Contributing Paper

Dams on Transboundary Rivers

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Prepared for Thematic Review V.3:
River basins-institutional frameworks and management options

For further information see http://www.dams.org/

Transboundary River Basins:
Proposed Principles and Discussion Papers

Introduction

Development on waters which cross political boundaries have additional complexities brought on by strains in riparian relations and institutional limitations. Recent studies, particularly in the field of environmental security, have focused on the conflict potential of these international waters. Some stress the dangers of violence over international waters (see, for example, Gleick 1993, Homer-Dixon 1994, Remans 1995, Westing 1986, and Samson and Charrier 1997), while others argue more strongly for the possibilities and historic evidence of cooperation between co-riparians (see Libiszewski 1995, Wolf 1998, and Salman and de Chazournes 1998).

There are 261 international river basins in the world. In addition, there are a large number of rivers that cross provincial boundaries where the provinces play a significant role in water management. Associated with these rivers there are unresolved conflicts and growing concerns that these will expand and intensify in the coming decade. The issue of water allocation, storage and dams lie behind many of these conflicts. Much has been written on the subject in recent years, including the work of Green Cross International as part of the World Water Vision. The recommendations of Green Cross include a series of general water sharing principles and a call to acknowledge the basic supply of water as a human right. Beyond that it calls for renewed attention by international bodies and financiers. At the same time, the 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses is a long way from being ratified by all nations.

However, the fortunate corollary of water as an inducement to conflict is that water, by its very nature, tends to induce even hostile co-riparians to cooperate, even as disputes rage over other issues. In fact, the weight of historic evidence tends to favor water as a catalyst for cooperation: nations have signed 3,600 water-related treaties since AD 805, while, in the same period, there have been only seven minor international water-related skirmishes (Wolf 1998).[1]

At the 7th Commission meeting at Zevenwacht Estate, guidance for **further work by the Secretariat** was offered relating to dams in tranboundary basins:

- A one-page note on transboundary waters and sharing for the common good is to be prepared. The paper on shared waters should: (i) draw attention to the problems, (ii) indicate that shared waters need to be dealt with through agreements, (iii) indicate that dams intensify the tensions, and (iv) highlight the need for reciprocity (mutual interest) and enlightened self-interest to remove tension.

Based on this background, the WCD requested the consultants listed below to prepare discussion notes.

1. **Anthony Turton** - Head of the African Water Research Unit at the University of Pretoria, South Africa.
2. **Fiona Curtin** - Green Cross International in Geneva, Switzerland.
3. **Ramaswamy Iyer** - Former Water Resources Secretary and now with the Centre for Policy Research in New Delhi, India.
4. **Erik Mostert** - River Basin Authority Centre, Delft University of Technology, The Netherlands.
5. **Aaron Wolf** - Department of Geosciences at the Oregon State University, USA.
6. Additional articles attached - by Kalpana Sharma and an Editorial of the Kathmandu Post.

The Secretariat also approached Professor Stephen McCaffrey, Len Abrams and Miguel Nucete to contribute, but they were not available at the time of our request.

[1] The only "water war" between nations on record occurred over 4,500 years ago, between the city-states of Lagash and Umma in the Tigris-Euphrates basin (Cooper 1983).

Given the apparent gulf between aspiration and practice, the consultants were requested to prepare a short discussion note on the approach that could be taken by the WCD in formulating its recommendations relating to dams on international and inter-provincial rivers. The note had to identify the special constraints and opportunities offered by the planning and management of dam projects on transboundary rivers and propose practical policy principles for resolving conflicts (suitable for national governments and financing agencies). It also had to go beyond the current narrow focus of the water sector to include opportunities offered by other forms of co-operation. For example, building on the notion that all countries should be better off as a result of the intervention - as embodied in the Columbia Basin Treaty. Copies of their papers are provided in this compilation.

The authors responded to the terms of reference within the context of their organisations and expertise. The papers provided herewith therefore deal - to a greater or lesser extent - with the problem definition, obstacles to cooperation and proposed principles and strategies to deal with dams in transboundary basins. There also seems to be a convergence of the view that rivers should be managed from a basin perspective. The notion of the *equitable sharing of benefits (and costs)* deriving from water use is also often repeated, especially versus the concept of *water sharing per se.* Such shared goods and amenities include energy produced, fishing, transportation and navigation, investment funds, data/information systems as well as basin protection/conservation measures.

Sovereignity is recognised as the critical element and no state can claim jurisdiction over another. However, sovereignity should not be seen as a barrier to regional cooperation. Political will to recognise upper and lower riparians' *rights and development needs* as well as an equitable benefit sharing approach to transboundary basin management could prevent conflict and enhance cooperation. Third parties, such as funding institutions and other multi-lateral organisations could be particularly apt instruments to encourage such basin-wide cooperation.

From these papers to the WCD the following aspirational principles to deal with transboundary issues could be developed further:

1. **Recognise that relative power relationships**, including riparian position, determine how a conflict unfolds. A regional power which also has an upstream riparian position is in a greater situation to implement projects without consultation. Turkey and India have been in such positions on the Euphrates and the Ganges, respectively. In contrast, the development plans of an upstream riparian may be held in check by a downstream power as, for example, have Ethiopia's plans for Nile development by Egypt.

2. One productive approach to the development of transboundary waters has been to examine the benefits in the basin from a regional approach. This has regularly required the riparians to get past looking at the water as a commodity to be divided – a zero-sum, rights-based approach – and rather to develop an approach which equitably allocates not the water, but the benefits derived therefrom – a positive-sum, *integrative approach*. Increasingly, however, linkages are being made between water and politics, between water and other resources. These multi-resource linkages may offer more opportunities for creative solutions to be generated, allowing for greater economic efficiency through a **"basket" of benefits**. In view of this, the problem definition should not be kept narrow in scope, and in no cases should it be confined only to the basin level of analysis. If the latter case is allowed to persist, then the range of potential remedies is too small and limited, thereby perpetuating the conflict potential by allowing sovereignty to remain a stumbling block.

3. Water dispute amelioration is as important, more effective, and less costly, than conflict resolution. To this end, the existence of a **basin-wide agreement** that has been signed by all role-players should be encouraged, and can even be made a prerequisite for funding. **Basin commissions/organisations** should be developed for those basins that do not have them, and strengthened for those that do. The formulation of water-sharing treaties should embody the policy principles of the Commission - particularly those relating to public acceptance and sharing rivers.

4. Any treaty or agreement should include suitable provisions – consultations, conciliation, mediation, arbitration, adjudication, as may be agreed upon - for the resolution of differences and disputes. What may be feasible in a given case will be a function of the felt needs and the facts of geography on the one hand, and the state of political relations between the countries concerned on the other. What is important is that **institutional mechanisms** appropriate to a given case must be established at a very early stage. However, encouragement to **resolve issues amicably** should always be offered to the respective role-players within any hydropolitical dispute.

5. The **role of third parties** can be quite considerable, and where there is evidence of the political will by third parties of sufficient magnitude to apply pressure on otherwise intransigent states, basin-wide agreements can be reached, even in the face of other potentially divisive issues. This is particularly valuable where funding is sought by one of the role-players with which to construct a dam.

6. States should be encouraged to **ratify the UN Convention** on the Law of the Non-Navigational Uses of International Watercourses. This will modify state behaviour in a manner that is conducive to the long-term resolution of potential hydropolitical conflicts.

From a practical perspective, the Secretariat proposes that the minimum requirements that the WCD could recommend and operationalise in Chapter 5 should include the following:

1. A **downstream environmental and social impact assessment** should be undertaken by an independent party for large projects in transboundary basins.

2. In addition to the principle laid out in section 3.6, **ECA's** should adopt as a minimum the current World Bank Policy (OP 7.50) principles on "prior notification" and an independent expert panel to assess objections.

Discussion Note for the World Commission on Dams Regarding a Possible Approach to the Management of Dams on International and Inter-Provincial Rivers

By

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1. Introduction

The purpose of this Discussion Note is to analyze the problem of dams on international and inter-provincial rivers with a view to recommending a solution for consideration by the WCD as noted in the Terms of Reference.

2. Definition of the Problem

The core problem relates to the WCD's concern that many unresolved conflicts in international or inter-provincial river basins are expected to increase in intensity in the coming decade.

There are three distinct dimensions to the problem. These are as follows:

- International dimension: This is relevant to international or shared river basins where two or more riparian states have a legitimate stake in the future utilization of water resources. Typical within this dimension is the fact that riparian states have different positions along the watercourse, and by virtue of this geographic location, may be relatively advantaged or disadvantaged vis-à-vis other co-basin states.

- Sub-national dimension: This is relevant to a river basin that may or may not be an international river basin, but where the water resources cross provincial borders within a given country. Typical within this dimension is the fact that various provinces, some of which may have slightly different provincial-level laws, are situated in different positions along the watercourse, and by virtue of this geographic location, may be relatively advantaged or disadvantaged.

- Water as a human right: Some commentators are advocating water as a human right. This is imposing a given norm on a potentially unwilling state, which may perceive the issue as being within their own sovereign competence to define. The absence of consensus on the issue implies a high conflict potential.

3. Analysis of the Problem

An analysis of the problem reveals the existence of two critically important elements. These are as follows:

- Scale: The issue of scale is relevant in the sense that the hydropolitical dynamics which are inherent in either of the above are almost identical, except that the one is international in nature whereas the other is sub-national in its manifestation. In the former, the potential conflict is between two countries, whereas in the latter, the potential conflict is within a given country. Beyond this important distinction, there is very little else making the inherent hydropolitical conflict potential different.

- Sovereignty: The critical element is that of sovereignty, and herein lies the crux of the matter.

    - International hydropolitical conflict is between two states that exist in the eyes of the international community as being sovereign equals. The way that the current international

political system is organized is based on the legal fiction of sovereign equality. In reality all states are not equal, but for purposes of international political interaction within existing institutional bodies, this legal fiction is enshrined in the Charter of the United Nations.

- Sub-national hydropolitical conflict as typified by inter-provincial rivalry, falls totally within the ambit of the legal fiction of sovereignty. In this context, all matters that are considered to be sub-national in nature, fall clearly under the sovereign control of the state concerned. The definition of water as a human right may thus be seen by some governments as being tantamount to meddling in their internal affairs. The effect of this will be to reduce consensus on the issue and thereby alienate the WCD to a point where they are incapable of interacting in a meaningful way.

In terms of the problem under review, the critical determining concept is that of sovereignty. This has four distinct consequences, the last two of which are directly relevant to the problem under discussion. These are as follows:

- When a question arises that has to be settled by consent, such as in the UN General Assembly, every state has a right to one vote and only one vote.
- The vote of the weakest state has as much weight as the vote of the most powerful state.
- **No state can claim jurisdiction over another**. This is relevant to the notion of water as a human right, because a given state reserves the right to define what rights are to exist within their own country.
- **The courts of one state do not as a rule question the validity of the official acts of another state insofar as those acts purport to take effect within the latter's jurisdiction.** This is also applicable to the human rights dimension noted in the previous section.

From this assessment it is clear that the notion of sovereign states leads to two distinctly important aspects that the WCD would have to consider.

- The current international political system is one of structured anarchy, with all states retaining, and in most cases jealously guarding, their independent sovereignty. In terms of this, each state retains the right of independent action, to do as they see fit, within the constraints of their foreign policy capabilities, and as dictated by their perception of reality. Within this anarchic situation, no consensus exists on water as a human right, and the insistence by some role-players that it is, can only serve to reduce the likelihood of consensus being reached, to the detriment of other areas of potential cooperation.

- This in turn means that no truly supra-national body exists. Even though international lawyers try to promote law as being a solution, and it is quite obviously a useful component of international relations, in essence international law is weak because it cannot be enforced. The reason it cannot be enforced is because each state retains the sovereign right to interact as they see fit. In other words, the absence of supranationalism perpetuates the existence of structural anarchy in the international political system.

This impacts directly on the workings of the WCD, because the WCD has no supranational authority. This in turn implies that states cannot be forced to cooperate if they do not want to. If one uses the simple analogy of the carrot and the stick in the context of the WCD, the stick is almost non-existent, and when used on its own will almost always fail. The carrot, on the other hand, is not as insubstantial as may first seem evident.

As a direct result of the existence of state sovereignty, an analysis of the hydropolitical spectrum ranging from water-related disputes through to water-related cooperation, reveals the existence of three generic categories. These are important to note when considering a possible range of options. These are as follows:

- Zero-Sum Configuration: This exists when a hegemonic riparian state, or in the context of a sub-national analysis, a hegemonic province, exerts its dominance over the water resources in such a manner as to advantage themselves while disadvantaging others. Some literature refers to this as the "Rambo Style" of hydropolitical interaction. The essence of this form is the

existence of an asymmetrical power configuration, with one of the role-players (either country or province) being powerful enough to get their own way at the direct expense of the other role-players. This configuration has a high conflict potential and the continued existence of this form, in the face of increasing levels of water scarcity, is likely to result in a rapid, non-linear escalation of conflict potential. No consensus on what constitutes the human right to water is likely to be found, and the insistence that such a notion should exist will only serve to further alienate role-players. This configuration will probably be resilient to any attempts by the WCD to harmonize the water sector by developing best practice principles, and will also ignore any attempts at the codification of principles into international law. As such the WCD would remain powerless to act in a decisive manner within this configuration.

- Minus-Sum Configuration: This exists when the actions of all role-players result ultimately in a lose-lose type of outcome. By its very nature, this form of conflict is bitter, drawn out, difficult to mitigate, and normally involves a spillover of political hostilities into the water sector, thereby politicizing water-sharing arrangements. Some literature refers to this as being a "Default Condition" whereby failure of the role-players to reach an agreement leaves all parties to the conflict in a worse off position over time. Under such conditions, no consensus will exist on the notion of water as a human right - on the contrary, water may even be used as a weapon in a way that can be called a human rights violation. Often this configuration sees water taking on an ideological dimension such as being "the lifeblood of the nation", or needing to be mobilized in order to "make the desert bloom". This is referred to by some commentators as the "hydraulic mission of society", and the existence of such a mission is usually manifest as a massive dam building tendency. This configuration will probably be resilient to any attempts by the WCD to harmonize the water sector by developing best practice principles, and will also ignore any attempts at the codification of principles into international law. As such the WCD would remain powerless to act in a decisive manner within this configuration.

