A Discussion Paper

WATER: CHARTING A COURSE FOR THE FUTURE

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I. Introductory

In recent years there has been a growing perception of a looming water scarcity. Water has suddenly become a favoured subject for seminars and conferences all over the world. The UNDP, the World Bank and the Asian Development Bank are seriously concerned about the projected water scarcity. Academic institutions in several countries are engaged in research programmes on the possibilities of conflict over scarce natural resources, particularly water. There is a currently fashionable thesis that future wars will be fought over water, not oil. That is a debatable proposition, but the prognosis of acute water scarcity in the not too distant future cannot easily be disputed. Several institutions and networks have sprung up to deal with this and related matters: World Water Commission, World Water Council, Global Water Partnership, and so on. A series of `Water Vision 2025' exercises were undertaken by the different countries in South Asia under the auspices of the Global Water Partnership during the last three years in preparation for the World Water Forum held at The Hague in March 2000. The `Vision' exercises were partly national (India Water Vision, Pakistan Water Vision, etc) and partly thematic (Water for Food, Water for Nature, etc), and these were eventually brought together into a `South Asia Water Vision 2025' for presentation at the Hague Forum.

A common trend in most of the discussions (those preceding the Forum as well as those at the Forum sessions) was to proceed from

projections of demand to supply-side solutions in the form of `water resource development' projects; estimate the massive investment funds needed; take note of the severe limitations on the availability of financial resources with governments; point to private sector investments as the answer; and stress the need for policy changes to facilitate this.

Within India, a consciousness of the importance of the subject led to the establishment of a National Commission on Integrated Water Resources Development Plan three years ago, and it - the first National Commission on water – finished its work and submitted its Report in September 1999. It covers extensive ground and makes numerous recommendations[i].

The present paper is an attempt to provide a broad and compendious account of the state of affairs in India in so far as water resources are concerned, and to chart a course for the future. Many of the topics and themes referred to in the course of the paper will warrant separate papers of considerable length. A summary (but, one hopes, not imprecise or misleading) treatment is all that is possible in this kind of survey. The effort is to weave all the strands together into a total picture.

At the outset, some background material may be useful, even if this covers territory familiar to many readers.

Some Fundamentals[ii]

Superficially, water seems over-abundant on this planet: three quarters of its area is covered by water. The 1400 million km^3 of water so present can cover the entire area of the earth to a depth of 3000 meters. However, around 98% of the water is in the oceans. Only 2.7% is fresh water; of this 75% lies frozen in the polar regions; 22.6 % is present as groundwater, some of which lies too deep; only a small fraction is to be found in rivers, lakes, atmosphere, soil, vegetation and exploitable underground aquifers, and this is what constitutes the fresh water resources of the world. Annually, 300000 km^3 of

precipitation takes place over the oceans, and 100000 km^3 over land; evapo-transpiration from land is 60000 km^3, 40000 km^3 runs off from land to sea, and 340000 km^3 evaporate from the seas. This is the annual hydrological cycle. It is this run-off of 40000 km^3 that is said to form the fresh water resources available to us.

In this context, two points of a fundamental nature need to be kept in mind. The first is that water in all its forms (snow, rain, soil moisture, glaciers, rivers, lakes, other surface water bodies, and groundwater) constitutes a unity. The second is that there is a finite quantity of water on earth, and this is neither added to nor destroyed. We cannot create new water, and whatever quantity is used up in any manner reappears though perhaps not always in a re-usable form. Water applied to the field in irrigation either seeps through to underground aquifers, or reappears as `return flow' and finds its way back to the surface (this is sometimes described as `regeneration'); seepages from canals recharge groundwater aquifers; industrial use of water results in effluents; domestic and municipal uses become sewage; and of course, whatever water evaporates comes back to earth as rain or snow.

The water available to us on earth today is no different in quantity from what was available thousands of years ago. That finite quantity has to be juxtaposed against increasing demands from a growing population. The population of the world, currently around 6 billion, is expected to exceed 8 billion by the year 2050. Apart from sheer numbers, the processes of urbanization and `development' are also expected to result in a vast increase in the demand for fresh water. It is this which leads to projections of water scarcity, which could be severe in some parts of the world.

However, while all this may be useful by way of background information, global figures are not of much practical significance. Water is not an internationally traded commodity like oil, and the availability of water in a distant part of the world is of no great

relevance to a water-short country or region. For instance, if the USA or Canada were to economize on water use and save large quantities, it will be of little help to the Indian farmer. People need sources of water close to their homes and lands. (There is a notion of trading in `virtual water', i.e., in commodities, say, foodgrains, grown in water-abundant countries, but there are complexities involved; it is not proposed to go into those here.)

India: Some Facts[iii]

With a population that is 16% of the world's, India has 2.45 % of the world's land resources and 4% of its water resources. The average annual precipitation by way of rain and snow over India's landmass is 4000 km^3, but the annual water resources of the country are measured in terms of the `run-off' in the river systems. This has been estimated by the National Commission as 1953 $km^3$. (This is supposed to include both surface and ground water resources, on the theory – on which there could be a difference of opinion - that except for some `static' groundwater, which could be trapped or fossil water, groundwater aquifers also flow and sooner or later join surface water flows to the sea, and that groundwater that finds its way direct to the sea is not of significant magnitude.) Some of the water resources of the country flow into it from beyond our borders – say, from Nepal or Tibet – and some cross our borders and go into other countries (Pakistan, Bangladesh). We have expectations of flows from the `upper' countries and obligations to the `lower' countries.

Turning to (dynamic) groundwater, the quantity that can be extracted annually, having regard to the rate of annual replenishment (`recharge') and economic considerations, is known as the `groundwater potential'. This has been put at 432 km^3. This stands included in the figure of 1953 km^3 mentioned above. (Extraction exceeding the rate of recharge is known as `mining'.)

Here we must take note of one more concept that is in common use: that of `usable' water resources[iv]. This is a vague concept, but it is clear enough that not all the `available' water resources of the country are forthwith `usable'. It has been estimated by the National Commission that the annual `usable' water resources of the country are 690 km^3 of surface water and 396 km^3 of groundwater, making a total of 1086 km^3. The present quantum of use is put at around 600 km^3. It follows that in national terms the position is not uncomfortable at the moment. However, this will obviously change with the growth of population and the processes of urbanization and `development'. The National Commission has made various assumptions in regard to these matters (high, medium and low rates of change), and come to the conclusion that by the year 2050 the total water requirement of the country will be 973 to 1180 $km^3$ under `low' and `high' demand projections, which means that supply will barely match demand. It is the Commission's view that there will be a difficult situation but no crisis, *provided* that a number of measures on both the demand side and the supply side are taken in time. (The precarious balance between supply and demand can of course tip over into a crisis if the actual developments fail to conform to the assumptions. Moreover, apart from demand putting pressure on the available supplies, the supplies themselves may also be seriously affected by the growing incidence of pollution and contamination of water sources.)

A word regarding the concept of `water stress' may not be out of place here. Dr. Malin Falkenmark, the leading Swedish expert, has calculated the `water stress' situation of different countries with reference to `Annual Water Resources per capita' (AWR). An AWR of 1700 m^3 means that only occasional and local stress may be experienced; an AWR of less than 1000 m^3 indicates a condition of stress; and one of 500m^3 or less means a serious constraint and a threat to life. Under this categorization, India is somewhere between categories (i) and (ii). In other words India is not among the most

water-stressed countries of the world. Israel, for instance, has a much lower endowment. But this situation will change with the growth of population, and India may join the ranks of `water-stressed' countries in the future if counter measures are not taken.

Variations

However, national aggregates and averages are as misleading as global figures. There are wide variations, both temporal and spatial, in the availability of water in the country. Much of the rainfall occurs within a period of a few months during the year, and even during that period the intensity is concentrated within a few weeks. Spatially, there is a wide range in precipitation – from 100mm in Rajasthan to 11000 mm in Cherrapunji. (Incidentally, it must be noted that despite the very heavy precipitation, Cherrapunji, known as among the wettest places on earth, suffers from an acute shortage of water in some parts of the year, because all the rain that falls quickly runs off the area.) Sixty per cent of the water resources of India are to be found in the Ganga, Brahmaputra and Meghna river systems which account for 33% of the geographical area of the country; 11% in the west-flowing rivers south of Tapi covering 3% of the area; and the balance 29% in the remaining river systems spread over 64% of the land area. Broadly speaking, the Himalayan rivers are snow-fed and perennial, whereas the peninsular rivers are dependent on the monsoons and therefore seasonal; and again broadly speaking, the north and east are well endowed with water whereas the west and south are water-short. Apart from the desert areas of Rajasthan, there are arid or drought-prone areas in parts of Gujarat, Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu; and of course the eastern parts of the country experience devastating floods from time to time.

The Standard Response

The standard engineering response to these temporal and spatial variations is to propose (a) the storing of river waters in reservoirs behind large dams to transfer water from the season of abundance to that of scarcity, and (b) long-distance water transfers from `surplus' areas to water-short areas. To projected future demands, supply-side solutions in the form of large dam-and-reservoir projects are believed to be the proper answer; and for water-scarce areas, the answer is believed to lie in bringing in water from distant areas. Both large `storages' (i.e., reservoirs) and the `linking of rivers' (i.e., `inter-basin transfers') have played an important part in the thinking of our water resource planners, and both involve major engineering interventions in the form of large projects.

A major concern of our planners has been the consideration that a significant part of India's water resources is in the Brahmaputra and that ways and means must be found of `harnessing' those resources and taking them westwards and southwards to areas that are water-short. This was the thinking behind the Indian proposal of the seventies (in the context of the Indo-Bangladesh talks over Ganga waters) for a gravity link canal between the Brahmaputra and the Ganga through Bangladesh. That proposal was strongly objected to by Bangladesh and is no longer being seriously pursued, but the idea of tapping the waters of the Brahmaputra continues to exercise the minds of our water planners. Similarly, three decades after Dr. K.L. Rao mooted the notion of a Ganga-Cauvery link, and Captain Dinshaw J. Dastur, a pilot, came up with the proposition of a `Garland Canal', these ideas, long ago discarded as impracticable, continue to beguile the minds of the Indian public, particularly in the water-short south. For over two decades the National Water Development Agency (NWDA) has been studying the resources of different basins, assessing the availability of surpluses for transfer, and identifying possibilities of storages, links and transfers. They took

up the peninsular rivers first, and studied the possibility of transferring waters from the Mahanadi to the Godavari and thence to the Krishna, Pennar and the Cauvery, though it is difficult to persuade Orissa and Andhra Pradesh that there is a surplus in the Mahanadi and in the Godavari. Another idea that has been mooted is the diversion of west-flowing rivers eastwards, but there is resistance to this too. In recent years the NWDA has been studying the Himalayan rivers, but this is an even more difficult subject. When the National Commission was set up, the `linking of rivers' was a major consideration in the Government's thinking, and though the Terms of Reference of the Commission were much wider in scope, `inter-basin transfer' was an important element in them.

The National Commission does talk about demand management, economy in water use, resource-conservation, etc., and also devotes a whole chapter to local water harvesting and watershed development, but the thrust of the Report is on large water resource `development' projects which are regarded as the primary answer to the future needs of a growing population. The report also discusses the financing of projects and the contributory role of private sector participation in the massive effort that is envisaged.

