state and national level institutions as linking up and continuing this kind of hierarchical, federated structure. Ultimately, water allocation will be efficient only if decision-making is responsive to the end users. Furthermore, it is important to emphasize that detailed central planning will not succeed for water allocation any more than for other goods. The role of the institutions at the national and river basin levels is to provide mechanisms for dealing with conflicts associated with externalities, and lack of well-defined property rights, not to allocate water at the micro level. Finally, in any kind of hierarchy, the potential for influence activities and associated costs will exist: we are suggesting that these can be reduced by the creation of specialized institutions, with clearly defined limits of authority.

We envisage a national level water institution as incorporating the tasks of dispute resolution, perspective planning, and information gathering and maintenance. These tasks are currently scattered among tribunals, the NWRC and the NWDA. The last of these organizations seems to be particularly isolated and relatively unsupported. The advantages of integrating information collection and storage with long-range planning and dispute resolution seem manifest. One stumbling block will, of course, be the reluctance of ministries, including

politicians and bureaucrats, to give up power over decision-making[3]. It is here, perhaps, that ultimately goodwill, emphasized by several analysts of Indian river water disputes, will have to come into play. The possibility of significant, potentially positive institutional change in India is illustrated by recent legislation strengthening local governments. The allocation of water is another aspect of India's federal institutions that can be improved.

7. Conclusion

In summary, current Indian water-dispute settlement mechanisms are ambiguous and opaque. A cooperative bargaining framework suggests that water can be shared efficiently, with compensating transfers as necessary, if initial water rights are well-defined, and if institutions to facilitate and implement cooperative agreements are in place. Our analysis also emphasizes the role of complementary investments, and the need to expand the scope of bargaining to include these where feasible. Furthermore, delay in the dimension of agreement over water can encourage inefficient, non-cooperative investments in dams, irrigation, etc.

Additionally, we draw the distinction between situations where cooperation is possible, and situations where the initial allocation of rights is at stake, where consequently the parties face

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[2] See, in particular, Meinzen-Dick *et al* (1994), pp. 25-27. It is interesting to note that a recent study for the United States by Foster and Rogers (1988) makes somewhat similar institutional recommendations to the ones proposed here, including a national and regional councils for water resources policy.

[3] Currently, the Ministry of Water Resources is responsible for "overall planning, policy formulation, coordination and guidance in respect of the water resources sector as a whole", according to the National Water Policy of 1987 (quoted in Frederiksen, *et al*, 1993, p. 39). However, this Ministry is essentially the old Ministry of Irrigation, and it tends to focus on irrigation and flood control only. Other important functions are not directly under its control. An important organization, the Central Water Commission, has a Chairman with a rank equivalent to the seniormost bureaucrat in the Ministry, and acts directly as a technical adviser to the planning commission. Other organizations include the Central Groundwater Board, and the National Institute of Hydrology. Overall, there are competing voices, and sometimes-ambiguous lines of authority (Frederiksen, *et al*, 1993; Chitale, 1992; Rogers, 1992).

a situation of pure conflict rather than one of potential gains from trade. In the pure conflict situation, which seems very relevant for Indian inter-state disputes, a search for a negotiated solution may be futile, and quick movement to arbitration or adjudication may be more efficient. However, in the Indian case, not only is this process slow, but also effective binding arbitration does not exist. The threat point of no agreement has been the outcome in several major disputes (e.g., Cauvery; Ravi-Beas). This can result in inefficient levels of investment by the individual, non-agreeing states, generating a diversion of scarce investment resources, as well as inefficient use of the water itself. This in turn can have negative impacts on economic growth. The problems are compounded by the entanglement of inter-state water disputes with more general center-state conflicts, and with everyday political issues. We would argue that these impacts can be reduced by a more efficient design of mechanisms for negotiating inter-state water disputes. In Section 6, we have presented some of the possibilities, including a national water commission independent of daily political pressures, a federated structure incorporating river basin authorities and water user associations, and fixed time periods for negotiation and adjudication.

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