

National Water Policy: An Alternative Draft for Consideration

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The Ministry of Water Resources is at present engaged in revising the National Water Policy 2002. Instead of trying to make changes in the 2002 Policy, the ministry should put it aside and draft a new policy, starting from first principles. In that context, the draft presented here is an attempt to formulate the kind of document that could be drawn up. It seeks to set forth for consideration a broad national perspective on the nature of water and on its prudent, wise, sustainable, equitable and harmonious use.

This is one person's draft, but it has benefited greatly from consultations with and notes from a number of friends. Their names are mentioned in the Appendix. Some of their ideas figure in the draft, but they may not agree with all the statements in the document. Agreements and disagreements with the draft will of course vary from member to member of the consultative group.

My son Mahadevan Ramaswamy has been of immense assistance in the preparation of this draft. Several paragraphs bear evidence of his contributions. I am grateful to the Centre for Policy Research for hosting the meeting of the consultative group on 9 March 2011 and for other general assistance.

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Preamble

There is a growing and widespread sense of a water crisis, arising from estimates of the availability of water and projections of future demand. The following numbers may be taken note of in this context:

(Figures in cubic km – km³ or Billion Cubic Metres (BCM))

Precipitation over the Indian landmass	4000
Available surface water resources	1953
Available groundwater resources	432
Usable surface water resources	690
Usable groundwater resources	396
Total usable water resources	1086
Present quantum of use	around 600

Projected total water requirement for all uses in 2050 (low and high estimates) 973 to 1180 BCM

Source: Report of the National Commission on Integrated Water Resource Development Plan or NCIWDRP 1999.

There are some problems here relating to the concepts of 'available' and 'usable' water resources; and there are wide variations, both temporal and spatial, in the availability of water in the country, limiting the significance of national aggregates and averages. The 'availability' figures have been questioned by some scholars on two different grounds (overlap between surface water and groundwater leading to double counting; and under-estimation of evapo-transpiration). There are also concepts such as 'water stress' based on availability per capita (annual water resource or AWR per capita), and comparisons of 'water storage per capita' in different countries. These concepts have been questioned by some scholars. Leaving all those controversies aside, it is evident that the projected 'demand' figures are close enough to the 'usable' availability figure to warrant concern. This is what leads to a sense of crisis, and to recommendations of supply-side projects.

However, this Policy Statement proceeds on the basis that much of the crisis is of our own making through the gross mismanagement of water as well as unsustainable ideas of 'development', and that a major rethinking on water policy is called for.

Policy Statement

1 Need for a New National Water Policy

(1.1) This is a policy statement and not a strategy or a plan of action. It will be concerned with approaches, perspectives and principles, and not with statistics, targets or programmes. Any strategy or plan of action will have to be guided by the policy in force.

(1.2) The starting point of this document is the recognition that a radical rethinking on water has become necessary because

there has been serious mismanagement of water in this country, leading to a near-crisis.

(1.3) That there has been serious mismanagement of water will be clear from the following brief, selective, illustrative enumeration of problems:

- intermittent, unreliable, unsafe and inequitable water supply in urban areas;
- in rural areas, the constant problem of ‘covered’ villages (i.e., villages with access to a nearby source of safe drinking water) lapsing back into the ‘uncovered’ status;
- large numbers of people lacking access to safe drinking water and decent sanitation;
- rivers turned into sewers or poison, and aquifers contaminated;
- alarming depletion of aquifers in many parts of the country;
- inefficiency and waste in every kind of water-use;
- the environmental/ecological impacts of big water-resource projects, poor EIAs, the displacement of people by such projects and the general failure to resettle and rehabilitate project-affected persons;
- major and medium irrigation systems in disarray, rendering poor and unreliable service, and characterised by inequities of various kinds;
- intractable water-related conflicts between uses, sectors, areas, States; and so on.

These problems doubtless call for improvements in efficiency, technological innovations, institutional reform, and better ‘governance’, but going beyond these, a major change in thinking and orientation is necessary.

(1.4) Such a rethinking would have been necessary even if the phenomenon of climate change had not supervened. A water policy formulated in the light of that rethinking will remain valid despite climate change, and will provide the basis for adjustments necessitated by that phenomenon and its impacts on water. (See paragraph 30 below.)