Thus, both at the regional/international level and at the national level there seems to be widespread agreement (a) that to the projected water needs of the future an important (if not the major) part of the answer lies in `water resource development' projects for storage and transfer over time and/or space; and (b) that considering the financial constraints and managerial limitations of governments, at least a part of that development will have to come from the private sector. However, before we consider the future course of action, we must take a clear look at the past: diagnosis must precede prescription.

II. Problems, Weaknesses, Failures

There is no doubt that the projects and schemes undertaken in the past (`major/medium' irrigation and multi-purpose projects, minor irrigation schemes based on surface water and groundwater, etc) have contributed (along with other factors) to an increase in food-production, added to hydro-power capacity, provided water for domestic, municipal and industrial uses, and (to some extent) helped in flood-moderation. However, there have been many problems, weaknesses and failures, and these need to be recognized. This section will therefore be necessarily concerned with negative aspects.

Drinking Water

The National Water Policy (NWP) assigns the highest priority to drinking water, but like most statements in the NWP, this remains a mere declaration on paper. Despite five decades of planning and more than a decade of `Drinking Water Missions', there are large numbers of `No Source' villages (i.e., those with no identified source of safe drinking water). The curious fact is that targets for covering such `No Source' villages are repeatedly achieved, but the numbers grow larger rather than smaller. This must mean that some `covered' villages are lapsing back into the uncovered category, and that newer villages are being added to this class[v].

A significant aspect of the scarcity of water in rural areas is that the burden of bringing water from distant sources falls on women (including girl children); and yet women who are the providers and managers of water in the household have little voice in `water-resource planning' in this country.

As for urban areas, most large cities are chronically short of water. A few illustrations may suffice. Chennai has been waiting for water from the Krishna under the Telugu Ganga Project (for which it has contributed large sums of money), but the partial supplies that began belatedly appear to have stopped because of some difficulties.

Chennai is now trying to revive the old, abandoned Veeranam project. Bangalore is hoping for water from the distant Cauvery IV project. Delhi is repeatedly asking the neighbouring States for more water, and is waiting for the fruition of some major (and distant) projects (Tehri, Renuka) which seem unlikely to materialize in the foreseeable future.

It seems clear that ensuring access to safe drinking water to all has not been among the successes of our planning.

Drought-Prone Areas

There are many arid zones and drought-prone areas in the country: for instance, in Rajasthan, Gujarat, Maharashtra, Karnataka, Andhra Pradesh and Tamil Nadu. Droughts are a recurring feature in these areas, cause much misery to human beings and livestock, and often result in large-scale migration. Unfortunately, there is no well thought-out strategy for `drought-proofing' these areas. The planners and engineers, whether at the State level or at the Central level, seem to be pinning their hopes on vague notions of long-distance water-transfers. There has been no serious attempt to work out a series of area-specific answers by way of local conservation and augmentation to the maximum extent possible. The severe drought of the summer of this year (2000), which, incidentally, affected Pakistan as well, was not an indication of `water insecurity', nor did it point to the need for big projects or long-distance water transfers. Most of the comments, analyses and prescriptions by experts that appeared in the media, whether in India or in Pakistan, recognized that the drought conditions were the result of bad water management in the past and that the answer lay in better resource management in the future. Failure to harvest rainwater, excessive extraction of groundwater, and failure to ensure the recharge of the aquifers, led to the water table falling sharply over the years, so that when a bad year came there was no groundwater reserve to draw upon. That is a broad description of what went wrong, though conditions may have differed from place to

place. The correctness of that explanation is proved by the fact that in the same areas (parts of Rajasthan and Gujarat in India) lush green villages were to be found side by side with dry, brown villages: the former had practised water-harvesting and groundwater recharge for some years, the latter had not.

Floods

This is another area of an absence of policy and strategy, though the NWP had something to say on the subject, and before that, in the seventies, there was an elaborate Report by the National Flood Commission or Rashtriya Barh Ayog (RBA). The numerous recommendations of the RBA remain largely unimplemented. Governments have tended to react spasmodically whenever floods occurred in disastrous form. The initial response to flood damage was to try to `control' floods through structural means such as dams or embankments. It was found through experience these efforts were ineffective or even harmful. For instance, large dams are not often planned with flood moderation as a primary aim, and even where they are, the competing claims of irrigation and power-generation often override the flood-moderation function[vi]. Further, while dams may moderate flood flows to some extent under normal conditions, they may aggravate the position if (in the absence of a flood cushion) water has to be suddenly released in the interest of the safety of structures. As for embankments, they have to be repeatedly re-built at great cost; they may fail in the event of a major flood and cause greater difficulties; by jacketing the river and preventing it from spreading they may create new problems further down; by blocking drainage from the adjoining areas into the river they often lead to water-logging and `man-made floods' in the `protected' villages; and they deprive the farmers of the benefit of the deposit of silt by the receding floods. Thus they have often proved a remedy worse than the disease, and there is a powerful people's movement in Bihar against them. On the other

hand, while flood-moderation has been very modest, the extent of suffering, damage and economic loss caused by floods and the magnitude of government expenditure on `relief' have been growing because of a number of factors[vii]. It is increasingly recognized that what we must learn to do is not so much to `control' floods as to cope with them when they occur and minimize damage, partly through `flood-plain zoning' (i.e., regulation of settlement and activity in the natural flood plains of rivers) and partly through `disaster-preparedness'. Unfortunately, `flood-plain zoning' has been found politically difficult. As for `disaster-preparedness', the most important element in this is timely knowledge. Governments, local bodies and people need to know how soon a flood is likely to arrive, and what its magnitude is likely to be. They can then take appropriate measures for the prevention or minimization of hardship, loss and damage, and for relief where necessary. Unfortunately, again, while there has been much talk of `flood management' and `disaster-preparedness', very little has in fact been done.

Irrigation

The benefits of irrigation are evident, but as a water-user it has much to answer for. As it is the largest user of water (around 80%), it needs to be very efficient; unfortunately, it is in fact very inefficient. Canal-irrigation efficiency in India (around 35 to 40%[viii]) is well below international standards. It is true that what is lost from canals through seepage is partly recovered as groundwater recharge and as `return flows' further down, but that is not a reason for inefficient conveyance. In any case, it is the actual application of water on the ground in irrigation that contributes more to recharge and return flows than seepage from canals. That again is not a justification for the excessive use of water in irrigation. A reduction of water-use in agriculture, and a conscious pursuit of the objective of maximum value per unit of water ("more crop per drop"), have to be major

elements in any future water planning. If there could be even a 10% saving in agricultural use, a substantial quantity of water will be released for other uses.

Secondly, injudicious canal-irrigation without regard to soil conditions, over-application of water because it is virtually free, the failure to take the groundwater table into account, and inadequate attention to drainage have led to the emergence of conditions of water-logging and salinity in many areas, resulting in valuable agricultural land going out of use. The reclamation of such lost lands is not always possible, and where feasible, it often requires large investments. A 1991 Report of a Working Group of the Ministry of Water Resources estimated the extent of water-logged land in the country at 2.46 million hectares (mha), and that of salt-affected land at 3.30 mha.

Thirdly, on an average the yields of irrigated agriculture in India have been relatively low in comparison with what has been achieved in other countries, or even in some parts of this country; and there has been inadequate attention to increasing productivity in rainfed areas. Even the National Commission's projections for the future seem fairly modest:

tonnes per ha

Average Yield	Year 2010	Year 2050
Irrigated Foodcrop	3	4
Unirrigated	1.1	1.5

Higher yields, which are surely achievable, will mean a reduction in the demand for water.

Fourthly, canal irrigation in India has been marked by a number of inequities. As waters begin to rise in the reservoir, and canal systems for taking them to the tail-end are not yet ready, the head-reach farmers have plenty of water available and tend to plant water-intensive crops. This establishes a pattern of water-use that cannot easily be changed at a later stage: by the time the full canal

system is ready, much of the water stands pre-empted in the head-reach areas and there is little left for conveyance to the tail-end. This is a familiar problem in most project commands. Further, with the increasing affluence of the large farmers, their money-power begins to transform itself into political power with a potential for influencing policy-formulation and the planning, designing and location of major projects, as also their operation.

`Water Resource Development' Projects (`Major/Medium')

Some of these represent remarkable engineering and construction achievements (in some cases under difficult conditions), and much of the heavy equipment needed has been manufactured within India. Unfortunately, there has also been a history of poor planning and implementation, and grave failures on the human, social and environmental fronts. A recent study of the Indian experience with large dam projects (for which the `major/medium' category is a rough proxy) for the World Commission on Dams by a team (of which the present writer was one) brings this out clearly. (What follows draws partly upon this writer's contribution to that study, and partly upon a Presentation made by him at a Round Table organized by the World Bank at Delhi on 11-12 May 2000.)

(i) Planning has by and large tended to proceed on the basis of discrete, individual projects. These are not conceived of as part of a truly integrated, holistic, environmentally harmonious, participatory planning for an area.

(ii) The basic criterion for the approval of projects has been the Benefit-Cost Ratio (BCR). The BCR as actually operated is an unsatisfactory criterion, and is liable to distortion. The costs of such projects are often under-stated and the benefits over-stated to conform to the required BCR. Dissatisfaction with the manner in which irrigation and multi-purpose projects were being dealt with led to the establishment of the Nitin Desai Committee which submitted a

report in 1983 making recommendations for a change-over to a better appraisal system involving a proper socio-economic cost-benefit analysis leading to the determination of an economic IRR (internal rate of return). This remains unimplemented.

(iii) Partly as a consequence of the abandonment of the earlier financial return criterion in favour of the BCR, and partly because the pricing of irrigation water in many States is so low and the recovery so poor as to make it virtually free, most `major/medium' projects are loss-making propositions in so far as the state exchequer is concerned. This aggravates the resource shortage of the States.

(iv) The primary, controlling discipline in project preparation at the State level, and examination at the Central level, is engineering. Other disciplines, concerns and points of view are to some extent brought in through consultations and comments, but there is no *inter-disciplinary* planning in the proper sense of the term.

(v) One major feature of project planning has been the dominance of irrigation. Even `multi-purpose projects' often have only two components, namely irrigation and hydro-electric power. The integration of other purposes has not been a standard feature of project planning. There could be conflicts between two different uses (e.g., between irrigation/ power generation and flood moderation, between irrigation and maintaining minimum flows), but these are not always explicitly recognized and built into project planning.

(vi) Project decisions do not represent carefully considered choices out of a number of possible answers to a given need or problem. Only one unique project is proposed for approval. *Within* the ambit of a project, there may be multiple possibilities at various stages, and some of these may be covered in the processes of project preparation, but *alternatives* to the project are not usually considered.

(vii) One of the factors that militate against holistic, integrated planning is the fragmentation and compartmentalization of responsibilities at the administrative level. Even within the area of

water resources proper there is a dispersal of different components or aspects such as major/medium projects; minor irrigation; command area development; groundwater; watershed development; rainwater-harvesting; water management; and so on. Different Divisions/ Departments/ Agencies tend to deal with these matters with little coordination, much less integration.

(viii) The processes of appraisal and decision-making are not rigorous enough, as evidenced by the unsatisfactory investment criterion employed, and the post-clearance history of scope changes and modifications in several projects.