- Plus-Sum Configuration: This exists when the actions of all role-players result ultimately in a win-win type of situation. Some literature refers to this as being a "Dilemma Situation", which allows for the balancing of hydropolitical asymmetry through the linkage of the problem to other broader issues. By its nature, this form is consequently based on more symmetrical power configurations. As such it has low levels of conflict, characterized by the institutionalization of potential conflict in the form of regimes involving rules, bureaucratic procedures and other consensus building mechanisms. Under these conditions, consensus is likely to be reached on water as a human right because rational dialogue prevails. This configuration is clearly the most desirable condition for the WCD to strive to attain.

The challenge for the WCD is therefore centered on seeking ways of transforming "Rambo Type" or "Default Condition" hydropolitical configurations into "Dilemma Type" of hydropolitical configurations. In other words, asymmetrical power configurations need to be transformed into symmetrical power configurations. This in turn implies that the emphasis has to be more on the carrot than the stick.

4. Constraints being Faced by the WCD

As noted in the analysis of the hydropolitical problem above, the existence of international sovereignty is a reality, which constrains the possible range of actions that the WCD can effectively bring to bear on the problem. While the United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses does exist, and is clearly a desirable instrument with which to mitigate conflict, in reality it has not yet been ratified by many of the countries which are the very locus of hydropolitical conflicts. The existence of this constraint implies the following for the WCD:

- The WCD cannot really wield the stick, and it probably has no intention of behaving in such a manner in any event.

- While sovereignty results in a number of potentially negative hydropolitical impacts, it does exist and there is little evidence to suggest that this situation is likely to change in the near future.

- International law is therefore weak, and where it is being applied, it is because of the existence of the political will to cooperate in the first place. The independent variable is therefore the existence of political will, and the dependent variable is international law. Where the law does exist, there is no codification of any form of sanction, and this law is inappropriate to sub-national problems such as hydropolitical conflict at the inter-provincial level.

- States may therefore choose either the "Rambo Type" or "Default Condition" and the WCD can do little about this if presented as a *fait accompli*. The same holds true with a definition of water as a human right.

- Inter-provincial conflict is sub-national in nature and therefore falls under the sovereign competence of the state in question. Again the WCD can do little by way of direct intervention.

5. Opportunities Available to the WCD

Having noted the constraints, it does not imply that the WCD is powerless to act however. On the contrary, the carrot can be more persuasive than the stick in many cases if wielded effectively. The analysis of various river basins shows that cooperation exists in more cases than open and hostile conflict. These river basin studies reveal the following opportunities for the WCD:

- The role of third parties can be quite considerable, and where there is evidence of the political will by third parties of sufficient magnitude to apply pressure on otherwise intransigent states, basin-wide agreements can be reached, even in the face of other potentially divisive issues. This is particularly valuable where funding is sought by one of the role-players with which to construct a dam.

- By developing an understanding of, and ultimately codifying a set of so-called "Best Practices", the WCD is confronted by an opportunity of major proportions. This is already being done by the WCD, and the existence of such "Best Practices" can become the normative element needed to regulate state behavior.

    - To this end, the existence of a basin-wide agreement that has been signed by all role-players should be encouraged, and can even be made a prerequisite for funding.

    - The role of NGOs is crucial, because they act as significant balancers of power. NGO activity should be encouraged, particularly where gross human rights violations or the blatant disregard for fundamental principles of environmental sustainability are detected. This is particularly relevant where asymmetrical power configurations are present, and by allowing NGO activity to be at the forefront of contested issues, the legitimacy of the WCD will not be questioned.

- The carrot, if correctly wielded, can therefore be seen as an effective instrument with which to induce state compliance.

- This can only be achieved when either the "Rambo Type" or "Default Condition" form of behavior is replaced by "Dilemma Type" hydropolitical configurations. In order to achieve this desired end state, the problem has to be seen in a more holistic fashion, with the remedy being sourced from outside the narrowly defined water sector. In other words, by broadening the hydropolitical frame of reference, the WCD can find the necessary inducements with which to solicit state compliance with "Best Practice" norms.

6. Recommendations for Consideration by the WCD

In order to induce states to comply, and thereby overcome the central problem of sovereignty, the WCD should consider focussing its attention on the development of a range of inducement instruments. These efforts would in all probability bear the most fruit if consideration were to be given by the WCD to focus on the following:

- The WCD should seek to develop a comprehensive and empirically derived set of "Best Practices" with the purpose of influencing third party behavior as far as possible. As such an output is already being produced by the WCD, details of what such an instrument should comprise are beyond the scope of this Discussion Note.

- Because no easy consensus is likely to exist on the notion of water as a fundamental human right, the WCD should consider removing this issue off their agenda. Where necessary, such an issue should be taken up by activist NGOs.

- Third parties to any potential hydropolitical dispute should be targeted by the WCD. In this regard, the role of funding institutions and other multilateral organizations can be particularly fruitful.

- States should be encouraged to ratify the UN Convention on the Law of the Non-Navigational Uses of International Watercourses. This will modify state behavior in a manner that is conducive to the long-term resolution of potential hydropolitical conflicts.

- Encouragement to resolve issues amicably should always be offered to the respective role-players within any hydropolitical dispute. As such the carrot should always be favoured over the stick. This form of behavior is non-aggressive and as such is more likely to influence potentially non-compliant states. Where states remain persistent in their non-compliance, then remedies can be effectively sought in the wider hydropolitical environment if the "Dilemma Situation" is fostered.

- As a result, the problem definition should not be kept narrow in scope, and in no cases should it be confined only to the basin level of analysis. If the latter case is allowed to persist, then the range of potential remedies is too small and limited, thereby perpetuating the conflict potential by allowing sovereignty to remain a stumbling block.

- The desired end result for any WCD interaction should be the transformation of "Rambo Style" and "Default Condition" behaviors to be replaced by "Dilemma Type" situations. It is only once the problem is perceived by the relevant hydropolitical decision-makers to be of the "Dilemma Type" that conflict potential can be effectively mitigated in the long-term.

Additional comments by Anthony Turton

1) Regarding Basin Wide Agreements, my personal view is that they should be encouraged wherever possible. Because the WCD lacks the power to enforce this, encouragement is the best option. In this regard, the aspiration level should be to have as comprehensive an agreement as possible. The role-players would negotiate this down to a minimalistic agreement, but as a ball park target, I would suggest that the WCD should opt for more than what the WB is calling for. There is no recipe to work from. At the theoretical level, the more issues that are reduced to bureaucratic procedures and other consensus building mechanisms, the better, because this would institutionalise the conflict potential. This is clearly a desirable state of affairs.

2) Another example where the hydropolitical frame of reference has been widened is in the Indus Basin. Here you have two parties with a fairly deep history of belligerence. The basin has been divided in a deeply convoluted manner, and subsequent political decay has caused smaller “provinces” to break away, further exacerbating the problem. There has been a series of wars, and even political assassinations etc. Yet the 1960 Indus Water Treaty has held, where many commentators had expected it to fail. I mean, it could have been better than it is, but it also could have been much worse! I would argue that the WB played a leading role as a third party in those negotiations, and that the Indus Water Treaty was only possible because of third party involvement, and because it was linked ultimately to funding beyond the immediate arena of water. At the risk of sticking my head out too far, I would even suggest that this is what is starting to happen in the Jordan River Basin. The current peace talks involve heavy duty third parties, and they are trying to cascade the solution out of the basin. I would suggest if I was

commentating on the process, that this is what we are seeing in the ME Peace Process. It is the emergence of a new type of hydropolitical dynamic.

The whole things boils down to the fact that a whole new paradigm is emerging within the international water sector. The WCD is an example of that new paradigm. I would therefore argue that we cannot only focus on what has happened in the past. We can now ask what should happen in the future. With this as a point of departure, I would argue that the WCD is playing a major role in developing an new normative order. This will be embodied in the Best Practices, and that will lay the foundation for all funding etc. The Achilles heel is always funding. If a third party has the political will, and they can use funding as a lever, then the WCD Best Practices can become the new water gospel for the 21st Century.

TRANSBOUNDARY IMPACTS OF DAMS:
CONFLICT PREVENTION STRATEGIES

DRAFT: *Discussion Note prepared for the World Commission on Dams*

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July 4, 2000

The construction of large dams was for many decades seen as the most overwhelming symbol of the power of humankind, and particularly The State, over water, and thus over nature itself. Technologies developed in the 20th Century have allowed us to dam, divert and seemingly completely control most of the world's most powerful rivers with awe-inspiring feats of engineering and construction. This was heralded as a triumph of our civilisation and unprecedented progress, allowing the growth of cities in deserts, irrigated agriculture to feed the growing world population, and energy to power industry and development.

With the benefit of hindsight, it is now clear to many that the explosion in technology and engineering, and the monuments to human dominance that accompanied it, unfortunately took place before the societies in question had the chance to develop either a real understanding of the consequences of large dams, or the institutions, rules and agreements necessary to control and monitor them. Never before had governments had such power to change the course of nature and thus the lives of its inhabitants; and sadly even the most basic means to regulate the process were sorely lacking. We are now faced with a *fait accomplis.* Large dams are a part of our world and not only are they extremely difficult to decommission or remove, but they continue to be built.

Nothing as destructive and permanent as a large dam can ever be an uncontested, uncomplicated good, and the "Faustian bargain" which was made between dam construction for development on the one hand, and the preservation of riverine ecosytems and the communities dependent on them on the other, is one which will continue to haunt millions of affected people for generations to come.

Now that the process of learning and reflection has at least partially caught up with our technological advancements, it is our responsibility to ensure that we proceed more responsibly and accountably with the struggle to provide enough energy and water to power and feed our world. Responsible to nature and her right to replenishment and protection, and accountable to all affected peoples. It is essential to ask who has the right to make decisions which so dramatically alter the environment and lives of the people of a basin, who has the right to object, and on what ground.

There can be no development, whether social, economic or technical, without adequate water supplies; there can be no lasting stability in regions where large quantities of water are shared across boundaries if this fundamental element in the life and growth of states and communities is not sustainably and equitably managed. Basin wide cooperation is imperative. There may not be a universally applicable blueprint for water management, but in the case of large dams it is clear that the most important precautions and principles should always be adhered to.

An integrated and long-term vision is particularly crucial in the case of dams whose impact reaches far beyond the confines of the political entity which constructed them.

1. Nature & Extent of the Problem:

This note will contest that all dams have transboundary impacts. Transboundary in the sense that the people involved in the authorisation, construction and operation of a large dam are never the only group affected. Boundaries, and therefore potential conflicts, exist not only geographically and politically, but also socially, economically, culturally and ethnically. Awareness of differences between the effects of a dam on rural and urban, rich and poor, men and women, and different ethnic and occupational groups should be viewed as equally important as the overall impacts which the dam may have on other basin states or provinces.

Such a definition of “transboundary” greatly complicates and broadens the extent of the problem at hand, but more limited definitions belie the truly integrated nature of the social and environmental impact of dams, and therefore of the conflicts which they can engender. Conflicts and tensions caused by the effects of dams, whether actual or proposed, exist between states in many of the almost 300 international basins in the world, between provinces, and between affected communities and the government or other entity responsible for the authorisation, financing and operation of a dam. Conflicts relating to dams can develop at the level of the smallest (individuals) and the largest (states) concerned groups and can take on a multitude of different shapes, from outright violent clashes to lingering tensions and a lack of cooperation which renders effective water management in the basin impossible. Conflicts over dams can be accompanied by highly visible protests from people and other basin states, or fester below the surface among disempowered project affected peoples unable to make their objections heard. Either way these conflicts contribute to destabilisation and hinder regional cooperation. They can also represent an additional burden on societies in some of the world’s poorest nations.

Large dams can have impacts on an entire basin. Upstream effects include the inundation of large, often inhabited areas, siltation, salination and all the consequences of the construction itself (building of roads and infrastructure, deforestation etc.). Downstream effects are more difficult to assess as they are generally less immediate and visible. These involve all manner of changes to the floodplain, including the pattern of floods, drainage and river flows, water quality and temperature changes, depleted fish stocks, effects on wetlands, and reduction in silt carried out to the estuary and the sea. On a grander scale, dams have been accused of increasing seismic activity, even earthquakes, and contributing to climate change. These changes have considerable, and hard to quantify, impacts on populations living downstream, often across state boundaries. Anyone involved in farming, fishing, grazing or navigation is usually affected, and in some basins this will amount to the entire population. As dams also affect water quality, greatly exacerbate the problem of salination, and can reduce the overall quantity and reliability of water downstream, it is hard to imagine anyone not being affected in some way.

As river valleys are the cradles of almost all civilisations, the areas flooded by dams often include the homes of the surviving members of indigenous communities and irreplaceable spiritual, architectural and archaeological treasures. The disruption and displacement caused by dams has been accused of severing the last tenuous links to the traditional lifestyles of indigenous societies in South and North America, Africa and Australia.

On the positive side, flood control is often cited as a downstream advantage to dams, but in cases where the regions benefiting from this control are not informed of the operation of the dam (usually because they are across political boundaries), even this can backfire. The flood control capacity of dams can deprive soils of the nutrients deposited by regular floods, and distorts the cycle of the natural floods which will have determined the development and management of land use in the region. One consequence of this can be development and growth beyond the level which the natural environment of the area would have otherwise sustained, creating an artificial situation and undermining traditional lifestyles. Dams also make flooding unreliable, and therefore, especially in basins where downstream communities are not alerted when the dam releases or impounds water, potentially even more dangerous. The state of uncertainty which dams bequeath on inhabitants of the basin is extremely difficult to either quantify or compensate.