2 Nature of Water

(2.1) The change that has been advocated above must be based on a clear understanding of the nature of water, as briefly set forth below.

(2.2) **Water on Planet Earth:** Water is a *finite* substance. The quantum of freshwater on this planet has remained the same over millennia. Water cannot be created or destroyed; only its form changes (though it can of course be polluted and made unusable). All forms of water – rainfall, snowfall, glaciers, rivers, streams, springs, lakes, ponds, groundwater, wetlands, atmospheric and soil moisture – are inter-related and constitute a unity. Water is an integral part of the ecological system, sustaining and being sustained by it. Water is a sustainer of all forms of life, including vegetation and forests, and plays a vital role on Planet Earth. In the words of the European Water Framework Directive, “water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such”.

(2.3) **Water in Human Lives:** From a human perspective, water is many things in one: a basic life-need and right; an amenity; a

cleaning agent; a social good (e.g., for firefighting, hospital use, use in schools and public institutions, etc); a requirement for economic activity (agriculture, industry, commerce); a means of transportation; an occasional manifestation as floods; a part of our social, political and cultural life; and a sacred substance.

(2.3.1) Water is at the same time a local resource, a State resource, a national resource, and a regional resource.

(2.4) The understanding of water outlined above is the bedrock on which this water policy statement rests.

(2.5) Though water, wetlands, land, forests, mountains, wild-life, bio-diversity, tribal communities, and so on, are inter-related and cannot be considered in compartments, this document focuses on water for convenience.

(2.6) The term ‘resource’ implies an economic perspective, and ‘management’ comes from the world of business. These are not wholly appropriate in the case of water. However, they are in common use, and are not avoided in this document.

3 Overarching Policy Perspectives

(3.1) Water comes from, and is dependent on, the ecological system. Ecological concerns and imperatives must therefore govern all planning and action relating to water at all levels and scales. It is the duty of both the state and the citizen to ensure the protection, preservation and conservation of all water sources and of the larger ecological system of which these form a part.

(3.1.1) Going beyond protection, the sanctity of water sources and of the ecological system must be accepted and ensured.

(3.2) As Nature’s bounty, water should be gratefully and reverentially received, and shared equitably with fellow human beings within and across political borders intra-national and international, with all other forms of life, and with future generations. Equity, no less than ecology, must be a governing consideration in water-related planning and action.

(3.3) Harmony between groups of people, between States, between countries, between generations, and between humankind and nature, will require a combination of ecological sensitivity, equity and justice.

(3.4) Ecology, equity, justice and harmony must therefore be the overarching policy perspectives governing all other perspectives.

4 Right Thinking on Rivers, Wetlands, Water Bodies

(4.1) Ecology includes rivers, but some special guidelines regarding rivers are necessary because they have been much abused in this country despite being worshipped as divinities. They are cavalierly obstructed with dams, barrages or embankments; the abstraction/diversion of their waters is regarded as the proper ‘use’ of their waters; in-stream flows (particularly flows to the sea) are regarded as wasted; pollution and contamination are inflicted on them beyond their capacity to handle; sand is mined from their beds; and so on. Instead of killing rivers first and then trying to revive them, we must learn to let them live and remain in a healthy state.

(4.2) The following statements should constitute the new policy in respect of rivers:

A river is not a drain. A river doubtless ‘drains’ its catchment, but to consider it mainly as a ‘drain’, i.e., as a conduit taking the runoff to the sea, is a reductionist view.

Rivers are natural phenomena and not human artefacts. They are not pipelines to be manipulated at will, turned in different directions, cut, rejoined, welded.

A river must flow. If it does not flow, it is not a river. Apart from the ecological functions that a river performs as it flows, its capacity to cope with pollution and regenerate itself depends crucially on adequate flows.

'Minimum flows' or 'ecological flows' are misleading concepts. 'Minimum Flow' implies maximum abstraction, leaving a small quantum reluctantly in the river. As for 'ecological flows', all flows are ecological; any diversion or abstraction will have an ecological impact, ranging from minor to major. Interventions cannot be wholly avoided, but they can be minimised. The right approach is not minimum flows, but minimal intervention in natural flows.