(ix) Civil society (in the sense of the people concerned, i.e., beneficiaries and those who are likely to be adversely affected, and the community in general) plays little or no role in the planning and implementation of such projects. The activity is essentially governmental. The Irrigation Acts vest the management and control of waters in the hands of the state, and project planning and implementation are largely internal activities of the state. As the colonial state had consciously distanced itself from the people, and as that distance did not significantly narrow in the post-colonial era, a tradition of consultation of, and participation by, the people did not develop. It is only in recent years that a consciousness of the importance of `stakeholder participation' has begun to emerge. Project-Affected Persons (PAPs), with the assistance of some NGOs, have become more conscious of their rights (both their fundamental rights as citizens and their traditional rights of use of river waters, forest produce and other natural resources).

(x) The hardships (`social costs') inflicted by such projects often fall on poor and disadvantaged sections, particularly tribal communities, whereas the benefits accrue to others- usually more prosperous people - in the command area. There are inherent difficulties in resettlement and rehabilitation: a lack of full knowledge of the numbers and categories of people likely to be affected;

separation of communities from the natural resource base on which they are dependent; inadequacy of land for land-based rehabilitation; scattering of well-knit communities; resettlement in distant and unfamiliar areas; difficulties with the host communities in the resettlement areas; major transformation in ways of living, loss of old coping capabilities and the need to learn new skills and ways of living; and so on. However good and enlightened the rehabilitation policies and `packages', there will inevitably be great hardship and suffering, to which the response of the governmental machinery is rarely adequate, much less imaginative.

(xi) In the absence of institutional arrangements for consultation and grievance-redressal, the processes of displacement, resettlement and rehabilitation often generate serious dissatisfactions leading in some cases to confrontationist situations. This has been a major problem area in many projects.

(xii) Some State Governments have tried to provide project-affected persons (PAPs) with benefits in the command area through legislation, but while these Acts are on the statute book and contain some enlightened provisions, it cannot be said that they have been fully put into practice.

(xiii) The Government of India has been trying to formulate a National Rehabilitation Policy, but this effort which has been going on for several years has not reached finality so far.

(xiv) In regard to the planning, funding and implementation of major irrigation/multi-purpose projects, four main (inter-related) dysfunctional features need to be noted:

- the thin and sub-optimal spreading of resources on a large number of projects;
- the time and cost over-runs on many projects;
- the persistent problem of projects remaining forever incomplete, spilling over several Plan periods, and pre-empting Plan resources

for continuance/completion, leaving hardly any funds for new projects; and

- the failure in many cases to achieve the projected benefits in full measure, thus undermining the justification for the social costs imposed by the projects.

Successive Plan documents have stressed the need for better project planning and implementation and for completing on-going projects before starting on new ones, but to little purpose. From the Sixth Plan onwards the theme has been `consolidation' rather than `new starts', but this has not been effective.

(xv) The monitoring system is weak, and there is no effective mechanism to ensure that wherever sanctioned costs are likely to be, or have been, exceeded, the Revised Cost Estimate (RCE) is promptly brought before the appropriate authorities for a fresh appraisal when there is still time for a review of the original decision. There is also no established system of a post-completion evaluation. Very few projects, other than those that receive World Bank assistance, are subjected to such an *ex post facto* reappraisal.

(xvi) The environmental impacts of such projects will of course vary from case to case, but most such projects have some common and inescapable consequences, such as violent disturbance of pristine areas; varying degrees of submergence of land including forests in some cases; impacts on flora and fauna, leading to a reduction in bio-diversity; in particular, severe impacts on the fish population in the river; the stilling of flowing waters leading to temperature stratification, variations in nutrient content and dissolved oxygen, rendering the water inhospitable to aquatic life; drastic changes in the river regime downstream of the dam (reduced flows affecting aquatic life and riparian communities, reduced capacity for self-regeneration, increased pollution levels, reduced recharge of groundwater aquifers, adverse impact on estuarine conditions); and so on. Some of these effects cannot be remedied or even mitigated; and in some cases

efforts at the mitigation of or compensation for environmental impacts in turn create further problems. Further, it is clear from past experience that all the consequences and ramifications arising from the damming of a river cannot really be fully foreseen and planned for. In a word, when we undertake this kind of major intervention in nature, we do not really (or at any rate fully) know what we are doing.

(xvii) Environmental concerns are still largely looked upon as an externally imposed discipline that has to be complied with. An `Environmental Impact Assessment' (EIA) has no doubt been a prescribed requirement for all projects for some years and is being complied with, but EIAs are often inadequate and unreliable, and the cost-benefit analyses based on these are suspect[ix]. Until recently, there was no statutory requirement of a public hearing in relation to the environmental clearance of such projects. It has now been introduced but has not yet become a well-established procedure.

(xviii) The `political economy' aspects of such projects cannot be adequately gone into here. It could be argued that inequities, injustices, corruption, collusion, etc., arise from the socio-political milieu and cannot be attributed to engineering structures; but (in the water sector as elsewhere) some of the inequities and ills are perhaps facilitated by or at any rate associated with big projects involving large sums of money.

(xix) The cost of creating irrigation potential through such projects has been steadily increasing: from Rs. 1200/ha in the first plan (1951-56) to Rs. 66570/ha in 1990-92 in current prices; and from Rs. 8620/ha to Rs. 29587/ha in constant 1980-81 prices[x].

(xx) There is a persistent gap between the irrigation potential[xi] created at such cost and the extent of its utilization:

At the end of 1995-96 (in mha)[xii]:

	Ultimate	Created	Utilized	Gap	Actually irrigated (land-use statistics)
Maj/md	58.46	32.20	27.45	4.75	
Minor (surface)	17.38	12.10	10.72	1.38	
Minor (grw)	64.05	44.42	40.83	3.59	
Total	139.89	88.72	79.00	9.72	70.64

(xxi) Resource constraints, an unsound Plan/Non-Plan distinction, and an in-built preference for new construction over the efficient running of what has been built, have together resulted in the under-provisioning and neglect of maintenance. Systems built at great cost fall into disrepair, and there is a failure to provide the planned service.

Conflicts

As seen in the Ravi-Beas and Cauvery Dispute cases, inter-State disputes over river waters are becoming intractable, and the constitutional conflict-resolution mechanisms do not seem to be working well. Conflicts could also arise between uses, between users, between areas, between classes: these are not acute yet, but could become so. There is also the possibility of conflicts between the people and the state, as has happened in the Narmada (SSP) and Tehri cases. Further, community initiatives are hampered by the `eminent domain'

claimed by the state, as was experienced in Alwar (the Tarun Bharat Sangh initiative). We shall need to return to these issues.

Groundwater

(i) There has been over-extraction (mining) of groundwater leading to depletion in some areas, and salinity ingress in coastal zones (e.g., in Gujarat). On the other hand, there is a situation of rising water tables and the emergence of water-logging and salinity in other areas (e.g., in the Sharda Sahayak command in UP).

(ii) Water markets tend to emerge in the context of groundwater extraction through tubewells and borewells, and they serve some useful purposes, but there are dangers of unsustainable extraction as also of inequitable relationships between sellers and buyers.

(iii) The answer to both (i) and (ii) above may be claimed to lie in regulation, but this has so far not been found feasible because of political factors and the legal problem of easement rights. Under the directions of the Supreme Court the Central Groundwater Authority has been established, but it is not yet clear how it will evolve and operate, what kind of regulation it will attempt, and with what success.

(iv) There are problems of pollution/ contamination of aquifers (fluoride, arsenic).

(v) There is a hypothesis that there are deep aquifers under artesian conditions in the Gangetic plains, but this remains uninvestigated.

Water Quality

There are pollution control laws and institutions, but these have not been able to prevent the growing pollution and contamination of water sources and systems, which in effect makes much of the `available' water resources unusable. This is in fact as great a threat (if not greater) to security as the `scarcity' about which alarm bells

have been ringing. What needs to be done is clear enough (prescription and continuous review of standards; their enforcement, not forgetting the cumulative impact of individual clearances and permits; making the polluter pay; adopting and moving towards clear, time-bound goals in regard to desired water quality; and so on), but not much of this has begun to happen as yet.

(Incidentally, pollution and contamination are not respecters of political boundaries. The countries of the region have to agree on common standards and on trans-boundary water quality protocols. Conflicts have arisen in the past over water-sharing; but water quality may well become the focus of even sharper conflicts in the future unless clear inter-country understandings are reached and appropriate institutional mechanisms are provided for ensuring compliance with such understandings.)

Waste of Water

There is a waste of water in every use: agricultural, industrial, municipal, domestic. There is a complete absence of a sense of scarcity, and this is aided by a gross under-charging of water, whether for irrigation or in urban water supply. The Report of the Committee on the Pricing of Irrigation Water (the Vaidyanathan Committee) set up by the Planning Commission was submitted in 1992, but its recommendations still remain unimplemented. Now the National Commission has reiterated those recommendations with some modifications and additions, and we shall have to see what the State and Central Governments do with this report.

III. Constraints, Real and Perceived

Before we proceed from diagnoses to prescriptions, it is necessary to take note of certain `constraints' that are often put forward as serious impediments to the policy changes and corrective

actions that are needed in response to the ills mentioned above, and indeed as partial explanations for the present situation. These `constraints' represent a combination of realities and perceptions.

Constitutional Constraints?

A complaint often heard is: "Water is a State subject; the Central Government cannot do much; water should have been in the Concurrent List, and should now be brought into it by amending the Constitution." This is a complex question that cannot be discussed in detail in this paper. It is indeed possible to argue that the entries relating to `water' in the Constitution are flawed. If the Constitution-makers had anticipated some of the perceptions and concerns that became current later, perhaps they would have drafted a different set of entries. However, this is mere speculation: we have to go by the text of the Constitution as it exists. Even if we feel that amendments to put `water' in the Concurrent List are desirable, such amendments would be enormously difficult to put through: they go counter to the trend towards greater decentralization and federalism. The Central Government has in fact failed to play even the role it could have played on the basis of the existing provisions. Much can be done without wasting time and energies on pursuing the chimera of restructuring the constitutional entries relating to water. (The examination of that issue is not being ruled out; see Section V, sub-section I).

Financial Constraint?

Another `constraint' with which we tend to paralyse ourselves is the financial one. As mentioned earlier, the general tendency is to proceed from projections of future demand to supply-side answers in the form of large projects, estimate the magnitude of investments needed, and wring one's hands in despair. This is both a real and a perceived constraint: *real* because large investment funds are indeed

hard to come by, *perceived* because there is a failure to explore possibilities that do not call for heavy investments.

The India Water Vision 2025 exercise under GWP auspices for presentation at the Hague Forum postulated an investment of Rs. 5000 billion in 25 years, or Rs. 200 billion per year. The National Commission's rough estimates of amounts needed for completing spill-over projects are Rs. 70000 crores in the Tenth Plan and Rs. 110000 crores in the Eleventh Plan. Not only does this leave no scope for new major projects, but the difficulty of finding funds of this order necessitates a severe selectivity even in regard to the continuance of what are called `on-going projects'. The National Commission devotes a whole chapter to the `prioritization' of these. Some very hard choices are called for: some projects may have to be accelerated, others restructured and drastically pruned, and yet others abandoned.