A. IMPACTS ACROSS POLITICAL BOUNDARIES:

The fact that dams can have consequences for other states and provinces in an international or transboundary basin has long been acknowledged; the challenge is to assess the nature and extent of the impact on the different sectors of the affected states, and their natural environment, *before* the dam is constructed. This way decisions can be taken on the basis of an integrated vision of all the positive and negative impacts of the proposed dam, and with the full awareness of the benefits and the losses (in terms of costs and compensation payments) that will be accrued. This was not the case for most of the dams already, or currently being, constructed.

The link between natural resources and national security is becoming increasingly apparent, but in the case of water discussions have largely focussed on the question of water scarcity and water-

stress. These concepts conjure-up visions of a world in which conflicts arise over inadequate water supplies, and possibly distract attention from the most important cause of water related conflicts, including scarcity and water-quality issues, the control of water by dams. The reluctance to name dams as an outright cause of conflict is another result of their controversial nature. It is more comfortable to speak of water scarcity, flooding, pollution etc. as causes of conflict than of outright man-made constructs, of which dams are the most visible and destructive example; but if one investigates almost any of the most commonly cited conflicts, or potential conflicts, involving water, at the heart of the matter is one or more dams. For, except in extremely arid basins, it is only with dams that states can significantly re-direct, store and otherwise alter the course of rivers to the extent that would cause changes of conflict-invoking proportions in neighbouring states. At the international basin level this is true of the conflicts lurking over the Tigris-Euphrates, the Ganges, the Nile, the Parana-Plata, the Mekong, and many other basins.

It is not enough to negotiate at the state level and reach mutually satisfactory agreements. The Columbia Basin Treaty is often cited as a good example of an agreement which left both states involved, namely the USA and Canada, better off. Unfortunately, in the 1930s, when this treaty was negotiated, there was little concern for the rights of the Native American and Canadian First Nation tribes who were badly affected by the dams. The treaty for the Yacyreta Dam, hastily negotiated by authoritarian governments in Argentina and Paraguay in 1973, was acceptable on both sides, but shamefully neglectful of any other stakeholders – namely the more than 80,000 people who stood to be displaced and isolated due to the construction – or the environment. The agreement for the Gabcikovo-Nagymaros dams between Czechoslovakia and Hungary was reached in 1977 when both states were under totalitarian regimes. The people had no recourse to influence the decision regarding the dams, which had been labelled the most potentially environmentally destructive and unproductive in Europe, until the late 1980s when public protests accompanying the collapse of communism in Hungary called for a stop to the construction. In both these cases, the populations later reasserted their sovereignty after a long period of denial, causing disruption in the development of the dam and drawing attention to the dangers of decisions concerning such vital resources being taken exclusively by governments, particularly those which do not democratically represent the people. Thus, even in cases where transboundary dam agreements are reached before construction, if they are non-participatory and fragmented in nature, conflicts will inevitably arise.

B. IMPACTS ACROSS SOCIAL BOUNDARIES:

It is always easier to negotiate with one's peers than with people whose positions and lifestyles are far removed from one's own. Thus, while government to government and expert to expert negotiations may be fraught with disagreement, at least the infrastructure usually exists to permit their proceedings; this is often not the case when it comes to discussions with other stakeholders. Whereas compensation packages or water and energy transfers can take place fairly smoothly from state to state, the effects on each individual inhabitant of a basin are impossible to quantify. This would necessitate a knowledge and understanding of the ecosystem and people of a region which in most cases is simply not available. Consideration of the different impacts on women, the very poor and indigenous people (to name but a few) requires even further insight, and the necessity of assigning adequate importance to the non-economic uses and values of the water and land in the basin.

Impacts on different stakeholders must also be assessed both within and beyond the boundaries of the state or province concerned. Ideally, equal weight should be given to people throughout the basin; in reality, politicians are more concerned with public opinion in their own constituencies. State-hired consultants and experts also often have a political or occupational bias, and may overlook certain under-represented sectors and communities. Stakeholder consultation is a time-consuming and expensive process, but is certainly more efficient than the all too frequent practice of withholding information from concerned groups, blocking objections and then later suspending construction in the face of large-scale, often internationally-supported, protests. This is not only inefficient, but also destabilising and destructive to the communities and environment in the basin.

If one considers the temporal and spatial context of the question of large dams, the position of governments fades into relative insignificance. Dams permanently disrupt the riverine ecosystem and the lives of its current and future inhabitants. Governments can only claim the legitimate right

to make decisions as important as those which authorise the construction of a large dam when they truly believe that they are in the best interest of the people of the affected basin, and will not have insurmountable consequences for the environment. Short-term political or economic gains are not appropriate reasons for the construction of dams, and should not be accepted by either the affected people or the international community. Now that the world is host to some 40,000 large dams, it is time to assess whether the benefits reaped can ever justify the terrible environmental and social price which has been paid; the decision taken on this question will affect the position on the large dams still awaiting completion and financing, but many constraints exist to limit external influence on national dam policies, even in cases where the dams will have international impacts.

2. Constraints to Integrated Basin Cooperation

A. NATIONAL SOVEREIGNITY:

The principle of national sovereignty, though in most cases at odds with the hydrological realities of an international basin, is the cornerstone of international relations, and one which is in most cases jealously guarded by states. The implication of state sovereignty in the case of dams is that the state can effectively do as it pleases. As in other matters, the international community and other states can voice disapproval, take diplomatic action and withhold international trade and financing, but nothing can be forced on the state. The soft measures which can be taken are obviously most effective on small, highly dependent states, and not at all effective on large, powerful ones. On the other hand, public opinion has recently become an effective tool in the fight against questionable dam projects, for example in France, Malaysia and Nepal where schemes have been cancelled as a result, and when correctly channelled is capable of crossing state boundaries and influencing decisions. This is a reflection of the fact that the only genuine sovereignty over a timeless and crucial resource such as water rests in the hands of the people themselves.

The purely national approach to the use and management of international water resources, which is still the norm in many basins, is made even more of a concern for two reasons. Firstly because in most cases governments are singularly poorly equipped for tackling transnational environmental and social problems. More importantly, it is because many people are not adequately represented in the state system. Such marginalised groups include peoples lacking statehood, obvious examples of which being Palestinians, Kurds, and many indigenous peoples, such as the Himba people in Namibia, all of whom are severely compromised and discriminated against in water management questions. In some countries, women, emigrants, and the very poor and dispossessed could also be included amongst those frequently ignored by the state.

B. RIPARIAN POSITIONS:

The relative positions of the states in a basin is the key to their hydropolitical relations. These positions are bound in their geographic location (i.e. upstream or downstream), economic strength, strategic importance and military capacity, and usually dictate the power-relations and water policies of the states in the basin. Where the upstream state is also the most powerful in other respects, as, in the Ganges Basin, India is compared to Bangladesh, the relations are very simple and conflicts, and cooperation, are generally avoided due to the disproportionate strength of the state which is in the best position to utilise the river. Where it is the downstream state which is the regional power, and the upstream state(s) have acquired the ability to utilise the water resources (most significantly for hydropower), disagreements are more likely to degenerate into conflict. This is the case of the Nile Basin, and Egypt is certainly not encouraging upstream Ethiopia to tap the great hydropower potential of the Blue Nile. Riparian position is an unchangeable fact (except by redrawing state boundaries or occupying territory) but like most things it can be manipulated to the advantage of powerful states. The agreement on the Lesotho Highlands Water Project effectively handed over to downstream South Africa the rights to control and use over 40% of upstream Lesotho's only significant natural resource - its water. Control over the dams gives South Africa the benefit of upstream riparian status, and a vested interest in all of Lesotho's affairs.

C. LACK OF INTERNATIONAL AND BASIN-WIDE AGREEMENTS:

International law may not hold the answer to the problem of regulating the transboundary impacts of dams, but agreements and conventions do encourage stability and trust among nations. Unfortunately, the 1997 UN Convention, which though far from ideal does espouse the fundamental equitable use, prior-notification and no-harm principles, is yet to be ratified, and one

would be hard-pressed to find a truly integrated and enforceable agreement on the management of water in any of the world's approximately 260 international basins. Some basin agreements are based on water quality monitoring, some on water allocation, and some on hydropower, but none adopt an integrated "source to mouth" basin approach taking all sectors and interests into account. In addition, none have the financial or political power, or the institutional backing, to monitor or enforce even those measures which they do call for.

The fact that many important international basins contain some states which agreed to, and perhaps even ratified, and some which abstained or opposed the 1997 UN Convention suggests that until it is ratified the Convention could even be the cause of more rather than less mistrust between basin states. The ongoing debate over whether access to water should be considered a universal human right also has consequences for dam building, as if it is acknowledged that water is a human right nations will have the obligation to ensure that people downstream, both within and beyond their borders, have water of adequate quality and quantity. If a state could claim that, on the basis of the Universal Declaration of Human Rights, which states that "Everyone has the right to a standard of living adequate for the health and well-being of himself and his family…" (Article 25), they have the right to receive enough safe water from a co-riparian to meet the basic needs of their population (assuming that this would be possible under the natural flow of the river) this would imply that international human rights law (which is more advanced that its environmental counter-part) could be applied to water management disputes.

D. EXTERNAL FACTORS:

The overall political climate in a state and region is an important factor which can limit the likelihood of cooperation, or consideration, over the construction of dams with transboundary impact. This includes both the internal political realities in the state itself, with the absence of democracy or transparency in decision making, and lack of concern for minorities and indigenous people, being the most common problems, and the wider regional and international relations. It is fairly safe to say that where the people do not have a voice, their leaders show little concern for either human welfare or the environment.

Dam building has long been considered one of the keys to economic growth in developing states. The financing of dams is therefore a strategic business among developed states vying for influence in the "South". The Cold War greatly exacerbated this trend, and led to dams being built even when other basin states were vehemently, and often legitimately, opposed, in order to gain influence. This was the case for the Soviet-financed Tabqa High Dam completed on the Syrian stretch of the Euphrates River in 1973, and the cause of acute military tension between Syria and Iraq in 1975. The Apartheid system in South Africa also left a legacy of dams built without concern for their transboundary impacts.

E. FINANCING:

Today we are witness to a more modern economic imperialism which also has a role in the construction of dams. Northern financing is behind the construction of almost all dams in the developing world. The World Bank and the regional development banks have been the steadiest source of finance for large dams in the past fifty years, but money has also come from particular states and private sources. As international institutions and national governments grow more and more wary of funding dam projects, states and contractors increasingly seek guarantees from private sources thus worsening problems of accountability and transparency. Since investors have been available without strict conditions of regional consultation or environmental and social impact assessment, states with hydropower potential have had little incentive to exploit transboundary water resources in an integrated, mutually beneficial manner.

F. INFORMATION & COMMUNICATION:

Lack of communication is a problem which plagues all transboundary issues. Legacies of wars, disputes and rivalries have left many regions with lingering disagreements and little willingness to actively cooperate. This extends throughout the cycle of dam impact assessments, decision making, construction and operation. Lack of information and communication means that neither governments, contractors, investors nor the people of the basin know the full toll of impacts which a dam will have. If the people are not fully informed of the plans, and the government does not fully understand the lifestyles and ecosystems of the basin, it is impossible to quantify, moderate or

compensate the affects of the dam. The continued failure to inform affected communities of the operation of the dam also means that even potentially beneficial impacts are not taken advantage of. This is made even more difficult when impacts extend beyond national borders, and thus beyond normal channels of communication and information sharing. The lack of reliable and mutually accepted information leaves the way clear for rumour, suspicion and exaggeration on one side, and corruption and coercion on the other.

G. POLITICAL AND PUBLIC WILL:

All of the above, and many other, constraints to integrated basin management, including over dams, add up to a climate lacking in the political and public will to cooperate. Competition, rivalry, corruption, lack of interest and lack of knowledge all contribute to this problem, and the result is that there is no organised resistance to poor water resources management or search for improvements and alternatives. People need to be empowered with information regarding what their and their neighbours' governments are doing to their water resources, why, and for whom, in order that they may join-in the process. Governments, national and local, should be aware of the alternatives and consequences to the big dam projects proposed to them, and willing to seek mutually beneficial arrangements with different sectors in their country and with their neighbours.

3. Incentives for Integrated Basin Cooperation

A. NATIONAL SOVEREIGNTY:

National sovereignty is frequently seen as an ideological and logistical barrier to international and regional cooperation. This should not be the case. Sovereignty is not a static concept, but one which can and should be responsive to changes in both the physical realities of the world and the minds of its people. As analysis of the multifaceted notion of sovereignty, seen not exclusively on the state level but rather as a social construct involving everyone in a region, and its relationship to international watercourses, is important to the development of a new, integrated, basin-wide approach to water management which considers the needs of every water-user including the ecosystem. In its optimal sense, the exercise of national sovereignty should reflect the aggregate of the needs and desires of each individual in a nation; when confronting a need as fundamental as water it becomes critical that every individual and every aspect involved be taken into account and the common ownership of the river be recognised.

Sovereignty over shared water resources is best expressed as cooperation. Transboundary watercourses should be viewed less as a potential source of friction and competition between states than as a natural opportunity for cooperation among all water-users, and in so doing hopefully contribute towards the prevention of water-related disputes. Rather than continue the debate on where to place the limits and boundaries of national sovereignty over transboundary resources, it would be more constructive to encourage a scenario whose principal characteristics are determined less by the traditional idea of "restricted sovereignty" than by a positive spirit of cooperation and effective interdependence. States, especially small developing ones, have much to gain from pooling their national sovereignty with that of their neighbours and working together for sustainable regional development.

B: REGIONAL SOLIDARITY:

Dams need not always be divisive. If properly and jointly managed, the construction of a dam in a transboundary basin can be the impetus and provide the finance for broader regional cooperation. In developing regions, the energy produced by dams has also been credited with allowing regional independence from first-world hegemony.

Hydropower has been the key to resolving conflicts over territory and water in the Parana-Plata basin, particularly between Paraguay and Brazil. The shared physical geography allowed the two states with a history of difficult relations and of very disparate size, as well as military and economic strength, to embark on an immense and long-term project together - the Itaipu Power Project. Tapping and sharing the huge hydropower potential of the common rivers has proven to be a means of achieving economic growth, interstate cooperation and independence from outside influence, in this case from the United States. These opportunities are invaluable to the region, but should be pursued with more concern for the environment and societies effected, and with greater accountability and transparency. In this way the long term benefits of cooperation can be realised.