What we must accept in a clear-headed manner is that the actual availability of investment funds in the public sector is likely to be no more than a small fraction of the projections made. Nor should we delude ourselves into thinking that the answer lies in private sector investment. Private sector investment in this sector, if forthcoming, is likely to be marginal at best.

Environment/ Rehabilitation: Constraints?

To regard environmental and human concerns as `constraints' obstructing the undertaking of projects is to take a myopic view. Unfortunately, this is a fairly common tendency. Consider arguments such as the following:

> "Environmental concerns are all right, but they should not be carried too far; if they are, there can be no irrigation or hydro-power projects in the future. Concern for the protection of the environment should not come in the way of development."
>
> "If we keep liberalizing the rehabilitation policies and packages, and insisting on more and more stringent remedial

measures on the environment front, no project in the future will be economically viable."

"Whatever is possible should be done to mitigate the hardship of project-affected persons (PAPs) and resettle them humanely, but the infliction of hardship on some in the interest of the development of the country as a whole is inescapable. Some have to make a sacrifice in order that the nation may benefit."

These are not imaginary observations; arguments on these lines have often enough been heard in conferences and discussions. Moreover, during the deliberations of review committees set up to go into the environmental and rehabilitation aspects of certain controversial projects, one is often told: "Yes, we can discuss all this, but we must not interfere with the progress of the project: the project must proceed apace." [xiii]

Without entering into an extended discussion of the fallacies involved in these arguments, the following brief and categorical statement of what seems to this writer to be the right position is offered:

- the implicit priority assigned to `projects' over people and nature is untenable;
- the *imposition* of an involuntary `sacrifice' on some groups, for the sake of `benefits' which are said to be in the interest of the country as a whole but in which they have no share, is morally indefensible;
- appropriate remedial measures (environmental, human) are a necessary and legitimate charge on a project;
- if this renders the project non-viable, the project in question should not be undertaken; and
- if the project is already under implementation, and if a review reveals serious deficiencies on the environmental and rehabilitation fronts, the proposition that "the project must go on" should not be

used as an argument-stopper to block the review process and corrective action.

In short, we cannot start with the project as a given and adjust the social and environmental measures to maintain its viability, or to ensure its progress.

The Right Response

Not all the difficulties mentioned above can be dismissed as `perceived'. It is indeed true that WRD in the conventional engineering sense has become increasingly difficult to undertake. Much of India's `available water resources' calculated in national terms are locked in the Ganga-Brahmaputra-Meghna river systems involving distant and difficult locations with the added complication of the seismicity factor. Dihang, Subansiri and Tipaimukh projects are making no headway partly because of opposition to submergence. For a number of reasons, Karnali, Pancheswar and Saptakosi projects in Nepal seem unlikely to materialize in the foreseeable future. Within the country, inter-State conflicts as well as conflicts between the state and the people arise in a particularly acute form in the context of large projects. In general, there is a growing opposition to big WRD projects. It is no longer easy to displace people. As our environmental and ecological concerns become more acute and better informed, the costs of remedial measures will certainly mount. The investment costs of such projects have already reached unaffordable magnitudes, and the necessary resources cannot easily be mobilized. Under these circumstances, very few projects will pass muster, obtain the necessary finances and actually reach the implementation stage. The right response to this is not to bemoan the `constraints' but to realize that the pursuit of WRD in the form of large projects is likely to produce little useful result; that much time will be lost in this process; and that the exploration of alternatives has become an imperative.

IV. Objectives for the Future

Policies and plans for the future must be guided by a vision of the kind of world that we would like to see. A copy of a brief statement of that nature presented by this writer at the request of the organizers at one of the Seminars and Workshops held in preparation for the Hague Forum is reproduced as an Annexe to this paper. Keeping that in mind, our objectives for the future can be enumerated as follows:

- Ensure access to safe drinking water to all.
- Ensure adequate availability of water for agriculture, industry, urban centres (with due regard for efficiency, economy and equity).
- Find appropriate answers for drought-prone areas, arid zones.
- Foster consciousness of scarcity, promote conservation, minimize waste.
- Improve and maintain water quality; control pollution, protect water sources.
- Protect and preserve natural environment/ ecological system. Preserve integrity of rivers, maintain river regime.
- Ensure equity – between groups, between generations, between species.
- In particular, reduce burden on women and give them a voice in water planning and management.
- Minimize conflicts and hardships and provide means of resolution/ redress.
- Help people to cope with floods and minimize damage.

V. What Needs to be Done?

A. Reorientations

How are those objectives to be achieved? Many things need to be done, but they cannot be done without a major reorientation of attitudes and approaches. The needed change is set forth below in the form of catchphrases in a summary tabular statement:

RE-ORIENTATION FROM	TO
Water resource `development' (supply-side answers to demand projections)	Water resource management (demand management and resource conservation in recognition of finite supply)
`Mega' projects (`basin planning')	Local augmentation and management
`Harnessing' (Prometheus)	Harmony (Bhagiratha)
Centralized, top-down, technology-driven planning	Decentralized, bottom-up, people-centred planning

Those cryptic phrases are elaborated in the ensuing paragraphs.

In the conventional line of thinking the focus is on `WRD', i.e., `water resource development' which is understood to mean big storage and/or transfer projects. There are some unexamined ideas (partly unstated, partly explicit) underlying this argument for WRD. Firstly, `demand' projections are generally based (a) on current patterns of water-use with some adjustments for improvements in efficiency and resource-conservation, and (b) on prevailing notions of `development'. If we assume (`realistically') that no more than moderate

improvements in efficiency and economy in water-use are likely to happen, and if we assume further (even more `realistically') that there will be no change in our ideas of `development' (i.e., the pursuit of higher and higher `standards of living', with all countries aspiring to the condition of America), then there will indeed be a horrendous water scarcity necessitating massive supply-side projects. We must then also `realistically' acknowledge that sustainable development is an impossibility, and that planet earth (and along with it humanity) is doomed. Instead of such apocalyptic forecasts, it will surely be *more realistic* to recognize that given the precious nature of this life-sustaining element and its finite supply on this planet, a tremendous effort needs to be made at efficiency, economy and conservation, so that the benefit derived from a unit of water is maximized. The approach common in the case of other consumer or industrial goods, of projecting demand and providing the supply through production, is inappropriate in the case of water. Here we need to start from the recognition of finite availability and learn to live with it. (In the course of the India-Bangladesh talks on the sharing of river waters, it has often been argued that the waters of the mighty rivers Ganga and Brahmaputra are inadequate for the needs of the two countries[xiv]. This would sound very strange to people in other parts of the world who have learnt to live and live well with a far less generous natural endowment. Israel is an excellent example.) With the kind of reversal of approach indicated above (which implies changes in ways of living) the `demand' projections will undergo drastic reductions. (The reference here is to water for irrigation, industry, etc., and not to water for drinking, cooking and washing, though even here there is much scope for economy in the case of the middle and rich classes.)

Secondly, we must shake ourselves free of the usual engineering conventions of defining `available water resources' in terms of `run-off', and `usable water resources' in terms of what is stored behind a dam. What is available in nature is rainfall, not just run-off; and while

storing river waters behind a dam doubtless converts `available' water into `usable' water, so does *in situ* rainwater harvesting (i.e., `catching the raindrop as it falls') and local watershed development. These are also part of the supply-side answers to the demand.

If we combine those two propositions, namely, if we learn to reduce our draft on this finite and precious resource, and if we learn to augment supplies locally through watershed development and water-harvesting in every locality and area where this is feasible, then we may find that the available water will go a long way indeed, and that a crisis can be averted with very little (if any) recourse to big WRD projects and huge investments.

Further, underlying large WRD projects is the philosophy (still prevalent, though no longer stridently voiced) of `conquest of nature'. This is the legacy of the Western legend of Prometheus who is said to have brought fire to earth in defiance of the gods. Under the influence of that legacy, we are driven by technological hubris to undertake the `harnessing' of nature for `development'. In contrast, we have the Indian legend of Bhagiratha who brought water - the river Ganga - to earth in a prayerful spirit. If we forget for a moment the questionable calculus of supply and demand and look at ` water security' (to use an expression which has come into vogue) from the point of view of protecting the ecological system and planet earth, we get a different perspective altogether: we begin to realize that by building a series of large WRD projects we shall not be *ensuring* security but *endangering* it.

Fortunately, to future demands for water (based on visions neither of excessive affluence nor of Gandhian austerity, but of modest prosperity), the answer does not necessarily lie in large, centralized, `top-down', technology-driven projects: local, decentralized, community-based, people-centred alternatives are available. Achievements such as those of Anna Hazare (Ralegan Siddhi village in Maharashtra), P.R. Mishra (Sukhomajri in Haryana),

Rajendra Singh and the NGO Tarun Bharat Sangh (several hundred villages in Rajasthan), and similar efforts in Madhya Pradesh under the leadership of Chief Minister Digvijay Singh, have become well known. What needs to be understood is that these are not `small' instances but significant developments in terms of increased water availability, rise in groundwater table[xv], and extension of irrigation. If these examples could be replicated in thousands across the sub-continent (wherever feasible), they could be major components in water planning.

(The Indian country report to the WCD points out that out of the increase in the production of foodgrains from 51 million tonnes in 1950-51 to almost 200 million tonnes by 1996-97, 66.7% came from irrigated areas, which represented one-third of the total cultivated area, and that out of this only 36.8% came from the major/medium category. Thus, a significant part of our food production comes from areas irrigated by sources other than large projects. A nationwide spread of community initiatives in water-harvesting and watershed development can therefore make a substantial contribution to agricultural production in the country.)

What further needs to be understood is that these are instances not merely of water management, but of social mobilization and transformation. (Some activities assisted by multilateral or bilateral donor agencies, such as the Sodic Lands Reclamation and Swajal Projects in UP, have also achieved significant successes.) Being community initiatives, they are generally more harmonious and equitable than large, centralized, top-down systems. Conflicts may arise even in such local efforts, but they are likely to be resolved locally within the community. For instance, the people involved in using the waters of the Arvari (a small river in Rajasthan) have established the `Arvari Parliament' for decision-making on matters of common interest and for resolving conflicts. It is in this kind of local, civil-society initiatives, and not in grandiose visions of WRD or long-

distance transfers, that the answer to future needs lies. We must learn to shake off the spell of gigantism. Instead of thinking of water harvesting and watershed development as small, secondary and supplementary to large projects, we must reverse the order and regard the former as central and the latter as supplementary. Large projects should be not the first or the preferred route but the last option. The possibility of integrating a large project with smaller surface and underground storages within the sub-basin or watershed must also be considered.