A major river is among the most valuable assets which a region can possess, and thus the exploitation of water resources is fundamental to its development. In the arid Senegal River Basin some progress has been made to jointly manage the river, in terms of navigation, irrigation and hydropower, but there is still a huge incentive to improve this cooperation and resolve outstanding conflicts as integrated management of the water provides the poor Sahelian countries of the basin with the best chance they have to reduce poverty and environmental degradation.

In the age of globalisation, enhanced river basin development can help a region to retain its independence, but only if the states of the basin cooperate and agree. Another important incentive to collaborate with neighbouring riparians is the notion of uniting to preserve to the cultural heritage(s) of a region, which in many cases will have originally developed around the river itself. This can only be achieved if these cultures are respected by the decision-makers, particularly when one considers decisions like the construction of large dams.

A dam can give a country power, economical leverage it would not otherwise have and which it should use wisely to benefit the people. These tradable assets can also be used as an opportunity to strengthen regional cooperation. In some basins interstate transfers of hydropower, flood control, irrigation canals etc. are already being made. In the 1996 agreement over the Pancheshwar Multi-purpose Project, involving the sharing of the resources of the Mahakali River between Nepal and India, the focus is on producing the maximum total net benefit for both countries in the form of power generation, irrigation use and flood management, with the costs of the project being shared in proportion to the benefits accruing to each state. Since a transboundary river should be recognised as being of common ownership, then its goods and services should also be shared.

C: ENVIRONMENTAL PROTECTION:

It seems a contradiction in terms to speak of large dams as helping environmental protection, but, again, if they are well-managed they can contribute to a region's fight against desertification, water pollution, water scarcity, flooding, increase food production and assist with many other environmentally charged problems. It should be remembered that, just because a dam makes something possible, it does not mean it is wise or sustainable in the long-term. Finding a balance between the natural cycle of water in the basin, and what can be achieved through the control of a dam, is the key to respecting the needs of both people and nature.

4. Conflict Prevention Strategies:

1. Ratification of the United Nations Convention on the Non-Navigational Uses of International Watercourses. This would show commitment on the part of governments, give stability to international basins, and further encourage respect for the no-harm, prior-notification and equitable-use principles. The Convention also includes a Fact Finding Commission, the neutral good offices of which could be useful in conflict prevention/resolution.
2. Mutually beneficial basin agreements should be negotiated and respected, with benefits not only for governments and investors but also for the affected people. These agreements should result from widespread participation of people and all basin states and integrate the different uses and values of the shared resources of the basin.
3. Notification and negotiation among state parties – both before construction and concerning the operation of the dam. The construction and management of dams with transboundary impacts should never be a purely unilateral procedure.
4. Compensation for adversely affected people both up and downstream, taking into account all the impacts of the dam on riverine communities including those not economically obvious such as access to culturally important sites, collection of materials from forests etc. The compensation should not only consist of money transfers, but also include assistance in resettlement and integration in new location, employment and education opportunities etc. This compensation should of course extend to affected people beyond state boundaries and include specific measures to account for the impacts on different gender, occupational and ethnic groups.
5. Neutrality in the hiring of contractors and selection of organisations to carry-out impact assessments.

6. Transparency in decision making and negotiations between states and among stakeholders. Transparency in the financing of dam projects would reduce the corruption which has been rife in the dam industry and is a major cause of the growing lack of confidence in the authorities involved.
7. Accountability for the damage caused by the dam should be clearly assigned. The owners and operators of the dam should also be responsible for ensuring that agreements are adhered to and the effects of the dam do not exceed limits agreed; both public and private operators should be regularly monitored.
8. Information sharing is currently weak in the water management field. Details of both positive and negative impacts of dams, and any problems which are faced in their construction and operation, should be shared among all concerned parties. This should include information on financing, the results of impact assessments, regular progress reports during construction, and details of the power and other benefits generated. It is critically important that details of planned impounding and releasing of water in the dam is provided to affected communities and states in advance in order for them to take necessary precautions.
9. Flexibility is required when the predicted impacts of a dam are found to have been underestimated or inaccurate, and when changes in laws, ideas or circumstances in the basin necessitate a review of the agreements made. Many large dams approved in the decades after the Second World War would not be considered acceptable now, and measures should be taken to rectify the damage done, and provide people with retro-compensation. The decommissioning of highly detrimental dams is already beginning and should also be considered an option, and could be a means of avoiding conflict when the objections originate in other affected basin states.
10. Conflict Resolution Mechanisms should be an integrated and mutually respected element in basin agreements to provide for times when compromises are not easily reached. These can include: joint, or neutral, fact-finding missions; the creation of independent assessment teams; prior agreed methods of resolving conflicts using legal methods, such as tribunals and recourse to international or regional courts; and the use of mediators in the form of respected neutral individuals, institutions or third-party states. The creation of a highly respected independent international forum for water dispute resolution would be ideal. Individuals and communities in other states should also be able to voice and resolve their differences with the dam authorities through these official mechanisms.

5. Cooperation Enhancing Strategies:

1. Basin Management Organisations are essential to provide the institutional and administrative backing to implement basin agreements. Committees originating in hydropower and other specific or technical discussions can be extended to cover all areas of basin cooperation and integrated water resources management. Instead of grappling for a restrictive middle ground between upstream and downstream riparian claims, and mutually unsatisfactory compromise, the problem should be reformulated away from questions of different degrees of sovereignty towards a vision of cooperation.
2. Public Participation not only raises awareness and builds confidence, but is also the only hope for achieving integrated water management. Local people should not only be provided with the necessary information regarding water management decisions, but should also be recognised as an essential source of knowledge of the ecosystem, land-use practices and cultures of the basin. The flow of knowledge and communication should therefore go both ways, and the means of engaging in the debate and voicing opinions, complaints and concerns about the impact of dams should be readily accessible. Public participation regarding water management is so crucial that it is regarded as an emerging human right.
3. Prior planning and investigations made in preparation for the construction of a dam, or in later assessments, and used in the appraisal of its viability and impact, should take all users, upstream and downstream, and all possible affects, short and long-term, into account. Assessments should not consider only the isolated impact of a dam, but recognise the integration of all the water resources of the basin, and the dependence on the dam in question on other, usually yet to be implemented, projects.
4. Inter-cultural tolerance and consideration.

5. The non-economic values of the river - including aesthetic, cultural etc. - should be respected. Inclusion of certain, or certain sections of, rivers in UNESCO's list of protected World Heritage Sites would facilitate this process and could include sites spanning across national borders.
6. Integration of all stakeholders and water-related sectors, without undue priority given to any sector or interest group.
7. Joint operation (where feasible) and regular monitoring of the dam by affected states.
8. Power-sharing – both in terms of electricity and decision making - among peoples and states.
9. Responsible Financing – public-private partnerships insisting on consultation with affected basin states and communities, and genuine social and environmental impact assessments *before* construction are absolutely essential. International efforts from foreign investors to coordinate plans to develop rivers for the interest of all through integrated joint development projects are also needed.
10. Re-channelling and re-distribution of benefits gained from the dam among all the people affected, rather than funnelling almost all gains to elite, usually urban middle-class, groups. Well-managed dams have the advantage among water projects of generating a huge amount of money; this should be at least partially allocated to compensating and enriching affected communities and ecosystems. Funds should also be provided to support other elements in basin cooperation, such as the expenses of basin organisations, public participation and information sharing activities.
11. **Joint search for alternatives to large dams – regional investment in a common sustainable future**.

For the World Commission on Dams, Cape Town, South Africa

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Large Dams, Trans-Boundary Waters, Conflicts

Ramaswamy R. Iyer

There is a view, strongly held by some, that large dams do more harm than good and should not be built at all. Some others, who do not share that fundamental disapproval of dams, may still feel that such structures are best avoided on trans-boundary rivers. It is interesting to note that conflicts over river waters, whether inter-country or intra-country, seem often to arise in the context of large projects. The India-Bangladesh dispute over Ganga waters was precipitated by the Farakka Barrage Project in India. Projects on the Kosi and Gandak were the starting points of a prolonged history of misunderstandings between India and Nepal, and that mistrust was further accentuated by the Tanakpur Barrage Project, until it was resolved through the Mahakali Treaty of February 1996; but even after that Treaty there are pending issues relating to the Pancheswar Project. Within India, the Cauvery dispute arose because dams and reservoirs built by the State of Karnataka had the effect of reducing the flows into the Mettur Reservoir (an earlier project of Tamil Nadu). Between Karnataka and Andhra Pradesh, there is a dispute over the Alamatti Project of the former on the Krishna River.

Even within a State, a large project creates conflicts of interests between the people of the upper catchment and those downstream; between those who bear the social costs of the project and those who enjoy the benefits such as irrigation or hydro-power; between the head-reach farmers and those at the tail end of the canal system as also between the rich farmers and the poorer ones in the command area; between human beings and wildlife; and so on. Such conflicts have been incidental to many projects, but have been particularly marked in the case of some. In India, the Sardar Sarovar Project on the Narmada in Gujarat State and the Tehri Hydro-Electric Project on two tributaries of the Ganga in the Himalayan region, have been the centres of fierce controversy, and have become international *causes célèbres*. In Nepal, Arun III became controversial, leading to the withdrawal of the World Bank. There is also a controversy raging around the Kalabagh Project in Pakistan. It would appear that large projects tend to become the foci of conflicts.

If (hypothetically speaking) WCD were to come to the conclusion that dams should not be built at all or should be avoided on trans-boundary rivers, then there would be no need for further discussion on the trans-boundary aspects of dams. However, we cannot anticipate the position that WCD will take in its Report. Tentatively assuming that dams will continue to be built (some of them on trans-boundary rivers), and that WCD will accept that possibility, this paper will proceed to consider the issues that arise in such cases.

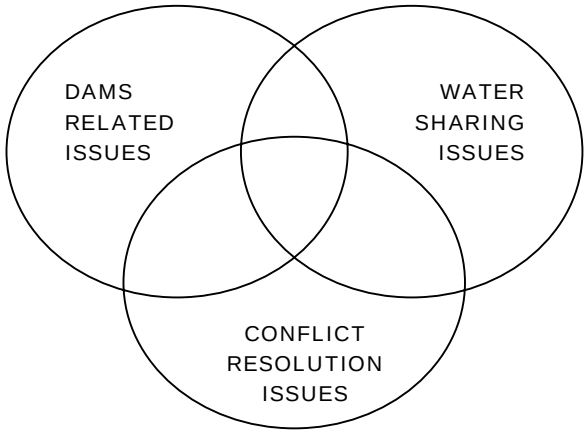
First, it is necessary to be clear regarding the manner in which the three components mentioned in the title of this paper are related.

(i) There is a cluster of issues relating to large dams: violent disturbance of pristine areas and disruption of long-established ways of living; submergence of land and forests; impacts on flora and fauna and reduction of bio-diversity; drastic alteration of river regime; reduced river flows downstream with serious implications for aquatic life, riparian communities, groundwater recharge, water quality (the capacity of the river to clean itself) and estuarine conditions; displacement of people and problems of resettlement and rehabilitation; public health aspects; the dangers inherent in damming a river; the benefits expected from the project; the overall balance of costs and benefits; inequities in the incidence of costs and benefits, and in the distribution of the benefits; heavy drafts on budgetary resources; and the question whether the objectives in view could have been achieved through alternative means that avoid some or most of the adverse impacts mentioned above.

(ii) There is another cluster of issues relating to trans-boundary waters (including both boundaries between countries and political divisions within a country, particularly one with a federal or quasi-federal structure): riparian rights and obligations; principles of water-sharing, and the sharing of costs and benefits on projects; issues of water quality; the impacts of the actions or omissions of one riparian on other riparians; the question of `harm' or `injury' to fellow-riparians; and so on.

(iii) There is yet another cluster of issues relating to conflicts (whether water-related or other) between states or between political units within a state and the modalities of their resolution: the avoidance of conflicts; early identification of possibilities of conflict; and the processes and mechanisms of resolution of conflicts.

These three classes of issues are distinct, but as many dams have been built on rivers that cross political boundaries (or flow along or mark such boundaries), the first two clusters get inter-connected; and as both large dams and trans-boundary waters hold potentials for conflicts, the third cluster also comes in. Diagrammatically this can be represented as follows:



One kind of conflict may be eliminated from the discussion at this juncture, namely, deliberate intention to harm. The wilful obstruction of the flow of water to a downstream area; the deliberate creation of floods downstream or backwater effects upstream; the poisoning of water sources; the bombing of a dam to cause devastation: these rather fanciful hypotheses illustrate acts of war or hostility, and are not the kinds of conflicts that this paper is concerned with. Assuming that there is no deliberate intention to harm, how do conflicts in relation to water arise, whether between countries or between constituent units within a country? They arise from one or more of the following causes:

wrong principles (Harmon Doctrine, prior appropriation, prescriptive rights, etc., asserted in an absolute manner);

- limited vision (myopic nationalism, blind assertion of local perceptions);
- lack of sensitivity on the part of the stronger party, excessive touchiness on the part of the weaker;
- wrong approach to natural resource planning (the notion of `conquest of nature' or `harnessing' natural resources through the application of science and technology, arising from the legacy of Prometheanism and implying an exploitative or adversarial relationship to nature; and a strong inclination towards gigantism);
- inadequate understanding of implications and consequences; failure to study these fully;
- ignorance; lack of data/ information;
- unwillingness to share information; failure to consult all concerned; failure of imagination about others' needs, rights or concerns; and
- politicization, i.e., the tendency for differences over water or environmental concerns to become elements in domestic electoral politics.

How can conflicts relating to river waters (and in particular large dams) be avoided or minimized? Let us assume that as a first preference all non-dam possibilities will be explored and that big projects on trans-boundary rivers will not be undertaken unless they are found to be unavoidable. That still leaves us with the question: how can conflicts be minimized?