As for water-scarce areas, let us not be hypnotized by visions of long-distance water transfers, whether inter-basin or intra-basin. We need to look at the various drought-prone and arid areas of the country severally and in each case explore local possibilities of water-harvesting and conservation, keeping in mind what has been achieved in some places (e.g., Alwar), and thinking of recourse to external water only as a last resort. The same approach applies to urban centres. They need not be helplessly dependent on water from distant sources. Realizing that the prospects of water from distant projects are remote and uncertain, Delhi is now seriously exploring the possibilities of local augmentation through increased storage in existing channels such as the Najafgarh Nalla, re-activation of old and disused water-bodies such as the one at Hauz Khas, roof-top collection of rain-water, and other similar means. Chennai is also trying to promote rooftop collection. This approach needs to be assiduously pursued. Similarly, traditional methods of water-harvesting and management, widely prevalent in diverse forms in different parts of the country[xvi], need to be revived and re-energized, and the almost forgotten role of the community in these matters restored. All this needs to be taken up as a national campaign. (At the time of writing, a very useful Occasional Paper of the Centre for Science and Environment entitled *Drought? Try Capturing the Rain* by Anil Agarwal has come to hand. Meant as a Briefing Paper for Members of Parliament and of State Legislatures, it

argues the case for water-harvesting and watershed development as the true answer to droughts very persuasively.)

In the case of electric power also, all options including demand management, energy-saving, increasing output from capacities already installed, minimizing energy inputs through technological improvements and innovations, extensive decentralized generation through biomass (integrating agriculture), wind/solar/ tidal energy, etc., need to be explored, minimizing the need for large centralized generation. The approaches advocated by Dr. A.K.N.Reddy, Girish Sant and K.R.Datye (see References) deserve more careful consideration than they have so far received.

Basin and Watershed

How is the recommended focus on local water-harvesting and watershed development to be reconciled with the generally accepted idea of `basin planning'? There is no contradiction here, but this needs a bit of explanation.

The term `basin planning' derives from hydrology and is essentially an engineer's language. How did this idea originate? It arose from a recognition of the limitations and dangers of isolated project planning. Engineers built a dam here, a barrage there, a run-of-the-river scheme in a third place, flood-control embankments in a fourth, and so on. By experience they learnt that this was not the best thing to do, and that in planning any such intervention in a river they needed to take into account the river as a whole. That logic cannot be faulted. Clearly, discrete project planning is inferior to project-planning within a larger framework. However, this is still a very limited vision for two reasons.

The first is that while widening our vision from a point on the river to the river as a whole we are still thinking only of the river, and not of the ecological system of which it is a part – by which it is sustained and which it in turn sustains. A basin is primarily a

hydrological concept, not an ecological one. In fact, even from a hydrological point of view, a river-basin approach suffers from the limitation that the boundaries of the basin may not coincide with those of groundwater aquifers. In theory everyone recognizes that water in all its forms – rivers, lakes and other surface-water bodies, wetlands, groundwater aquifers, atmospheric moisture, precipitation in the form of rain or snow, glaciers, and so on – constitutes a unity; in practice, however, basin planning is often focussed only on the river, ignoring or taking only perfunctory note of other forms of water.

Secondly, we are thinking of the river in terms of `planning'; and if we ask "What are we planning?" the answer is clear: `projects'. As the discrete and fragmented planning of projects is unsatisfactory we wish to plan in a larger context, but we are still thinking in terms of projects. We want to `harness' the water resources of a river for human use through the application of science and technology (`S&T'), and it is in that context that the idea of basin planning emerges: the engineer wants to build better and larger projects. When he thinks of the basin as a whole, he thinks in terms of what from an engineering or economic point of view might seem `optimal' locations for various purposes. This is essentially a centralizing tendency and it is usually the precursor to the formulation of big projects.

Thus, the idea of `basin planning and management', which *prima facie* seems eminently sound, contains within itself the seeds of centralization and gigantism. We need to be aware of and on our guard against such tendencies. If by `sustainability' we mean the long-term maintenance of an ecological balance and thus the survival of planet earth and with it humanity; if we approach this in a positive spirit of fostering a harmonious relationship with nature rather than merely limiting the harm that we do; if we think of rivers not as separate entities but as integral parts of larger ecological systems; then our planning might take different forms from the conventional. On the one hand we might look at a larger framework than a river

basin, and on the other, we might focus on smaller land-and-water complexes such as micro-watersheds as well as the enormous possibilities of local rainwater-harvesting. We would also learn to think not merely of human need but also of the needs of other species and forms of life - birds, animals, aquatic life, vegetation, indeed the river itself. We could still plan `projects' but with reference to a much wider and more complex framework; there could still be room and need for basin commissions or authorities but they will cooperate and live with the river, not `manage' or `harness' it.

Subject to that caution, it is certainly necessary to take a comprehensive view of a river system as a whole. The initiatives that are taken at the micro-watershed level have eventually to be built into a harmonious, holistic, integrated basin-wide (or sub-basin-wide) total picture. Contrariwise, a broad basin-wide master plan can provide pointers to local initiatives.

(Incidentally, `integration', a word often loosely used, has multiple dimensions. It can mean, illustratively, the integration of:

- water-use and land-use;
- different water uses (agriculture, industry, domestic and municipal uses, and so on);
- water in all its forms (groundwater and surface water, precipitation, and so on) regarded as constituting a unity;
- all water-related activities from local water-harvesting to `mega' projects within a basin or sub-basin;
- all large projects within a basin or sub-basin;
- the different aspects of a multi-purpose project, such as irrigation, hydro-power, flood moderation, navigation, and so on;
- environmental/ ecological, social and human concerns with techno-economic planning;
- water quality concerns (seen as an ineluctable part of all water planning);

- all the relevant disciplines (hydrology, engineering, agriculture, sociology, environmental and ecological sciences, law, and so on);
- state and civil society.)

Regional Cooperation?

It is often argued that in our water resource planning we must take note of the immense possibilities offered by regional cooperation, particularly cooperation with Nepal and Bangladesh, on the utilization of the water resources of the Ganga, Brahmaputra and Meghna. This was the subject of a collaborative three-country study project undertaken by the Centre for Policy Research, New Delhi, the Bangladesh Unnayan Parishad, Dhaka, and the Institute for Integrated Development Studies, Kathmandu. The present writer was closely associated with that study. The first phase of the project resulted in four books: one book by each of the institutions, leading on to a `consensus' book entitled *Converting Water into Wealth* (1994) by all three institutions. The second phase of the project had a twofold objective: the dissemination and propagation of the ideas emerging from the first phase, and further work on some of the identified possibilities; this resulted in a book entitled *Cooperation on the Eastern Himalayan Rivers* (1999). The basic thesis underlying the entire project was the following:

> *The GBM region is a resource-rich area, but it is home to a large concentration of the world's most poor; the water resources of the immense rivers that flow through the region hold promise of an escape from this paradox; water is in fact the magic key to future prosperity in this region; and the countries of the region must learn quickly to cooperate to bring about that prosperity or remain forever locked in grinding poverty*.

(That is not a quotation but an encapsulation by this writer). Leaving aside some reservations that one has on that seemingly compelling statement, and wholly endorsing the plea for cooperation, one still

needs to ask: in concrete terms, what does `cooperation' mean here? It means essentially cooperation in `harnessing' the water resources of the GBM system(s) by means of a number of major projects such as Karnali, Pancheswar and Sapt Kosi (on major tributaries of the Ganga) in Nepal; Manas and Sankosh in Bhutan and Dihang and Subansiri in India (on the Brahmaputra); Tipaimukh in India (on the Barak); the Ganges Barrage in Bangladesh; and so on. Most of these would be multi-purpose projects with hydro-power, irrigation and flood moderation components; some may also have a navigation element. We have already seen that such projects have serious adverse consequences not all of which can be foreseen or remedied. Without going over that ground again it needs to be noted that even if these projects do create wealth, they will not eliminate poverty: the wealth and the poverty will be in different hands. The alleviation of poverty, the ensuring of equity and social justice, the removal of the disabilities of women, children and disadvantaged groups and the `empowerment' of the community, are hard tasks to be tackled with patience, imagination and determination *within* each of the countries of this region. A preoccupation with big, multi-country projects and the naive belief that they hold the magic key to prosperity will produce complacency and distract us from what needs to be done.

If water is the key to prosperity, how can one explain the distress that repeatedly strikes Kalahandi which has plenty of water and produces rice? The waters of the Ganga, Brahmaputra and Meghna rivers are not a new discovery. They have been known to, and are being used by, the people living in the areas concerned for generations. The new element that is expected to transform the economies of the three countries is essentially hydro-electric power. However, this needs giant dams and reservoirs in a fragile and seismically active ecosystem. Whether, and if so when, any or all of these projects will in fact come up is a question that no one can

answer with any confidence. Meanwhile, what happens to inter-country cooperation?

This is not to argue that there is no need for inter-country cooperation. Inter-country treaties or agreements over river systems that run along or straddle boundaries will of course be necessary. Conflicts may arise in the absence of such understandings, or even in relation to the interpretation of clauses or the actual operation of such agreements; and mechanisms will be needed to resolve such conflicts. The point that is being made here is merely that such cooperation should not be identified with a clutch of big projects or confined to the sphere of governments. There are many other possibilities and compulsions of cooperation. The protection of water sources (rivers, lakes, mountains, forests, aquifers) from pollution, degradation or denudation; the preservation and regeneration of deteriorating wetlands (e.g., the Sunderbans); improving and maintaining water quality; dealing with common problems such as drainage in the Indus basin in both India and Pakistan, or the occurrence of arsenic in aquifers in both India and Bangladesh; coping with floods and minimizing damage; sharing experiences in local water-harvesting and watershed development and in the related social mobilization and transformation: these are among the areas in which inter-country cooperation will be very fruitful, and in some instances very necessary. Such cooperation can be at the level of governments, NGOs, academic institutions or `think tanks', or `people-to-people'.

Water Markets?

If engineers and administrators tend to argue for supply-side projects, `liberal' economists and officials of the multilateral financial institutions tend to argue for water markets. To them water is a commodity like any other, governed by the laws of supply and demand: if the state steps out of the sphere and leaves it to the private sector and to the operation of market forces, then supply will meet

demand, prices will be right, economy and conservation will be ensured, and conflicts will be automatically resolved by the market. The slogan is: “water is an economic and social good”. Yes, water is an `economic good' when it is used for industry or agriculture, and perhaps a `social good' when used for sanitation or in hospitals or for fire-fighting; but is `social good' an adequate description of water as a basic human and animal need (and indeed as the sustainer of the environment of which it is a part)? Can water in that basic aspect be reduced to a commodity like cement or steel or fertilizers or soap? Is it not more akin to the air? One is not ruling out water markets; they may have a role to play; but there are important issues of equity, social justice and sustainability that cannot be left to market forces. The glib answer to that will be that these can be taken care of through `regulation', but regulation is far from easy.

The doctrinaire call for `privatization' includes allowing the corporate private sector to build and operate dams across rivers for hydro-electric power and/or for irrigation. Assuming that the private sector is interested in investing in such capital-intensive, long-gestation, modest-return projects, how are the environmental and social impacts (which have presented serious difficulties to the state in past projects) going to be handled by the private entrepreneur and manager? Supply may match demand but resource conservation may receive scant consideration; resettlement and rehabilitation aspects are likely to be given grudging attention only to the extent that resistance by those affected and public opinion compel such attention; and it is naïve to imagine that market forces will obviate conflicts or provide a magical route to their resolution. Whatever the position in relation to industry, water cannot be left to market forces. One is not arguing for a dominant role for the state, but the alternative is civil society, not the corporate sector.