In this context we often come across two kinds of `ideal' recommendations. From a *hydrological* point of view, the recommendation is that national or political boundaries should be ignored, that a hydrological unit such as a basin or sub-basin should be taken as a whole, and that there should be *integrated* water-resource planning for such a unit. From a *political/economic* perspective, the recommendation is that *regional* planning is superior to national planning. There is much force in these propositions, but there are also some difficulties that must be taken note of.

The advocacy of regionalism tends to become doctrinaire. There are some problems and issues that are best dealt with on a national or local basis; some that call for cooperation between two countries or units; and others that demand a regional approach. The circumstances vary from case to case, and in each case the most appropriate route needs to be followed. On the one hand, a rigid bilateralism such as that adopted by the Government of India is unwise and unduly self-limiting; on the other, a dogmatic advocacy of regionalism as inherently superior to a national or bilateral approach would unnecessarily complicate simple issues and render them more difficult to resolve. What is called for is pragmatism rather than doctrine.

The `basin' approach is theoretically sound, but some basins are too large and have to be broken down into sub-basins. Besides, there is a great deal that can and needs to be done on a *local* basis through community initiatives. In India, Anna Hazare (of Ralegan Siddhi fame) and Rajendra Singh (Tarun Bharat Sangh, Alwar, Rajasthan) among others have shown the way. Such initiatives are not likely to be fostered by a planning approach that thinks in terms of large areas. `Basin planning', and the talk of `integration', carry with them an implicit bias towards gigantism and towards a technology-driven rather than a people-centred approach. It is necessary to ensure that `basin planning' covers the whole range of activities from local water-harvesting and watershed development to large projects, and that `integration' covers land-use and water-use, brings together all the disciplines concerned and is not dominated by engineering, incorporates environmental, social and human concerns (including special concerns relating to women, children, and tribal, backward and other disadvantaged groups), and proceeds on a people-centred, `bottom-up' rather than a bureaucracy/technocracy-driven `top-down' basis. `Holistic' is a better word than `integrated'.

Besides, a `hydrological' approach that ignores political boundaries may sound right in theory but may not work in practice. In principle it may be possible to argue that benefit-sharing is better than water-sharing and that within a basin or a sub-basin as a whole, food production should be concentrated in one area, power generation in another, and industry in yet another; but this may not be acceptable. Political boundaries, whether between countries or within a country, exist and cannot be forgotten. A theoretically right approach may have to be moderated by a degree of realism. The best need not be the enemy of the good. `Integration' may be ideal, but it may sometimes be necessary to settle for the second best option of `coordination'. Similarly, enlightened nationalism or bilateralism may be the first step towards eventual regionalism.

Turning to *principles*, neither the Harmon Doctrine (that of territorial sovereignty) nor that of prescriptive rights or prior appropriation has found general approval. What commands a fair degree of international acceptance is the principle of *equitable apportionment for beneficial uses*. That was the language of the old Helsinki Rules. The present UN Convention on the Non-Navigational Uses of International Water Courses (passed by the General Assembly in 1997, but still awaiting ratification by the stipulated number of countries) requires the watercourse States to "utilize an international watercourse in an equitable and reasonable manner" (Art 5, cl.1). Again, the next clause requires the Watercourse States to "participate in the use, development and protection of an international watercourse in an equitable and reasonable manner". What is `equitable' has of course to be determined with reference to many criteria, and there is enormous scope for differences here, but there is some merit in a general subscription to the principles of equity and reasonableness. Similarly, a general admonition to the upper riparian on the question of causing

harm to the lower riparian is unexceptionable, though the wording has changed from `substantial harm' in the Helsinki Rules to `significant' adverse effects in the UN Convention.

The short point is that if countries falling within a river-basin or sub-basin wish to avoid conflict while planning a project, there are enough principles and guidelines to go by. To put it in a nutshell (even if this runs the risk of over-simplification), the upper riparian, in exercising its powers of control over waters, cannot ignore the *rights* of the lower riparian; and the lower riparian, in asserting its rights over the waters, cannot ignore the *needs* of the upper riparian. Given that kind of understanding, conflicts will either not arise at all or can be resolved without much difficulty when they do.

However, principles are not enough. *Knowledge* and *awareness* are important. Large dams are major interventions in nature and should not be undertaken without the fullest study of the likely consequences and implications of such intervention. This imperative is clear enough in all cases, but becomes even more so when the project is on a trans-boundary river. Environmental Impact Assessments (EIAs) should not stop at boundaries. What happens beyond those boundaries is equally important.

Knowledge so generated must be *shared*. Any planning of dam-building should start with *advance notice* of that intention to all concerned. Here again, the prescription is valid for all cases: the people concerned (those who are likely to be affected adversely as well as those who stand to benefit) must be taken into confidence at the earliest possible stage; and this is even more important if different countries (or political units within a country) are involved.

Advance information should be followed by *continuous consultation.* It is the failure to give notice or consult that has led to (or aggravated) most conflicts. `Consultation' does not mean presenting the other countries concerned (or the people concerned within the country) with a prepared document and asking for comments: the planning should be a `participatory' exercise *ab initio*. This holds good both within a country and between countries. Ideally, there should be *joint* planning; as a second-best course, there should be at least *coordinated* and cooperative planning.

The consultation and cooperation should not be merely an inter-governmental matter: the *people* need to be involved. There has been much talk of `stakeholder participation' in recent years. This is part of the Dublin-Rio principles. It needs to be recognized that stakeholders exist not merely within the borders of the project-planning country but also beyond those borders. The principle of participation applies to them as well.

Similarly, when conflicts do arise or seem likely to arise, the processes of avoidance and resolution cannot be left entirely to governments. Civil society on both sides, represented by respected persons of goodwill and/or by reputable NGOs, has an important role to play. Academic and research institutions too can help. It is being increasingly recognized that such `Track II' efforts, as they have come to be known, can make valuable contributions to the processes of conflict-resolution: they can help to break logjams at the inter-governmental level, gently persuade the governments to go to the negotiating table, facilitate the talks through behind-the-scene `good offices', provide ideas and proposals (`menus') to serve as the basis or starting point for purposeful negotiations, and assist in the finding of answers to the difficulties that arise in the course of such negotiations. This is not a general hypothetical statement; it is based on actual experience. `Track II' activities cannot stop with the signing of a treaty or agreement; they will continue to be needed during the processes of implementation.

Finally, any such treaty or agreement must of course include suitable provisions – consultations, conciliation, mediation, arbitration, adjudication, as may be agreed upon - for the resolution of differences and disputes. As regards institutional mechanisms, there are many models to choose from: bilateral or multilateral commissions; purely governmental bodies or bodies with a large non-official component; advisory or empowered bodies; and so on. What is feasible in a given case will be a function of the felt needs and the facts of geography on the one hand, and the state of political relations between the countries concerned on the other. What is important is that institutional mechanisms appropriate to a given case must be established at a very early stage.

DAMS ON TRANSBOUNDARY RIVERS
Discussion note prepared for the World Commission on Dams

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SUMMARY AND CONCLUSION

Dams on transboundary rivers have many different positive and negative effects. It is impossible to condemn or welcome dams in general, since much depends on the local situation and whether negative effects are mitigated or compensated.

This discussion note approaches the dams issue primarily as a governance issue. It lists a number of policy principles that should be observed (§ 3):
- All environmental, economic and social effects throughout the river basin should be considered
- Dams should have net benefits
- The distribution of costs and benefits should be equitable, both within and between states
- The costs should be recovered from the beneficiaries, including the costs of mitigating or compensating the negative effects
- An impartial assessment of the effects should be made before decisions are taken
- Possibilities for effective public participation that do not stop at national boundaries are essential
- A proper legal and institutional framework should be in place, both at the international and at the national level
- An international strategic river basin management plan should be drawn up

Secondly, this discussion note discusses three obstacles at the international level that may keep states from applying these principles (§ 4):
- Upstream-downstream conflicts
- Bad international relations
- A lack of knowledge and expertise

Application of the principles requires first of all that the principles are disseminated widely. In addition, the obstacles mentioned need to be addressed explicitly. To overcome upstream-downstream conflicts, mechanisms such as issue linkage, diffuse reciprocity and financial compensation could be used. This requires effective negotiations, and several recommendations are given for this. These recommendations can also help to tackle the most intractable problem: bad international relations. In addition, the existing knowledge should be disseminated more widely and some additional research may be necessary, e.g. on public participation approaches. Convincing “success stories” of good governance may help as well. (§ 5)

Considering all this, the advice of the World Commission on Dams could:
- list the policy principles for decision-making related to dams on transboundary rivers
- advise national governments to observe these principles
- advise financing agencies to make lending dependent on observance of these principles by the national government(s) concerned
- suggest means to national governments to overcome upstream-downstream conflicts and improve international relations
- promote the dissemination of the available knowledge and indicate needs for further research.

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1: INTRODUCTION

This discussion note discusses decision-making on dams on transboundary (international or inter-provincial) rivers. It has been written at the request of the World Commission of Dams to propose a possible approach that the Commission could take in formulating its recommendations related to dams on international and inter-provincial rivers. This note discusses the following topics:

- Key characteristics of international river basin management (§ 2)
- Principles for deciding on dams on transboundary rivers (§ 3)
- Three obstacles that may keep states from using these principles (§ 4)
- Ways to overcome these obstacles (§ 5)

The implications for the Commission are spelled out in the summary and conclusion.

2: MANAGING TRANSBOUNDARY RIVER BASINS

The management of transboundary river basins is a complex task that is not always well understood. Two points are central (Mostert ed. 1999). The first is the prevalence of upstream-downstream conflicts. Upstream-downstream conflicts occur whenever the costs and benefits of management are geographically unevenly distributed. Usually the benefits are upstream and the costs downstream, as in the case of irrigation schemes upstream that reduce water availability downstream. Sometimes, however, the benefits are downstream and the costs upstream, as in the case of hydropower dams that benefit primarily downstream areas.[3]

To handle upstream-downstream conflicts well, international (or inter-provincial) co-operation is necessary. International co-operation prevents escalation and may also result in joint projects with benefits for all states involved. However – and this is the second point – the national level remains paramount. States (or sometimes lower-level governments) make international agreements, states are responsible for implementing the agreements, and if international river basin authorities have been established, states are usually represented in the boards. Consequently, to understand and improve transboundary river basin management, one has to look primarily at the national or even sub-national level.

3: PRINCIPLES FOR DEALING WITH DAMS ON TRANSBOUNDARY RIVERS

Decision-making on new and the management of existing dams on transboundary rivers is one form of transboundary river basin management. Many principles have been proposed and best management practices have been formulated on transboundary river basin management. (E.g. ICWE 1992, VROM and V&W 2000) This section contains a selection and reformulation/ specification of those principles and practices that seem most relevant to dams.

Basin-wide scope: net benefits
First and foremost all environmental, economic and social costs and benefits throughout the basin should be considered. New dams should only be built if the total benefits exceed the total costs. Existing dams should be managed in such a way that the benefits exceed the costs, and if this is not possible decommissioning should be considered.

Equitable distribution of costs and benefits
Secondly, the costs and benefits should be distributed equitably, both at the national and at the international level. At the international level two principles of international law may conflict, especially in river basins where the downstream state uses nearly all water resources. The principle of “equitable and reasonable utilisation” would allow the upstream state to use more of the available water resources to the detriment of the downstream state. The “no significant harm” principle, however, would forbid this. (Caflisch 1998)

[3] Upstream-downstream conflicts can also occur in river basins that are located in one jurisdiction, but they are easier to handle.

Full cost recovery
Full-cost recovery through water pricing can be good means to promote that only dams with net benefits are built. The costs recovered should also include the costs of mitigating or compensating negative effects – if necessary across national boundaries. In that case full-cost recovery would also promote an equitable distribution of costs and benefits. Exceptionally, subsidising a dam could be justified to promote regional development or for social reasons. However, other means to achieve the same ends should be studied first.

Impartial environmental, economic and social impact assessment
To determine the costs and benefits and their distribution, impact assessment(s) are necessary. Not only the environmental, but also the economic and social effects should be studied, both positive and negative. Moreover, the assessment should take place prior to decision-making and should be impartial. The assessment could be done either by a third party or by the proponent of the project (state agency or private developer). In the latter case the terms of reference (which alternatives to study, study area etc.) and quality control are essential. (Mostert 1996) All affected states and all stakeholders in these states should be involved in the assessment and counter-expertise should be possible.

Public participation
Public participation can not only improve the assessment, but also decision-making on the dam in question. If organised well, public participation can result in valuable information for the planners and the decision-makers. It can ensure that effects are not overlooked and may promote that legitimate concerns are addressed. It may reduce controversies over dams with net benefits and may help to stop dams with a net loss. However, it is essential that all stakeholders – including those living in other basin states – get a real opportunity to participate. (cf. UN/ECE - UNEP 2000)

A proper institutional and legal framework
Good decision-making also requires a proper institutional, legal and policy framework, both at the national and the international level. Nationally, it is essential that the regulator in charge of protecting the basin and the developer of the dam are independent from each other. Internationally, a platform is necessary where the basin states concerned can co-ordinate monitoring, research and public participation, discuss any problems and, if necessary, resolve conflicts. For this purpose an intergovernmental river basin commission is usually better than a relatively independent river basin authority with autonomous decision-making powers. An authority could be more practical for developing and managing joint infrastructure, such as dams in boundary stretches of rivers. (Mostert 2000)

A good national legal framework is necessary to ensure that the basin states can implement the international agreements that they conclude. Laws regulating the construction and operation of dams should be in place, compliance with the different rules and standards should be monitored, and if necessary effective sanctions should be applied. (cf. UN/ECE - UNEP 2000) The international legal framework is usually less developed and consists maximally of a regional treaty such as the UNECE Convention on Transboundary Watercourses and International Lakes (UNECE 1992), a river basin treaty or boundary (waters) treaty, and a specific treaty concerning the dam or dams concerned. Some attach little importance to a legally binding character of international agreements since non-legally binding agreements can be more ambitious and many have been complied with. (Victor, Raustiala and Skolnikoff eds. 1998)

International river basin planning
Finally, decision-making on dams can only be done correctly if first some thought is given to the aims concerning the river basin concerned and the means. Questions to be addressed include for instance: Does food production has to be increased?; Does this require more irrigation or are there other options?; Should irrigation be increased in this specific river basin?; What other demands are made on the river basin, such as nature protection?; and: Can these demands be reconciled, or should one be given priority? To answer these questions, a good policy and planning framework is essential. This framework should ideally include an international strategic river basin management plan.