B. Large Projects: Reforms Needed

Even if the reorientation recommended above is accepted and adopted for the future, it will not change the past. We are not writing on a clean slate. A number of projects are already under different stages of implementation, and as mentioned earlier, these will need a drastic review. As regards new projects, a few may still (rightly or wrongly) be found necessary, and in respect of these the entire planning and decision-making processes should be overhauled. Planning should be fully inter-disciplinary and holistic. Environmental, human and social concerns should be wholly internalized. *Minimum environmental impact* and *least displacement* should be important criteria in project selection. Planning and implementation should be fully `participatory', not in the sense of asking for comments on a complex document already prepared by officials but in that of involving and consulting the people from the very beginning. `Stakeholder participation' – part of the Dublin-Rio Principles and currently a fashionable phrase - should become a reality. The National Rehabilitation Policy, under consideration for 15 years, should be quickly finalized and made operational. Public hearings on such projects (on both the environmental and the displacement/rehabilitation aspects) should be mandatory and effective, not merely a ritual to be gone through. For the purpose of securing `informed consent', the fullest information must be provided to the people. EIAs should be made truly independent of project planners, approvers and implementers. Projects should be made to pass through a stringent appraisal procedure. The Nitin Desai Committee's Report of 1983 should be fully implemented without any further delay. A minimum financial return should be re-introduced into the criteria for approval, and concomitantly water rates and collections should be revised and rationalized in the light of the Vaidyanathan Committee's Report of 1992. Alongside of this the service should be improved through the transfer of the management of systems at a certain level (after restoring them to a reasonable

condition) to water-users' associations (WUA). The programme known as `participatory irrigation management' (PIM) should be vigorously implemented[xvii]. (However, it must be noted that this is `participation' only in the limited sense of transferring some responsibilities to the people in the context of a system already built by the state in a `top-down', non-participatory manner.) There should be effective monitoring and post-completion evaluation systems. Familiar and well-recognized weaknesses such as sub-optimal funding, stretching resources thin over too many projects, failure to anticipate cost increases in time and to submit revised cost estimates when a reappraisal is still feasible, failure to provide adequate funds for proper maintenance, and so on, need to be firmly tackled.

C. Efficiency, Economy, Conservation

There is no easy road to ensuring efficiency and economy in water-use and promoting resource-conservation. Proper pricing (full economic pricing for some uses, and reasonable pricing for others) is very important, but is only a part of the answer. In addition, a consciousness of the scarcity and precious nature of this resource has to be promoted strenuously, using every means and method of influencing behaviour available to us – pricing, regulation, tax incentives and disincentives, awards and other forms of recognition, dissemination of information, well-made media programmes, creation of a social climate of opinion, and so on. If the governments, village panchayats and nagarpalikas, private employers, NGOs, and society in general could adopt water-saving as a prime objective and value, and if opprobrium could attach to profligacy and waste and approbation to careful and economical use, it should be possible to bring about significant changes within a reasonable period of time. Apart from such a general campaign, economy and efficiency should be actively encouraged in agriculture, industry and water supply systems. Earlier, reference was made to agricultural yield in the sense

of output per unit of land. While an increase in that will indirectly mean a reduction in the demand for water, there should also be a direct objective of maximizing output per unit of water. (It has been reported that under similar climatic conditions farmers in California get 25 times the output of cotton that Indian farmers are able to achieve[xviii].) Industry should be compelled to recycle its water to the maximum extent and be allowed only a small allocation of `make-up' water. Even the National Commission makes only modest assumptions regarding such possibilities in its estimates of the industrial demand for water[xix]; a more determined and drastic discipline is called for. Waste and loss in public water supply systems should be severely penalized, and the scandal of `unaccounted' water (a euphemism for theft, collusion in unauthorized supply, and failure to bill for supplies made) should be eliminated.

D. Floods

On this subject, what needs to be done follows from the diagnosis given earlier. A proper flood management policy needs to be adopted. In flood-prone areas, a flood cushion should be provided in existing dams and in such dams as are built hereafter, and should not be allowed to be eroded by other objectives. The flood reserve should be properly operated so as to obviate the possibility of sudden releases in the interest of the safety of the structure creating man-made floods down below. Embankments seem undesirable on the whole, but where they are considered unavoidable, they should be well maintained, and remedies must be found for the ills that have been experienced. However, what are referred to as `non-structural measures' (for instance, advance information, preparedness and prompt response) are far more important. A network of well-equipped and technologically advanced systems for observation, analysis and warning must be established (or upgraded where they exist), and there should be real-time communication within the country as well as with

the neighbouring countries. There should also be good disaster-preparedness and mitigation plans, ready to swing into action at very short notice. As for flood-plain zoning, it may be difficult but a beginning needs to be made in that direction.

E. Water Quality

What needs to be done in respect of water quality will be clear enough from the diagnosis in Section II. There is nothing new to be added here.

F. Role of Women

The two objectives that need to be kept in mind in relation to the role of women are (1) reducing their drudgery and burden and (2) giving them a voice in planning and management. As the availability of water gets augmented locally through the kind of reorientation that has been suggested, the burden of bringing water from distant places will gradually diminish and perhaps disappear in due course. As for `voice', this is best ensured by mandating adequate representation for women in all the institutions (panchayats, WUAs, consultative committees, `river parliaments', etc) that are set up for water management at various levels.

G. Conflict Resolution

In so far as inter-State river-water disputes are concerned, the adjudication system provided by Article 262 of the Constitution and the Inter State Water Disputes Act 1956 enacted by Parliament under that Article is very necessary (despite opinions to the contrary) as a last-resort mechanism, and must be made to work better. This has two aspects. First, the delays to which the process is prone at every stage – the establishment of a tribunal; the proceedings of the tribunal and the giving of an award; the notification of the award in the Gazette and its implementation - need to be drastically reduced. Secondly, it

needs to be ensured that the award (declared by the ISWD Act to be final and binding) is in fact accepted by all parties to the dispute and implemented promptly and unreservedly. On the reduction of delays, there are specific recommendations by the Sarkaria Commission which remain unimplemented. These have now been reiterated and added to by the National Commission in its Report. The details of those recommendations (essentially, some time-limits at each stage) need not be gone into here; what is important is that decisions should be taken urgently. The second issue, namely, ensuring the implementation of the award, is far more difficult. If one of the parties to the dispute, i.e., a State Government, refuses to abide by and implement the tribunal's award, what remedies are available? Here, too, there is a recommendation by the Sarkaria Commission: that the award of a tribunal set up under the ISWD Act should be given the status of a decree of the Supreme Court through the appropriate statutory means. No action has been taken on this either. The Commission that is currently reviewing the working of the Constitution will doubtless go into this subject.

The present writer (as a member of the National Commission on Integrated Water Resource Planning) had put forward a suggestion aimed at (a) removing any scope for a sense of grievance on the part of any of the parties to the dispute, and (b) ensuring that the tribunal's award is respected and implemented. The suggestion was that an appeal against the tribunal's award to the Supreme Court – not possible at present – should be provided for through amendments to the ISWD Act and if necessary to the Constitution. The possibility of such an appeal will obviate any sense of grievance, and once the Supreme Court gives its verdict, it is unlikely to be disobeyed. The suggestion was not acceptable to the Commission. Those who are interested may wish to refer to the separate Note by the author to the Report of the National Commission, as also his article entitled `Inter-

State River Water Disputes: Some Suggestions' in *Mainstream*, 5 June 1999.

While it is necessary to make the adjudication process smooth and fast, it is even more necessary to facilitate the processes of settlement of disputes through negotiations and agreement. Some institutional means of assisting negotiations through `good offices', conciliation, mediation, and so on, seem desirable. The National Commission expects the River Basin Organizations recommended by it to perform these functions.

Conflicts relating to water can also arise in other contexts and at other levels: between uses or between areas (e.g., agriculture and industry; irrigation / power generation and flood moderation; diversion for irrigation and maintenance of downstream flows for various purposes; rural versus urban needs; and so on). Principles, laws and institutions are needed to deal with these matters. (There is a view that what is needed is a system of clearly defined water rights together with the possibility of trading in those rights, and that this will resolve conflicts. This seems a simplistic view, and it is also fraught with some danger.)

There is also the possibility of conflict between the people and the state. It must be noted that in the context of the ISWD Act `inter-State river-waters disputes' means *inter-governmental* disputes. Implicit in this is the assumption that rivers are resources of the state to be dealt with by the governments *for* the people. This fails to recognize that the people could have concerns and interests of their own, and that there could be conflicts between these and the aims and purposes of the government. This point (among many others) has come up in the case relating to the Sardar Sarovar Narmada Project, and we must await the Supreme Court's judgment which is expected very soon.

In Rajasthan, when community initiatives resulted in water reappearing in rivers and streams that had been dry for years, the

state claimed the right of control over those waters for the purposes of allocation, licensing fisheries, etc. The dispute has not become acute, and some kind of a *modus vivendi* seems to have been worked out, but the legal issue remains and could come up again in a future case. Again, reference was made earlier to a kind of `parliament' established by the people for dealing with the waters of the Arvari river and resolving conflicts relating to those waters. This is purely an informal body without any statutory backing, and any authority it has acquired by common consent in civil society can be taken away by the state if it so desires. This needs further consideration.

H. A New National Water Policy

The discussions of various issues in this paper clearly indicate the need for a thorough review of the National Water Policy of 1987. Having regard to the importance of water, the federal structure of this country, and the nature of the allocation of responsibilities in respect of water in the Constitution, the need for a national consensus on a policy framework was felt, and it was this that led to the formulation of the NWP 1987. The aim was to get all the States to subscribe in broad terms to a minimal set of propositions of a general nature, which could then form an agreed basis for more detailed policy-making and action plans. National consensus of a kind, with some compromises, was indeed achieved, and the NWP was adopted in 1987. That was doubtless an important milestone, but the achievement should not be exaggerated. Looking back on it now with the wisdom of hindsight, an unsympathetic critic could say that the National Water Policy was a good beginning but did not go far enough; and twelve years after its adoption, it still remains a set of general propositions that have not been operationalized to any significant extent.

It is clear enough that if the NWP were being drafted today, it would need to show a much greater awareness of the present climate of

opinion in regard to many matters such as environmental and ecological issues, `sustainable development', human rights, questions of displacement of people and their resettlement and rehabilitation, the impact of development activities on disadvantaged sections of the society and on tribal communities, the need to remove women's disabilities and `empower' them, and so on. The increasing acceptance of ideas such as a `participatory' approach to project planning, the involvement of `stakeholders', the need for public hearings, the transfer of the management of irrigation systems at a certain level to farmers' associations (`PIM' or `IMT'), and so on, would need to be recognized. The growing awareness of the importance of local water-harvesting and watershed development activities, the imperative of social mobilization in this context, the `success stories' in this regard and the need for a manifold replication of these into a national movement, would need to be reflected. The rediscovery of value in traditional systems of water harvesting and management, and the movement for restoring the role of the community in the management of common resources would need to be taken note of. The promotion of a consciousness of scarcity and of the crucial importance of water management will have to be central to the new Policy. The recognition of access to water as a basic human right, and a profound concern for equity and social justice, will have to be the governing considerations in redrafting the NWP.

It would also be necessary to go into the broad approach that should govern the relationship between co-riparian States on inter-State rivers[xx], as also the future of panchayats and nagarpalikas in relation to water management. Lastly, some of our important river systems are trans-boundary systems and involve negotiations with neighbouring countries (Nepal, Bangladesh); the new Policy may have to take note of this dimension.