4: OBSTACLES

In practice the principles outline above are often not observed. Often there is very little or no international co-operation, some dams have been built only because they received large subsidies, public participation has not always been organised, etc. Limiting ourselves to the international (or interprovincial) level, we can identify three factors that are responsible for this: upstream-downstream conflicts, bad international relations, and lack of knowledge and expertise.[4]

The importance of upstream-downstream conflicts has already been discussed in section 2. Conflicts turn the dams issue from a rational issue into a highly political issue. Scientific information may still play a role, but largely as ammunition in the conflict.

As will be discussed in the next section, there are several ways to overcome upstream-downstream conflicts. However, these can only work if the relations between the states concerned are good. Bad relations create mutual distrust, complicate communication and can make compromises unlikely. If the relations are good, states will always manage to find a solution to their conflicts, or at least the conflict will not escalate. On the other hand, if the relations are bad, this fact alone can create a conflict. (Mostert 1998)

Finally, the necessary knowledge and expertise for applying the principles may be lacking. This is very clear in the case of public participation. Even if all involved wholeheartedly embrace the idea of public participation, it is still very difficult to involve all stakeholders meaningfully. The number of stakeholders can be very high; distances can be very large; documents may have to be translated; stakeholders may have little trust in public participation or may have little time available; many affected citizens may not be organised; etc. Clearly, practical information on how to handle these problems could make public participation more effective.

5: APPLYING THE PRINCIPLES IN PRACTICE

To get the principles applied in practice, it is necessary to address the different obstacles. To handle upstream downstream conflicts a number of mechanisms are available, such as issue linkage, diffuse reciprocity and financial compensation.

Issue linkage implies that a contentious issue on which national interests conflict is linked to another issue where the distribution of costs and benefits is the reverse. An examples of such a set of issues is the construction of a dam in an upstream state that reduces water availability in the downstream state, and river regulation in the downstream state to improve shipping to the upstream state. Solving such issues simultaneously can result in a net gain for all parties involved, thus overcoming the conflict of interests. (LeMarquand 1977, Marty 1997, cf. Meijerink 1999, cf. Golub 1996).

Diffuse reciprocity refers to countries accepting less favourable agreements in order to keep good relations and create a “reservoir of goodwill” (cf. LeMarquand 1977) from which they can draw in the future.

Financial compensation are payments by a party with a net gain to parties with a net loss to compensdate for this loss. Financial compensation is most effective in the case of purely economic or financial losses. It is less effective when deeply held values or basic human needs are involved, as is often the case with water, and can be experienced as bribery. (Cf. Hisschemöller and Midden 1989, Zeiss 1991)

Using these mechanisms requires an agreement between all involved, and to reach such an agreement negotiations are necessary. The international literature on negotiations contains many

[4] Factors that are operation primarily at the national level include lobbying combined with not-transparent decision-making processes, considerations of prestige and regulators that have a stake in the construction of infrastructure. These factors are not further discussed.

valuable advices for making the negotiations more effective – to the benefit of all involved. (e.g. Fisher and Ury 1981, Mastenbroek 1996). Specific "lessons" include the following:

- The *scope* of the negotiations should not be too narrow since this would preclude many possibilities for issue linkage. At the same time, one should not discuss everything at the same time as this makes the negotiations too complex and may result in too general and vague solutions (Moore 1990).
- All negotiators should keep close *contact with their national governments and stakeholders* to prevent that draft agreements are not approved or that agreements that are approved turn out to be impossible to implement. Yet, their *mandates* should not be too strict, since this would limit their possibilities to explore possible solutions. The negotiators should get sufficient information from their constituency and keep their trust.
- The negotiators should not focus on the conflicting positions (e.g. for or against a dam), but on their *underlying interests*. This minimizes the chance of hard confrontations and deadlocks and increases the chance of an integrative agreement that meets all interests maximally.
- Further activities that promote agreement are searching for *common interests and principles* and for solutions that, while promoting one's interests maximally, are also acceptable for the other parties. Each party should *let the other "score"*, that is, make concessions on points that are important for the other party but not so important for yourself.
- Moreover, several potential integrative solutions should be explored and *a minimum of three alternatives* should be considered in negotiations to prevent too strong confrontations. To facilitate this, negotiations should include an *informal exploratory phase*.

Negotiations can only be successful if there is a basic level of trust; if there is no trust at all the states will not even be willing to start negotiations. There are no easy ways to develop trust; it may take a long time. However, there are a few lessons from the literature on negotiations that may prove useful:

- Especially if negotiations are hard, it is essential that the negotiators maintain and foster a *good atmosphere* and good interpersonal relations.
- In some cases *mediators and facilitators* may be useful, e.g. in the case of inflexible polarised positions and in the case of large cultural differences and therefore a large potential of miscommunication. (Cohen 1993, Painter 1995)
- Negotiators should be very wary of trying to influence the *balance of power* to get more out of the negotiations, since this can easily spoil the atmosphere and cause disruptive power struggles.
- It is often useful to *start discussing factual issues* before addressing the more value-laden "real" issues. This may make it easier to find and develop areas of agreement and promote mutual trust (cf. Brehmer 1989, cf. Vlek and Cvetkovich 1989). In general it is better to start with the less controversial issues.

Concerning the third obstacle – lacking knowledge and expertise – we already said that more information on effective approaches for public participation would be useful. Much information is available on the North America and – to lesser extent – Europe, but it is not clear to what extent this information is applicable to other parts of the world. Also more information on the other principles would be useful. Most can be expected from more information on the mechanisms to overcome conflicting interests and on effective negotiations. Overcoming conflicts and effective negotiations are in the interest of all states concerned, and this is the best safeguard for implementation in practice. In addition, training programmes and other forms of capacity building could be useful.

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DEVELOPMENT AND TRANSBOUNDARY WATERS: OBSTACLES AND OPPORTUNITIES

Submitted to the:
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SUMMARY

There are 261 watersheds which cross the political boundaries of two or more countries. These international basins cover 45.3% of the land surface of the earth, affect about 40% of the world's population, and account for approximately 80% of global river flow (Wolf et. al 1999). These basins have certain characteristics that make their management especially difficult, most notable of which is the tendency for regional politics to regularly exacerbate the already difficult task of understanding and managing complex natural systems. Disparities between riparian nations – whether in economic development, infrastructural capacity, or political orientation – add further complications to water resources development, institutions, and management. As a consequence, development, treaties, and institutions are regularly seen as, at best, inefficient; often ineffective; and, occasionally, as a new source of tensions themselves. Despite the tensions inherent in the international setting, riparians have shown tremendous creativity in approaching regional development, often through preventive diplomacy, and the creation of "baskets of benefits" which allow for positive-sum, integrative allocations of joint gains.

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INTRODUCTION: The Transboundary Setting

A closer look at the world's international basins gives a greater sense of the magnitude of the issues: First, the problem is growing. There were 214 international basins listed in 1978 (United Nations 1978), the last time any official body attempted to delineate them, and there are 261 today. The growth is largely the result of the "internationalization" of national basins through political changes, such as the break up of the Soviet Union and the Balkan states, as well as access to today's better mapping sources and technology.

Even more striking than the total number of basins is a breakdown of each nation's land surface which fall within these watersheds. A total of 145 nations include territory within international basins. Twenty-one nations lie in their entirety within international basins; including these, a total of 33 countries have greater than 95% of their territory within these basins. These nations are not limited to smaller countries, such as Liechtenstein and Andorra, but include such sizable countries as Hungary, Bangladesh, Byelarus, and Zambia (Wolf et al. 1999).

A final way to visualize the dilemmas posed by international water resources is to look at the number of countries which share each international basin. Nineteen basins are shared by five or more riparian countries: one basin – the Danube, has 17 riparian nations; five basins – the Congo, Niger, Nile, Rhine and Zambezi – are shared by between nine and 11 countries; and the remaining 13 basins – the Amazon, Ganges-Brahmaputra-Meghna, Lake Chad, Tarim, Aral Sea, Jordan, Kura-Araks, Mekong, Tigris-Euphrates, Volga, La Plata, Neman, and Vistula (Wista) – have between five and eight riparian countries.[6]

WATER, CONFLICT, AND COOPERATION

Development on waters which cross political boundaries have additional complexities brought on by strains in riparian relations and institutional limitations. Recent studies, particularly in the field of environmental security, have focused on the conflict potential of these international waters. Some stress the dangers of violence over international waters (see, for example, Gleick 1993, Homer-Dixon 1994, Remans 1995, Westing 1986, and Samson and Charrier 1997), while others argue more strongly for the possibilities and historic evidence of cooperation between co-riparians (see Libiszewski 1995, Wolf 1998, and Salman and de Chazournes 1998). The fortunate corollary of water as an inducement to conflict is that water, by its very nature, tends to induce even hostile co-riparians to cooperate, even as disputes rage over other issues. In fact, the weight of historic evidence tends to favor water as a catalyst for cooperation: nations have signed 3,600 water-related treaties since AD 805, while, in the same period, there have been only seven minor international water-related skirmishes (Wolf 1998).[7]

Much of the recent thinking about the concept of "environmental security," though, has moved beyond a presumed causal relationship between environmental stress and violent conflict to a broader notion of "human security" – a more inclusive concept focusing on the intricate sets of relationships between environment and society, and encompassing issues of internal stability and sub-acute tensions. It is important to understand in this context there *is* history of water-related violence – it is a history of incidents at the sub-national level, generally between tribes, water-use sectors, or states/provinces. In fact, there are many examples of internal water conflicts ranging from interstate violence and death along the Cauvery River in India, to California farmers blowing up a pipeline meant for Los Angeles, to much of the violent history in the Americas between indigenous peoples and European settlers. There is also an extensive history of sub-acute tensions between, for example, Arabs and Israelis, Indians and Pakistanis, and even between non-contiguous nations, such as Egypt and Ethiopia.

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[6] Note: We should be able to calculate how many large dams are in international basins within two or three weeks, as well as how many new ones are projected by the end of September.

[7] The only "water war" between nations on record occurred over 4,500 years ago, between the city-states of Lagash and Umma in the Tigris-Euphrates basin (Cooper 1983).

THE TRANSBOUNDARY FRESHWATER DISPUTE DATABASE

To aid in the assessment of the process of water conflict resolution, we have been working over the past five years to develop the Transboundary Freshwater Dispute Database, a project of the Oregon State University Department of Geosciences, in collaboration with the Northwest Alliance for Computational Science and Engineering. The Database currently includes: a digital map of the world's 261 international watersheds; a searchable compilation of 300 water-related treaties, along with the full text of each; an annotated bibliography of the state of the art of water conflict resolution, including approximately 1,000 entries; negotiating notes (primary or secondary) from fourteen detailed case-studies of water conflict resolution; a comprehensive news file of all reported cases of international water-related disputes and dispute resolution (1950-2000); and descriptions of indigenous/traditional methods of water dispute resolution.

A current project of the Database is called, "Basins at Risk," which attempts to assess the indicators of settings with a high potential for water disputes. By correlating each of the incidents of water conflict and cooperation against the bio-physical, geopolitical, and socio-economic setting which existed when each event occurred, we hope to be able to identify the international basins which are at the greatest risk for potential dispute in the near future. It is to be hoped that the appropriate international agencies might then be able to focus energy and resources on these "basins at risk" for activities of preventive diplomacy, in order to ameliorate the potential for conflict.

While the study is not yet complete (we anticipate final results in September 2000), the project is already yielding some preliminary results which are appropriate to the work of the World Commission on Dams:

Our working hypothesis on the project is as follows:

"The likelihood of conflict rises as the rate of change within the basin exceeds the institutional capacity to absorb that change."

This suggests that there are two sides to the dispute setting – the rate of change in the system, and the institutional capacity. Clearly, one of the most rapid rates of change within a basin, with an attendant risk for conflict, occurs when a dam or major development project is constructed (the other is the "internationalization" of national systems, as will be explored below). The likelihood of dispute over such a development rises with low institutional capacity – for example when there is no treaty or other regional agreement, or when relations are especially bad over other issues.[8]

PATTERNS AND INDICATORS OF CONFLICT

In general, a pattern which emerges is as follows. Riparians of an international basin implement water development projects unilaterally first on water within their territory, in attempts to avoid the political intricacies of the shared resource. At some point, as water demand approaches supply, one of the riparians, generally the regional power,[9] will implement a project which impacts at least one of its neighbors. This might be to continue to meet existing uses in the face of decreasing relative water availability, as for example Egypt's plans for a high dam on the Nile, or Indian diversions of the Ganges to protect the port of Calcutta, or to meet new needs reflecting new agricultural policy, such as Turkey's GAP project on the Euphrates.

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[8] Please note that these are *preliminary* findings, and should not be quoted without the author's permission. The final report is due by the end of September 2000.

[9] "Power" in regional hydropolitics can include riparian position, with an upstream riparian having more relative strength *vis a vis* the water resources than its downstream riparian, in addition to the more-conventional measures of military, political, and economic strength. Nevertheless, when a project is implemented which impacts one's neighbors, it is generally undertaken by the regional power, as defined by traditional terms, *regardless* of its riparian position.

This project which impacts one's neighbors can, in the absence of relations or institutions conducive to conflict resolution, become a flashpoint, heightening tensions and regional instability. Each of these projects is preceded by indicators of impending or likely water conflict, which might include:

Water quantity issues. Often, simply extrapolating water supply and demand curves will give an indication of when a conflict may occur, as the two curves approach each other. The mid-1960's, a period of water conflict in the Jordan basin, saw demand approaching supply in both Israel and Jordan. Also, major shifts in supply might indicate likely conflict, due to greater upstream use or, in the longer range, to global change. The former is currently the case both on the Mekong and on the Ganges. Likewise, shifts in demand, due to new agricultural policies or movements of refugees or immigrants can indicate problems. Water systems with a high degree of natural fluctuation can cause greater problems than relatively predictable systems.