The concerns and considerations outlined above seem to call for a fresh exercise of drafting a new policy document rather than an incremental approach of amendments and additions. (The National

Commission has also said this.) The document so prepared will need to be accompanied by a detailed blueprint for converting its generalities into operational plans; without such a blueprint the whole exercise of a redrafting of the NWP will become pointless.

During the last few years, an attempt to revise the NWP of 1987 has been in progress at the governmental level, and the resulting document was placed before the National Water Resources Council at its fourth meeting held recently (on 7 July 2000). The draft failed to receive approval because of reservations of diverse kinds on the part of different State Governments. This is a matter for relief rather than regret, as the draft under consideration was a wholly internal governmental exercise. The draft has been referred to a committee of Ministers, Central and State. The document should now be put into the public domain, and a series of broad-based meetings involving all concerned held at various places in the country for wide-ranging discussions.

I. A Review of the Laws

Several of the changes and reforms suggested in this paper may require legal underpinning. Alongside of the review of the NWP there should also be a comprehensive review of the totality of laws relating to or having a bearing on water. The following is an enumeration in summary terms of the aspects that need to be gone into.

(1) Federalism

(a) Entries Relating to Water in the Constitution:

The primary entry relating to water is Entry 17 in the State List:

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

Entry 56 of the Union List (to which Entry 17 in the State List has been made subject) runs as follows:

"Regulation and development of inter-State rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest."

In terms of the constitutional provisions, the Central Government could perhaps have played an important role in relation to inter-State rivers, if it had got the necessary laws passed by Parliament, particularly as most of India's important rivers are inter-State rivers. However, the Centre has not made (or been able to make) significant use of the enabling provisions of Entry 56. There has been a good deal of discussion on whether water should in fact have been put in the Concurrent List, and whether the Constitution should now be amended to bring this about. This has already been referred to earlier. While it was suggested there that we should proceed with whatever reforms are required without waiting for constitutional amendments to put water in the Concurrent List, the question whether the structure of entries relating to water in the Constitution is a sound one and whether any changes are required cannot be dismissed as an unimportant one; it needs to be gone into. If the National Commission to Review the Working of the Constitution (NCRWC) is not already seized of this matter, it should be referred to it.

(b) Third Tier in the Constitution:

The Eleventh and Twelfth Schedules to the Constitution lay down lists of subjects to be devolved to the *panchayats* and *nagarpalikas*. The lists include, *inter alia*, drinking water, water management, watershed development, sanitation, and so on. It seems likely that in future this third tier will come to play an important role in relation to water-resource development. However, the processes of decentralization are still evolving, and the role of the third tier is as yet only incipient. What full decentralization will entail, and what legislation, if any, will be called for will have to be gone into carefully.

(c) NWRC, NWP:

The National Water Resources Council (NWRC) is an important element in Indian federalism in relation to water resources, but it is only an institution established by a Resolution of the Government of India and has no statutory backing. Its prestige and influence are derived from its composition with the Prime Minister as its Chairman, the Union Minister of Water Resources as Vice-Chairman and all State Chief Minsters and several Central Ministers as Members. The National Water Policy 1987 approved by it is not a law; it has only the force of consent. It is sometimes suggested that the NWRC and the NWP should be given a statutory backing, but it is not clear whether this is in fact necessary, and if so how (under what entries in the Constitution) this can be done. This writer's view is that this is unnecessary, but perhaps this issue too could be referred to the NCRWC.

(d) Inter-State Water Disputes:

The issues referred to earlier in the sub-section on `conflict resolution' need to be dealt with without further loss of time. The necessary amendments to the ISWD Act, and to the Constitution, if necessary, should be put through as quickly as possible.

(2) Drinking Water

Among water uses, the NWP assigns the first priority to drinking water, but whether the operationalization of that priority would require any legislative backing needs examination. Access to safe drinking water should be recognized as a basic human (and animal) right. Perhaps this is implicit in the right to life, but a separate and direct recognition might be useful. (The other priorities in the NWP, i.e., irrigation, industrial use, navigation, etc., cannot be absolute; they will necessarily vary in accordance with circumstances. Incidentally, it is interesting that in its scheme of priorities the NWP does not recognize environmental rights, for instance the rights of aquatic life, or the right of the river itself.)

(3) Ownership Rights: An Asymmetry

There is an asymmetry in Indian law between flowing surface water and groundwater. In respect of the former, the law does not recognize ownership rights; there are only rights of use. However, in terms of the Indian Easements Act, the ownership of land carries with it the ownership of the groundwater under it, subject to regulation and control by the state. This leads to inequities: a rich farmer can install power-driven tubewells or borewells in his land and their operation can make dugwells in the neighbourhood run dry; he can sell water so extracted to his poorer neighbours even though the water may come from a common aquifer; and he can deplete the aquifer through excessive exploitation. The easement right makes regulation difficult. This problem needs to be dealt with.

Incidentally, in the context of the advocacy of water markets ("define water rights and allow trading"), the question arises: if water is either a state resource or a community resource, and what a user (an individual or an institution) gets is a use right, how can he (or she or it) have a surplus for sale, except temporarily and under special circumstances? This may seem an odd conundrum to raise, because we know that water markets do exist and serve some useful purposes; but there *are* difficult issues involved. (The state or the community may of course authorize a private entrepreneur or a cooperative society to set up a water supply agency, supply water in bulk to that agency from public or community sources, or allow that agency to put up its own project for generating the supply by constructing a dam or installing tubewells, and permit it to undertake commercial supplies. However, this is not a case of `defining water rights'.)

(4) Civil Society and State

In so far as river waters are concerned, the Irrigation Acts of the various States vest the control in the State Governments. Whether this is merely `control' or `ownership' makes no material difference. The ultimate authority to decide on the use of the waters rests with the government. This eminent domain makes community initiatives

problematic. Reference has already been made to the difficulties that arose in Rajasthan, where people found that they could bring rivers and streams back to life through their own efforts but had no clear rights over the waters so generated. Though the conflict between state and civil society has not become acute in this case, the potential for future difficulties exists. The Arvari parliament is an exciting development and needs to be replicated in other places, but there is no legal basis for such an institution. It must be recognized that the present legal framework in the country does not favour such community initiatives; it is in fact hostile to them. This is a problem that needs urgent attention if we wish to promote a greater role for civil society in water management.

Another related problem is that of the relationship between such civil society organizations and panchayats. Should panchayats themselves be made responsible for water-harvesting activities? In the commands of major irrigation projects, should panchayats and Water Users Associations be identical? If there are separate organizations for such water management activities, what is their standing *vis à vis* the panchayats, and what should be the role of the latter? The legal aspects of these issues need to be looked into. (Even with decentralization, panchayats and nagarpalikas are still forms of `state', and the question of the relationship between the people and the state remains.)

(5) A National Water Code?

It was mentioned earlier that there was a good deal of waste in all uses of water (domestic, municipal, industrial, agricultural). There is also profligacy in water use, and use for luxurious purposes by the affluent. Can this be dealt with entirely through economic instruments (incentives and disincentives)? Should we go beyond pricing and taxing and try to control waste and profligate/luxurious uses and enforce economy and conservation in some manner? If so, is there need for some kind of legislation for the purpose? This question was

raised at some of the Regional Conferences organized by the National Commission before it wrote its Report. An idea that was put forward was that there should be some kind of a National Water Code (as in some countries). It is difficult to see how such a Code can be enacted in our federal structure but the issue needs consideration.

(6) Major Projects

(a) EIAs:

It was mentioned earlier that EIAS should be made independent of project planners and managers. The kind of professional code that exists in the medical and auditing professions needs to be introduced into the world of EIA consultants as well. There should be a Charter for them and this would imply an Act.

(b)Stakeholder Participation:

`Stakeholder participation' has become a fashionable word, but is not a reality yet. The first requisite is the free flow of information. In this context a reference must be made to the notorious Official Secrets Act which creates a veil of secrecy around governmental actions, keeps the people at a distance, makes things as difficult as possible even for individuals and non-governmental organizations (NGOs) with a proven record of service to the people, hampers academic studies, and in general renders all talk of `participatory' or `people-centred' planning meaningless. This is a widely recognized evil. There has been a movement for reform and for a `Freedom of Information Act'. One must hope that such an Act will come into being soon.

(c) Displacement/Rehabilitation:

(i) The Land Acquisition Act, dating back to the nineteenth century, under which private land is acquired by the state for a public purpose, is the principal instrument of displacement. The actual operation of the Act has been beset with problems in many cases. It is generally agreed that major changes are necessary in the Land Acquisition Act and the related procedures.

(ii) Some State Governments have tried to provide project-affected persons (PAPs) with rights in the command area. Mention may be made of the Madhya Pradesh Project Affected Persons Resettlement Act (Pariyojanaon ke Karan Visthapit Vyakti Punahsthapan Adhiniyam) 1985; the Maharashtra Project Affected Persons Rehabilitation Act 1986; and The Karnataka Resettlement of Project Displaced Persons Act 1987. While these Acts are on the statute book and contain some enlightened provisions, it cannot be said that they have been fully put into practice. Similarly, well-intentioned provisions such as the collection of a `betterment levy' from farmers whose lands get the benefit of irrigation at state expense, or a lower land ceiling for irrigated land as compared with unirrigated land, have remained largely unimplemented. These are important areas needing attention.

(iii) Public hearings are now a statutory requirement in respect of such projects, but this is essentially in the context of an environmental clearance. The hearings should also cover the displacement/rehabilitation aspects. A `rehabilitation clearance' similar to the environmental clearance (or `financial closure' in the case of power projects) should be made a statutory condition before work on a major WRD project can begin.

(iv) The rights of access of people in the submergence areas and in the upper catchments to the natural resource base on which they depend should be statutorily recognized.

(v) A grievance redressal machinery in the form of an Ombudsman should be made a statutory requirement in the case of all such projects.

(vi) The National Rehabilitation Policy which has been under consideration for years should be quickly finalized and given statutory form.

(vii) The PIM programme and the establishment of WUAs under it need legal backing. The AP Government has already passed an Act for the purpose. This should be done in all States.

(7) Other Matters

Other matters such as flood-plain zoning, pollution control, water quality, groundwater regulation, and so on, will also necessitate a review of the existing (or absent) legal underpinning. The antiquated Irrigation Acts too will need an overhaul.

What is called for is a comprehensive review of all the laws having a direct or indirect bearing on water, with a view to improving their relevance and effectiveness, filling gaps, and building up a coherent, inter-related, integrated structure (or `architecture' to borrow a term which is in vogue in another context).

J. Institutional Reform

Some institutional issues have figured in earlier sections: for instance, improving the effectiveness of the NWRC; the PIM programme and the formation of WUAs; providing an institutional machinery for conciliation and mediation in the context of disputes relating to inter-State rivers; water markets; public hearings as well as a grievance redressal machinery (`Ombudsman') in the context of large projects; ensuring the professional independence of EIAs; fostering the civil society institutions needed for local water management initiatives; and so on. That ground need not be gone over again. Nor is it necessary to go into the reorganization and restructuring of bureaucracies at the Central and State levels, as there is no dearth of recommendations on that subject: see for instance the report on the organizational and procedural change requirements in the irrigation sector, brought out by the Central Water Commission; and the discussion on institutional aspects in the Report of the National Commission.

(Similarly, it is not proposed to go into the question of river basin organizations; there is a detailed discussion of that subject in the report of the National Commission. One has doubts about the workability of the kind of RBOs that they have suggested; the structures of both the general assembly and the executive committee seem cumbersome and unwieldy. In any case, the Report is presumably still under consideration, and meanwhile the very idea of river basin organizations appears to have been rejected for diverse reasons by the State Governments at the last meeting of the NWRC. Elsewhere in the world different countries have been able to come together in Commissions on shared rivers, but it appears that our State Governments are mortally afraid of an erosion of their powers by any such body!)

From the point of view of this paper, the details of organizational restructuring are not as crucial as the spirit that should guide and inform the process. Broadly speaking, the following are the important considerations:

- ensuring inter-disciplinary functioning;
- integrated or at least coordinated functioning rather than compartmentalization and fragmentation;
- openness and readiness to share information;
- a realization that there is wisdom outside the government, and in particular, that there is a great deal to be learnt from traditional systems and practices of water management;
- a willingness and a capacity to work with the people and NGOs.

Organizational change will have to be accompanied by a concerted effort at a reorientation of attitudes (or `mindsets', to use the currently fashionable word). The success of whatever is undertaken in relation to water (or anything else) is crucially dependent on a constructive partnership between the state and civil society.

VI. A Final Question

The kind of overhaul of policies, procedures, laws and institutions that has been advocated in this paper will undoubtedly be difficult to bring about, and may seem naïve or unrealistic. In discussing the changes felt to be needed we sooner or later encounter the statement that `politics' will come in the way. For instance, stopping the thin spreading of resources on too many projects, pricing water properly, regulating the exploitation of groundwater, giving PAPs the first claim on the benefits expected from the project, ensuring equity between head-reach and tail-end users in a canal system, resolving inter-State water disputes in a fair and harmonious manner, enforcing economy in the use of water, shifting the focus from big, `top-down' projects to local community initiatives, and so on, may be sensible things to do, but `politics' of various kinds and at various levels may render them very difficult to achieve. This paper can provide no easy answer to this; it can only say that we must keep patiently exploring possibilities and seizing opportunities when they occur.

End Notes

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ANNEXE

Presented at (1) Regional South Asia Meeting on Water for Food and Rural Development, New Delhi, 1-3 June 1999, and (2) Regional Workshop to Develop a South Asia Water Vision, Colombo, 27-29 June !999

SOUTH ASIA WATER VISION

WHAT KIND OF A FUTURE WORLD ARE WE ENVISIONING?

Ramaswamy R. Iyer

1. A Sane World

A world neither of undue luxury nor of excessive austerity, but of modest comfort.
(Water demand projections to be derived from a world so visualized).

2. A Humane World

(a) Access to water as a basic human and animal right to be recognized and respected. (Right to be non-discriminatory).
(b) Entitlement/ access to food to be ensured.

3. A Caring World

(a) Women not to be put to undue hardship in fetching and managing water for the household.
(b) The needs of the weak, the handicapped, the aged, the disadvantaged and the poor to be adequately taken care of.
(Query: should we assume the continuing existence of the poor in the world we are imagining?)

4. An Equitable World

(a) Divisions such as rich-farmer/poor-farmer, head-reach/tail-end, etc., (and the concomitant differences in political power) to be eliminated or mitigated.
(b) Women to be empowered as providers, users and managers of water.
(c) Inequities within the family (e.g., in relation to women, the girl-child, etc) to be eliminated.
(d) Differences between urban and rural `entitlements' to be removed or minimized.
(e) Projects and schemes (big or small, simple or sophisticated, local or of a wider compass, low-cost or high-cost): (i) alternatives not

involving displacement or dispossession of people to be preferred; (ii) the full participation of all concerned (all `stakeholders') – institutionalized, with proper legal backing - to be ensured right through, from the earliest planning stages to completion and operation; (iii) equity as between people in the upper catchments and the submergence area on the one hand and those in the command area, i.e., between those who bear the social costs of a project and those who enjoy its benefits, to be a prime concern.

5. An Efficient World

(a) For increasing the availability (i.e., utilizable quantum) of water resources, least-cost options (financial, economic, environmental, social) to be preferred.
(b) Economy in water-use to be promoted; waste in all uses to be eliminated or minimized.
(c) Value (i.e., utility) from each unit of water to be maximized.

6. A Sensible World

(a) Water for agricultural, industrial, transportation (IWT), and recreational uses to be regarded as an `economic good', and full user charges recovered. (Concessions for poor farmers, small industries, boatmen, etc., to be carefully `targeted' and regulated.
(b) In pricing water, the scarcity of this resource and the need to conserve it to be an important factor.
(c) Water for life-support (a basic human right) not necessarily to be free except for the very poor; in other cases reasonable, though not full, charges to be recovered.

7. A Sustainable, Harmonious World

(a) The mutually sustaining role of water and the natural environment (and the ecological system) to be kept in mind always.
(b) The water rights of aquatic life (fish, birds, even riparian communities), of the larger environment, and of the river itself, to be given due recognition.
(c) The maintenance of the quality of water (surface, ground) and its preservation from deterioration and pollution/ contamination to be the prime duty of all users.
(d) The extraction of groundwater for use not to exceed the annual re-charge, except under special circumstances and for limited periods.
(e) In all water-resource planning, apart from the environmental rights mentioned above, the rights of future generations to be an important consideration; natural resources and the environment to be held in sacred trust for the future.

[i] The present writer was a member of the National Commission. His reservations on certain matters are indicated in a separate Note at the end of the Commission's Report.
[ii] Source: National Commission.
[iii] Source: National Commission.
[iv] On the concepts of `available' and `usable' water resources, see section V, sub-section A, third paragraph.
[v] Cf. The following extract from an internal paper of the Planning Commission made available to the author:
"In 1972, surveys revealed that out of a total of 5,80,000 revenue villages there were 1,50,000 drinking water `problem villages in India. By 1980, some 94000 villages were covered by government and 56000 were left uncovered. But the 1980 survey revealed that the number of problem villages was actually 231,000 and not merely 56,000. By 1985, all but 39,000 villages were covered but the new survey revealed 161,722 problem villages. Again, by 1994, they were all covered leaving only 70 uncovered villages but the 1994 survey revealed 140,975 problem habitations. This time the number included both revenue villages as well as hamlets…."
[vi]The Damodar Valley Corporation (DVC) was planned for multiple functions (flood moderation, power generation, irrigation and the general development of the area), but the flood moderation achieved was not of the planned order. The functions of DVC were whittled down over the years. DVC today is mainly a power-generating body, and much of that power is ironically enough thermal power.
[vii] It has been pointed out that the 1988 floods caused greater damage than the 1978 floods (Rs. 4630 crores as against Rs. 1455 crores; even in constant 1981-82 prices, the figure for 1988 is said to be one-third higher than that for 1978. Central assistance for flood/cyclone relief is also reported to have risen from Rs. 838.3 crores in the VI Plan period (1980-85) to Rs. 2816.7 crores in four years of the VIII Plan period (1992-96). (R. Rangachari in an article in *Seminar,* June 1999.)
[viii] Source: National Commission.
[ix] Cf. This has been elaborated in the author's `Water Resources Planning: Changing Perspectives', *Economic and Political Weekly*, 12 December 1998:
"EIAs are notoriously undependable…….. Even when a reputed external consultancy firm is engaged (as is often the practice), the thoroughness and objectivity of the study cannot be taken for granted. It needs to be recognized that the insidious pressure on the consultant to be `positive' about the project could be very strong….. The latter has an interest (not necessarily conscious) in coming to the conclusion that the adverse impacts of the project can be remedied or mitigated or compensated for; that the project will still remain viable; and that the overall balance of costs and benefits will be favourable to the project. A consultant who says: "The impacts of this project are too grave to be mitigated or offset: the project should not be undertaken" is unlikely to secure many assignments. It is only a disinterested examination by an independent appraisal agency, say, the Ministry of Environment and Forests or an agency appointed by it, that could be expected to be truly neutral and objective. Even that agency could come under strong pressure from other agencies <u>within</u> the Government to be `positive' and supportive of `development'……..The cost-benefit calculus is a flawed basis for decision-making because (i) it is susceptible to manipulation (costs are usually understated and benefits overstated); (ii) it is necessarily incomplete and inadequate (not every aspect or dimension can be brought within the ambit of the calculus); and (iii) it is morally blind (the infliction of misery on some people is often sought to be justified on the ground that a larger number elsewhere will be benefited)".
[x] Source: Ninth Plan Working Group on Major/ Medium Irrigation Sector.
[xi] `Irrigation potential' is a problematic concept, but nevertheless the `gap' between created and utilized potential cannot be dismissed as unreal.
[xii] Source: National Commission.
[xiii] All the observations cited were actually heard by the author at various Committee and Commission meetings.
[xiv] The idea of a shortage of water in the Ganga leads to proposals for the `augmentation' of those waters. On this, see the author's <u>The Fallacy of `Augmentation'</u>, *Economic and Political Weekly*, Bombay, 14 August 1999.
[xv] For instance, water levels in various wells in the village Buja in Rajasthan went up from 0 to 44.5', from 3' to 40.3', from 10' to 66', and so on as a result of the promotion of water-harvesting activities

by Tarun Bharat Sangh. (*Johad*, published by the UN Inter-Agency Working Group on Water and Environmental Sanitation, October 1998.)

[xvi]See *Dying Wisdom*, (The State of India's Environment, A Citizens' Report, No 4), The Centre for Science and Environment, New Delhi, 1997.

[xvii] The essential parts of the PIM programme would include: good maintenance of that part of the system that remains in the hands of the government; appropriate financial provisions for such maintenance; a proper legal form for the WUA; a sound contractual relationship between the government and the WUA with penalties for failures to deliver water as agreed; charging for the water supplied on a volumetric basis with freedom to the WUA to fix rates for recoveries from members; provisions to protect the interests of women and smaller farmers in the WUAs; and so on.

[xviii] Mentioned by Prof.Garry Jacobs at a meeting in the Planning Commission.

[xix] The water requirement for industrial development is estimated by the National Commission at 103 km^3 in the year 2050 on the basis of the present rate of use of water, and at 81 km^3 on the assumption of "a significant breakthrough in the adoption of water-saving techniques". A saving of roughly 20% in the industrial demand for water over projections based on the current rate of use does not seem a striking improvement.

[xx] Should the NWP include or be accompanied by a declaration of water-sharing principles? In theory this seems unexceptionable, but in practice the prospects are not promising. The Ministry of Water Resources did attempt a statement but this has not found general acceptance, because of a divergence of views among the State Governments. One does not know when a national consensus on water-sharing principles will be achieved. Many years may pass in this process. Nor is it clear that the process of conflict-resolution will be greatly facilitated by any document that emerges from such an exercise: it is unlikely to set forth any principle other than that of equitable apportionment (which successive tribunals have been trying to apply), and it is bound to be couched in very general terms which will still need detailed elaboration and application in each case with reference to the facts and circumstances of the case. In any case, the resolution of the disputes that have actually arisen cannot be deferred until a national policy on water-sharing has been adopted.