Water quality issues. Any new source of pollution, or any new extensive agricultural developing resulting in saline return flow to the system, can indicate water conflict. Arizona return flow into the Colorado was the issue over which Mexico sought to sue the USA in the 1960s through the International Court of Justice, and is currently a point of contention on the lower Jordan between Israel, Jordanians, and West Bank Palestinians.

Management for multiple use. Water is managed for a particular use, or a combination of uses. A dam might be managed for storage of irrigation water, power generation, recreation, or a combination, for example. When the needs of riparians conflict, disputes are likely. Many upstream riparians, for instance, would manage the river within their territory primarily for hydropower where the primary needs of their downstream neighbors might be timely irrigation flows. Chinese plans for hydropower generation and/or Thai plans for irrigation diversions would have an impact on Vietnamese needs for both irrigation and better drainage in the Mekong Delta.

Political divisions. A common indicator of water conflict is shifting political divisions which reflect new riparian relations. Such is currently the case throughout Central Europe as national water bodies, such as the Amu Dar'ya and the Syr Dar'ya, become international. Conflicts, including those on the Ganges, the Indus, and the Nile, took on international complications as the central authority of a hegemon, in these cases the British empire, dissipated.

Along with clues useful in anticipating whether or not water conflicts might occur, patterns based on past disputes may provide lessons for determining both the type and intensity of impending conflicts. These indicators might include:

Geopolitical setting. As mentioned above, relative power relationships, including riparian position, determine how a conflict unfolds. A regional power which also has an upstream riparian position is in a greater situation to implement projects which may become flashpoints for regional conflict. Turkey and India have been in such positions on the Euphrates and the Ganges, respectively. In contrast, the development plans of an upstream riparian may be held in check by a downstream power as, for example, have Ethiopia's plans for Nile development by Egypt.

The perception of unresolved non-water related issues with one's neighbors, both water-related and otherwise, is also an exacerbating factor in water conflicts. Israel, Syria, and Turkey, each and respectively have difficult political issues outstanding, which makes discussions on the Jordan and Euphrates more intricate.

Level of national development. Relative development can inform the nature of water disputes in a number of ways. For example, a more-developed region may have better options to alternative sources of water, or to different water management schemes, than less-developed regions, resulting in more options once negotiations begin. In the Middle East multilateral working group on water, for instance, a variety of technical and management options, such as desalination, drip irrigation, and moving water from agriculture to industry, have all been presented, which in turn supplement discussions over allocations of international water resources.

Different levels of development within a watershed, however, can exacerbate the hydropolitical setting. As a country develops, personal and industrial water demand tends to rise, as does demand for previously marginal agricultural areas. While this can be somewhat balanced by more access to water-saving technology, a developing country often will be the first to develop an international resource to meet its growing needs. Thailand has been making these needs clear with its relatively greater emphasis on Mekong development.

The hydropolitical issue at stake. In a survey of fourteen river basin conflicts, Mandel (1992) offers interesting insight relating the issue at stake with the intensity of a water conflict. He suggests that issues which include a border dispute in conjunction with a water dispute, such as the Shatt al-Arab waterway between Iran and Iraq and the Rio Grande between the US and Mexico, can induce more severe conflicts than issues of water quality, such as the Colorado, Danube, and La Plata rivers. Likewise, conflicts triggered by human-initiated technological disruptions -- dams and diversions -- such as the Euphrates, Ganges, Indus, and Nile, are more severe than those triggered by natural flooding, such as the Columbia and Senegal rivers.

One interesting lack of correlation is also found in Mandel's study -- that between the number of disputants and intensity of conflict. He suggests that this challenges the common notion that the more limited, in terms of number of parties involved, river disputes are easier to resolve.

Another surprising lack of correlation that we seem to be finding is, somewhat counter-intuitively, that climate seems not to be a major variable in water disputes. This fact may be because water has multiple uses, but these uses vary in critical importance, depending on climatic conditions. The hydropower or transportation offered by a river in a humid climate is no less important to its riparians than is the irrigation water provided by a river in an arid zone.

Institutional control of water resources. An important aspect of international water conflicts is how water is controlled *within* each of the countries involved. Whether control of the resource is vested at the national level, as in the Middle East, the state level, as in India, or at the sub-state level, as in the United States, informs the complication of international dialogue. Also, *where* control is vested institutionally is important. In Israel, for example, the Water Commissioner for years was under the authority of the Ministry of Agriculture, whereas Jordanian control is at the ministerial level, with the Ministry of Water. These respective institutional settings can make internal political dynamics quite different for similar issues.

National water ethos. This term incorporates several somewhat ambiguous parameters together which determine how a nation "feels" about its water resources, which in turn can help determine how much it "cares" about a water conflict. Some factors of a water ethos might include:

- "mythology" of water in national history, eg. Has water been the "lifeblood of the nation?" Was the country built up around the heroic *fellah*? Is "making the desert bloom" a national aspiration? In most countries, in contrast, water plays little role in the national history.
- importance of water/food security in political rhetoric;
- relative importance of agriculture versus industry in the national economy.

BASKETS OF BENEFITS

One productive approach to the development of transboundary waters has been to examine the benefits in the basin from a regional approach. This has regularly required the riparians to get past looking at the water as a commodity to be divided – a zero-sum, rights-based approach – and rather to develop an approach which equitably allocates not the water, but the benefits derived therefrom – a positive-sum, integrative approach. The boundary waters agreement between the USA and Canada, for example, allocates water according to equal benefits, usually defined by hydropower generation. This results in the seemingly odd arrangement that power may be exported out of basin for gain, but the water itself may not. In the 1964 treaty on the Columbia, an arrangement was worked out where the USA paid Canada for the benefits of flood control and Canada was granted rights to divert water between the Columbia and Kootenai for hydropower. Likewise, the 1975 Mekong accord defines "equality of right" not as equal shares

of water, but as equal rights to use water on the basis of each riparian's economic and social needs. The relative nature of "beneficial" uses is exhibited in a 1950 agreement on the Niagara, flowing between the USA and Canada, which provides a greater flow over the famous falls during "show times" of summer daylight hours, when tourist dollars are worth more per cubic meter than the alternate use in hydropower generation.

In many water-related treaties, water issues are dealt with alone, separate from any other political or resource issues between countries -- water *qua* water. By separating the two realms of "high" and "low" politics, or by ignoring other resources which might be included in an agreement, some have argued, the process is either likely to fail, as in the case of the 1955 Johnston accords on the Jordan, or more often to achieve a sub-optimum development arrangement, as is currently the case on the Indus agreement, signed in 1960. Increasingly, however, linkages are being made between water and politics, between water and other resources. These multi-resource linkages may offer more opportunities for creative solutions to be generated, allowing for greater economic efficiency through a "basket" of benefits. Some resources which have been included in water negotiations include:

Financial resources. An offer of financial incentives is occasionally able to circumvent impasses in negotiations. World Bank financing helped resolve the Indus dispute, while UN-led investments help achieve the Mekong Agreement. Cooperation-inducing financing has not always come from outside of the region. Thailand helped finance a project in Laos, as did India in Pakistan, in conjunction with their respective watershed agreements. A provision of the Nile Waters Treaty has Egypt paying Sudan outright for water to which they both agreed Sudan had rights, but that it was not able to use.

Energy resources. One increasingly common linkage being made is that between water and energy resources. As noted above, in conjunction with the Mekong Agreement, Thailand helped fund a hydroelectric project in Laos in exchange for a proportion of the power to be generated. In the particularly elaborate 1986 Lesotho Highlands Treaty, South Africa agreed to help finance a hydroelectric/water diversion facility in Lesotho -- South Africa acquired rights to drinking water for Johannesburg, and Lesotho receives all of the power generated. Similar arrangements have been suggested in China on the Mekong, Nepal on the Ganges, and between Syria and Jordan on the Yarmuk.

Political linkages. Political capital, like investment capital, might likewise be linked to water negotiations, although no treaty to date includes such provisions. This linkage might be done implicitly, as for example the parallel but interrelated political and resource tracks of the Middle East peace talks, or explicitly, as talks between Turkish acquiescence on water issues have been linked in a quid pro quo with Syrian ties to Kurdish nationalists.

Data. As water management models become more sophisticated, water data is increasingly vital to management agencies. As such, data itself can be used as a form of negotiating capital. Data-sharing can lead to breakthroughs in negotiations -- an engineering study allowed circumvention of an impasse in the Johnston negotiations when it was found that Jordan's water needs were not as extensive as had been thought, allowing for more room in the bargaining mix. In contrast, the lack of agreed-to criteria for data in negotiations on the Ganges has hampered progress over the years.

Data issues, when managed effectively, can also allow a framework for developing patterns of cooperation in the absence of more contentious issues, particularly water allocations. For one, data gathering can be delegated to a trusted third party or, better, to a joint fact-finding body made up of representatives from the riparian states. Perhaps the best example of this internationally is on the Mekong, where the Mekong Committee's first five-year plan consisted almost entirely of data-gathering projects, effectively both precluding data disputes in the future, and allowing the riparians to get used to cooperation and trust.

Water-related "baskets." Some of the most complete "baskets" were negotiated between India and Nepal, in 1959 on the Bagmati and the Gandak, and in 1966 on the Kosi (all tributaries of the Ganges). These two treaties include provisions for a variety of water related projects, including

irrigation/hydropower, navigation, fishing, related transportation, and even aforestation -- India plants trees in Nepal to contain downstream sedimentation. While Nepal has expressed recent bitterness to both these accords, the structures of these treaties are good examples of how broader "baskets" can allow for more creative solutions.

WHAT TYPES OF POLICY RECOMMENDATIONS CAN ONE MAKE?

Given these lessons, what can the international community do?

International Institutions:

Water dispute amelioration is as important, more effective, and less costly, than conflict resolution. Watershed commissions should be developed for those basins which do not have them, and strengthened for those that do.

Three characteristics of international waters – the fact that conflict is invariably sub-acute, that tensions can be averted when institutions are established early, and that such institutions are tremendously resilient over time – inform this recommendation. Early intervention can be far less costly than conflict resolution processes. In some cases, such as the Nile, the Indus, and the Jordan, as armed conflict seemed imminent, tremendous energy was spent getting the parties to talk to each other. In contrast, discussions in the Mekong Committee, the multilateral working group in the Middle East, and on the Danube, have all moved beyond the causes of immediate disputes on to actual, practical projects which may be implemented in an integrative framework.

Funding and Development Assistance Agencies:

Water-related needs to be coordinated and focused, relating quality, quantity, groundwater, surfacewater, and local socio-political settings in an integrated fashion. Funding should be commensurate with the responsibility assistance agencies have for alleviating the global water crisis.

Ameliorating the crux of water security – human suffering – often rests with agencies that, given the size of the crisis, are extraordinarily underfunded. One can contrast the resources spent on issues such as global change and arms control, laudable for their efforts to protect against potential loss of life in the future, to the millions of people now dying because they lack access to clean fresh water. Agencies such as USAID, CIDA, and JICA have the technical expertise and experience to help, yet are hindered by political and budgetary constraints. Funding agencies often are hamstrung by local politics. A powerful argument can be made that water-related disease costs the global economy US$125 billion per year, while ameliorating the diseases would cost US$7-50 billion in total (Gleick 1998). Programs such as USAID's Project Forward, which integrates water management with conflict resolution training, offer models for the future.

Universities and Research Agencies:

Universities and research agencies can best contribute to alleviation of the water crisis in three major ways: 1) Acquire, analyze, and coordinate the primary data necessary for good empirical work; 2) Identify indicators of future water disputes and/or insecurity in regions most at risk; and 3) Train tomorrow's water managers in an integrated fashion.

The internet's initial mandate is still one of the best: to allow communication between researchers around the world to exchange information and enhance collaboration. The surplus of primary data currently threatens an information overload in the developed world, while the most basic information if often be lacking in the developing world. Data availability not only allows for greater understanding of the physical world but, by adding information and knowledge from the social, economic and political realms, indicators showing regions at risk can be identified.

Private Industry:

Private industry has historically taken the lead in large development projects. As the emphasis in world water shifts to a smaller scale, and from a focus on supply to one on demand management and improved quality, private industry has much to offer.

Private industry has three traits that can be harnessed to help ameliorate the world water crisis: their reach transcends national boundaries, their resources are generally greater than those of public institutions, and their strategic planning is generally superb. Historically, private companies such as Bechtel and Lyonnaise des Eaux have been involved primarily in large-scale development projects, while the smaller-scale projects have been left to development assistance agencies. Recently, a shift in thinking has taken place in some corporate board rooms. Bank of America, for example, was not involved in the California-wide process of water planning until recently, when its president noticed that practically *all* of the bank's investments relied on a safe, stable supply of water. This was true whether the investments were in micro-chip manufacturing, mortgages, or agriculture. When the bank became involved in the "Cal-Fed Plan," it brought along its lawyers, facilitators and planning expertise, and its financial resources. Subsequently, progress was made in several areas where previously there had been impasse.

Civil Society:

Inherent in our recognition that the most serious problems of water security are those at the local level, is the attendant recognition that civil society is among the best suited to address local issues.

One recurrent pattern in water resources development and management has been a series of projects or approaches in opposition to local values, customs and other cultural processes. Examples of these include large projects such as dams that have displaced hundreds of thousands of people and wiped out sites of cultural and religious heritage, projects promoting water markets among religious groups for whom the idea is sacrilege, or activities as seemingly minor as cutting down a tree sacred to a village djinn. In recent years, as a consequence, those affected by a project have been increasingly involved in the decision-making process, and such efforts must be strongly encouraged.

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Additional Articles

The Hindu edit page articles by Kalpana Sharma on 27th and 28th April, 1999.

'Harnessing' rivers I - By Kalpana Sharma

THANKS TO chaos in Delhi over the formation of a government, all other issues that the country ought to address seemed to have been put on the back burner. One more massacre takes place in Bihar but it is hardly noticed. Villagers opposing the privately- constructed Maheshwar dam in Madhya Pradesh go on a hunger- strike, their demonstration is brutally broken up by the police but hardly anyone notices. The dilemmas of development are thus, yet again, buried in the high drama of politics. Yet, whatever the shape of the next government, these are issues that will have to be addressed. Do we do anything about continuing Dalit massacres in Bihar and blatant discrimination elsewhere? How do we deal justly and equitably with displacement when dams, roads, power plants and other infrastructure projects are planned? Should the affected communities have a say in such decisions? These are not academic questions. They govern the lives of millions of people. Yet, they figure nowhere on the "national" agenda.

Some of these deeper philosophical questions on how we view and use the natural resources came up at a recent meeting in Kathmandu convened jointly by the Centre for Policy Research (CPR), New Delhi, the Bangladesh Unnayan Parishad (BUP), Dhaka, and the Institute for Integrated Development Studies (IIDS), Kathmandu. Discussions centred on arriving at a consensus on "harnessing" the eastern rivers for the benefit of the entire region.

More than one person asked whether "harnessing" was an appropriate concept in thinking about a natural resource such as river. The debate over "taming" or harnessing rivers, as one would harness a horse, has raged for many years. The question how best to control the turbulence of swollen rivers, for instance, has never been properly concluded. The solution suggested by many who live in flood-prone areas like north Bihar is to leave the river alone and instead prepare themselves for the annual flood. These people argue that in the past floods did some damage but also a great deal of good. The silt they deposited on the land added greatly to its fertility. Within a few weeks of the flood, the land would be ready for cultivation. Today, thanks to embankments, rivers have no natural way to discharge silt. It builds up, raises the level of riverbeds and forces the river to break through any weak spot on the embankment. The force of this flood destroys everything in its wake. There are no benefits. Worse still, the water does not recede for months, sometimes years, as the embankments destroy the natural drainage of the land.

By virtue of its being at the tail-end of all major rivers flowing through this region, Bangladesh has to suffer devastating floods during monsoon and shortages during the dry season. The differences with India over sharing of the Ganga waters after the construction of the Farakka barrage are now legion. Despite the 1996 treaty between the two countries, the problems are by no means over as this writer saw firsthand during a visit to that country.

For one, there is the practical problem of implementing a lean season sharing formula. An intricate system of measuring and checking has been put in place. But ultimately the successful implementation of the treaty depends on trust. At the moment, the ruling party in Bangladesh is for the treaty. A change of government could result in reopening of all issues on water sharing.

The dominant belief in Bangladesh, echoed by politicians, technocrats and even the media is that the overall quantity of water in the Ganga is less today than in previous years because of excessive use by India upstream. Thus, Bangladesh has been pushing for ways to "augment" the river waters, a concept unique to the subcontinent. Whether augmentation is needed and whether it will make a difference or not are still issues being debated. But central to any future strategy is Nepal's role. Many of the rivers which are in floods annually and bring with them huge loads of silt, like the Kosi which enters India in north Bihar, flow through Nepal. It is argued that a high dam on such a river could help regulate flows during the peak and low seasons. Although on paper this might sound a straightforward proposition, it is not so simple. Why, for instance, should Nepal agree to build large storage reservoirs unless it gets some benefits? While it could sell the excess power

generated by such projects, is it worth the price it will pay in terms of environmental costs? Equally relevant is the destabilising impact of large projects, attracting large funds, in a poor economy. Several of the projects recommended will cost many times more than Nepal's annual budget. For a country struggling to establish a democratic system and already heavily dependent on donor-money, such additional funds could prove disastrous.

Apart from the pros and cons of "augmentation", the original proposition - that flows in the Ganga are declining - is taken as a given. According to Mr. M. Ramaswamy Iyer, former Water Resources Secretary and now with CPR, although the quantum of water fluctuates seasonally, the overall quantity has not declined significantly. He argues that what is needed are not high dams and canals to feed more water into the Ganga during the lean season but a wiser use of the water.

Interestingly, one of the papers presented, which was a consensus document among the three institutes, also mentions this as one of three ways to augment supply. One way is to divert water without creating a storage and use barrages and canals, the second is a major surface water storage through dams and a third, "indirect form", is "through efficient management strategy emphasising conservation. This strategy might include conservation and management measures like water rationing, improved distribution of the available supplies, increased efficiency of water use, rain harvesting, prevention of water pollution, recycling and appropriate pricing policy."

Although this has been presented as a third alternative - which is mentioned but not seriously addressed as the rest of the paper concentrates on the second option of building dams - it ought to be the first. For this is a strategy that all the three countries could implement right away regardless of the areas of cooperation. However, the argument against making this option priority is always "time". For instance, Mr. B. G. Verghese, who has written extensively on water-related issues, emphasises that "time is of the essence" and that there is no room for debates that delay decisions on harnessing water resources for irrigation and power in all the three countries. Delay leads to escalation of cost. For instance, although the Mahakali Treaty between India and Nepal was signed in 1996, no progress has been made on building the Pancheswar Dam, thereby leading to a 20 per cent escalation in cost. Regarding environmental costs, Mr. Verghese holds that there is no such thing as a "pristine" forest in this region which has to be saved as much of the vegetation is secondary. Thus, these considerations should not colour the importance of projects which would provide long-term benefits.

Mr. Iyer, on the other hand, projects a different view. He says that proponents of large projects hold that all their negative implications could be foreseen. But experience has shown that this is not true. They also assume that these problems can be remedied or compensated. This too has not happened in most recent projects in India. He says that the alternatives are generally dismissed even without being given a chance. He suggests that big projects are pushed because it is easier for a technocratic bureaucracy to build one large dam than to manage and regulate several smaller projects.

'Harnessing' rivers II - By Kalpana Sharma

THE DEBATE over how best to use the hydro resources of India, Bangladesh and Nepal for their common benefit throws up important issues that have to be resolved internally by each nation. However, the fascination with large multi-purpose projects to deal with the needs of power, irrigation and flood control continues to dominate the discourse - both official and unofficial - within these countries and among them. Take the issue of floods and the role storage dams can play in controlling them. There are 6,000 big and small rivers in Nepal which then feed into the major river systems and finally merge with the Ganga. These are snow-fed rivers which also bring with them a heavy load of silt. Sometimes, a cloudburst can result in an enormous quantity of silt in just one day as a mountainside collapses into the river. Thus, it is difficult to plan engineering interventions without accommodating these imponderables.

During monsoon, these rivers affect the low-level areas in Nepal and north Bihar. The increase in the water level in the Ganga ultimately takes its toll on Bangladesh. The two worst floods were witnessed in 1988 and last year when 60 per cent of the country was submerged. The engineering approach is to create reservoirs that can store monsoon water and control the rate at which it is

released. A second approach is to build embankments to prevent the river spilling over its banks. A third is to create channels to improve the flow of the river and the fourth is to improve the drainage. All these are solutions based on the belief that the river can and should be controlled. The problem with the first option, as even engineers acknowledge, is that it is difficult to justify a high dam just for flood control. If its purpose is to serve the needs of irrigation and power, these two requirements are likely to be placed on a higher priority than flood control. A majority of the multi-purpose dam projects in India are outside the Himalayan Ganga system.

The belief that embankments "protect" vulnerable areas from floods has repeatedly been proved wrong. Bangladesh has 8,300 km of embankments which are breached at several points every year. According to a joint paper prepared by the Centre for Policy Research (CPR), the Bangladesh Unnayan Parishad (BUP) and the Institute for Integrated Development Studies (IIDS), embankments in India and Bangladesh have "inadvertently added severe problems like drainage congestion" because they cut off the natural drainage. The drainage sluices which are provided cannot function when the water levels are high.

According to the paper, "Some persons in the 'protected areas' claim that while nature's floods last only for a few days, 'man- made' floods last for months, if at all they drain out." The paper concludes that embankments will be satisfactory "only in suitable locations if properly designed, well-executed and adequately maintained." This conclusion, however, hides the reality that there are few "suitable locations" for embankments and that the design, execution and maintenance do not detract from the fact that they cause more damage than good.

In the Eastern Kosi Embankment area of north Bihar, for instance, an estimated 1,82,000 hectares is permanently waterlogged. On the western side, an estimated 94,000 hectares is under water throughout the year and of this 34,000 hectares cannot be saved. All the drainage schemes so far have failed. Thus, concludes Mr. Dinesh Kumar Mishra of the Barh Mukti Andolan in north Bihar (in an article in the South Asian monthly Himal January 1999), "the only solution is to do away with the embankments and allow the river to go ahead with its natural land-building process."

An unlikely, though strong, supporter of Mr. Mishra's position is Bihar's Inspector-General of Police, Mr. Ramachandra Khan, whose family was uprooted after the 1986 floods in the Kosi. In an interview to Himal, he terms the Kosi flood-control project not just a failure but "devastation, disaster, catastrophe." The plan, he says, has failed and only resulted in greater corruption. Indeed, the irony in Bihar is that while the embankments lengthened from 160 km in 1954 to 3,454 km in 1988, the flood-prone area did not decrease. Instead, it increased from 2.5 million hectares in 1954 to 6.46 million hectares in 1988. Mr. Mishra has long argued that even the British did not embark on a policy of building embankments because they thought that it was unwise. But the independent Indian Government decided to undertake an engineering solution, thereby increasing the sufferings of people in north Bihar many times over. People were deluded into believing that the embankments would become more effective once a high dam was built on the Kosi. The negotiations between India and Nepal on the 290-metre Kosi High Dam remain inconclusive although in the meantime a barrage has been constructed on the border. It is not clear whether the dam, if built, will actually reduce the damage from floods in north Bihar. The high dam solution also does not accommodate the real costs of displacement and the dangers of building such structures in a geologically unstable region. The tendency of those recommending a one-time solution for all ills is to gloss over these problems while emphasising the benefits of the economies of scale. But the costs of not realising that certain things do not have a simple technological fix have to be borne by ordinary people, such as poor farmers living in north Bihar, and not by the technocrats pushing these "solutions". Given the dismal record of embankments as an effective tool for flood control in both India and Bangladesh, it remains a mystery why independent research organisations in both countries still consider these a solution. In fact, much more practical and feasible is the "non-structural" approach suggested in one of the papers prepared jointly by three institutes.

At the moment, despite apparent improvements in the technology, the apparatus for giving Bangladesh adequate advance flood warning is not in place. Bangladesh's river authorities point out that a flood-warning system could help reduce some of the problems as even a few hours of advance warning enabled people to be prepared.Indeed, the agreed position as articulated in the

joint paper includes, apart from flood forecasting and warning services, flood plain management measures, disaster relief, flood fighting including public health measures and flood insurance.

These are areas in which, without too much controversy, India and Bangladesh can share data and experience and develop joint strategies. This will not cost too much, will not take too much time, and it could make a real difference in terms of the annual devastation caused by floods, particularly in Bangladesh.

The effort by the institutes to arrive at a "consensus" on "harnessing" water resources has tended to hide the value of alternatives. Thus, the easily agreed upon strategies of building large projects are projected as solutions while hidden in the text are viable alternatives that are not given equal weightage. This is a pity. For although there is a great deal that can be gained by all the countries in the region through cooperation and dialogue, approaches to the use of resources have to be developed internally based on an honest assessment of the lessons of the past - including the cost of pursuing capital-intensive strategies instead of low-cost alternatives - and a realistic assessment of the needs of the future. (Concluded)

Editorial, Kathmandu Post, June 27, 2000

Go to the Hague

The construction of the 22 kilometres long South Laxmanpur barrage across the Rapti river without Nepal's consent is a clear violation by India of the international laws, practices and norms. It is beyond any Nepali's comprehension how a democratic country like India could have done so undemocratic a deed and brought woe and misery to thousands of Nepalese people living near the Nepal-India border. Had New Delhi harboured friendly attitude towards the Nepalese people or had it not undermined Nepal's just demands and dues, such a huge afflux dam that dislocates thousands of Nepali villagers and inundates hundreds of thousands of hectares of arable land, would not have been possible. The callous attitude shown by India towards Nepal's sensitivities and genuine grievances should come to an end and an amicable solution to the problem posed by the Laxmanpur barrage must be found. But, as things now stand at an advanced stage, this does not look at all feasible.

India, under the Koshi agreement, has built a dam across the Koshi river in Nepal for two purposes : it prevents floods in Bihar state during monsoons and it supplies much needed water for Bihar and the Ganges during dry season. But whenever India diverts Koshi water to prevent floods in Bihar, it submerges hundreds of hectares of arable land, destroys standing crops worth millions of rupees and dislocates thousands of local people every year. This, New Delhi has not been able to resolve with Kathmandu even after four decades. However, India continues to control the Koshi dam in its own way.

Similarly, India has built a number of dams in its territory very near the border across those rivers which flow through Nepali territory causing untold misery to the local inhabitants on the Nepalese side of the border. This is a sheer violation of understanding reached between India and Nepal to consult one another before launching any river project along the border areas. This apart, such river projects go against the international laws and practices.

The Laxmanpur barrage constructed by India within 300 meters of the international border was undertaken without considering its effects on the Nepalese side of the border. Neither did India get the necessary approval from Nepal before the construction of this afflux dam. The study report shows it affects directly more than 15,000 local people in 33 villages, besides the inundation of thousands of hectares of arable land. The other adverse effects of the dam remain unidentified so far. The international law states "any country, if constructs such an edifice within eight kilometre that affects directly or indirectly another country, must get prior permission."

Within this, India cannot deny the fact that it has violated the relevant international laws and practices. It has done so time and again but Nepal has failed to take up the issue strongly with India or with the International Court of Justice at the Hague. Nepali Congress-led government

cannot remain silent especially when the country's vital interests are at stake. Nepal must take up the issue with the International Court of Justice at the Hague as this seems to be the only option left for a poor but proud and fiercely independent country, Nepal. Perhaps this might make New Delhi think twice before venturing into such ill advised projects.