A river needs space. When floods come, as they will from time to time, the river needs space for spreading and accommodating them. The natural floodplain of a river is an integral part of the river and should not be stolen from the river.

A river needs its bed. The riverbed is an integral part of the river and must not be abused.

A river is an inseparable part of the hydrological unity; and a river basin is an integral whole. Any intervention in a river must be guided by a knowledge of its likely impact (a) on water in any other form, and (b) on any other part of the basin.

The health of a river would depend on the health of the ecological system of which it is a part. It follows that the protection of the river will call for the protection of the system as a whole.

(4.3) The wide variety of wetland systems in the country are important water sources and repositories of aquatic biodiversity. They are not wastelands and cannot be drained for agriculture, urbanisation, or other purposes without serious adverse consequences. The preservation and conservation of wetlands ought to be an essential part of water policy.

(4.4) That applies to all water bodies as well. Many water bodies have been lost to the processes of urbanisation and 'development'. What remains must be protected, and efforts must be made to restore at least partially what has been lost.

5 Policy Reversal: Restraining Growth of Demand

(5.1) The economist's language of supply and demand is inappropriate in the case of water. We cannot 'demand' water and expect a 'supply' response; the 'supply' of water is what is received from nature; what is available in nature has to be put to wise use; there can be no 'demand' for water that does not exist. However, the terms 'supply' and 'demand' (meaning 'availability' and 'stated requirement' respectively) are in general use and will be used in this document for convenience.

(5.2) In the past (at least up to the 1960s and perhaps the 70s), 'water policy' (inferred from practice) meant essentially making more water available for use, i.e., a supply-side response to projected or imagined demand, particularly for irrigation; and the thinking was primarily in engineering terms. Attention was focussed on what is referred to as 'water resource development', which meant mainly big 'projects', i.e., dams, reservoirs and canal systems. This approach became a part of the Green Revolution

strategy and produced dramatic short-term results by way of a rapid increase in the production of foodgrains.

(5.3) However, in the long-term, that approach, and the idea of 'development' with which it was linked, set in motion an ever-growing unmanageable demand for water, inflicted grave damage on water and soil, was accompanied by inequities and injustices of various kinds, and generated severe water-related conflicts at various levels. It is clear that the old approach, which continued to be present in NWP 1987 and 2002, is no longer tenable. Primacy in water policy will have to shift from supply-side projects to restraining the runaway growth of demand.

(5.4) The restraint urged here is not in respect of the basic water requirements of human beings and animals but in respect of agricultural, industrial, commercial, recreational and other demands for water.

6 Questioning Projections of Demand

(6.1) As was mentioned in the Preamble, projections of future demand are close to or exceed availability, causing a sense of crisis. However, behind the projections lie not merely population numbers, but also (a) inefficiency and wastefulness in all water uses, and (b) ideas of development and conceptions of the good life that generate a competitive, unsustainable demand for water, make an excessive draft on all natural resources and in particular water, and cast a heavy burden of pollution and contamination on water sources, cutting into availability. In brief, the crucial factor underlying the water crisis is a combination of a poor use of water and 'greed' in the Gandhian sense. This makes for a large 'water footprint', as part of a large 'ecological footprint'.

(6.1.1) Our water footprint and our ecological footprint must shrink. The slogan must be "Reduce, recycle, re-use". We must aim not only at a low carbon economy, but also at a low water economy.

(6.2) Confining the discussion for the present to questions of efficiency and technology, strenuous efforts need to be made to optimise what is obtained from each drop of water in every kind of water-use. Major economies are possible and necessary in every kind of water use.

(6.2.1) Agriculture is the largest user of water, but hardly an economical user. The total agricultural demand for water can be significantly brought down by improvements in water-use efficiency, avoidance of wasteful use, minimisation of losses, production of 'more crop per drop', changes in cropping patterns (where feasible), better irrigation techniques and practices, water-saving innovations such as System of Rice Intensification (SRI), improving the productivity of 'rainfed' agriculture, and so on.

(6.2.1.1) Water-intensive irrigated agriculture must not be extended to water-short areas, generating a growing demand for water that cannot be met.

(6.2.2) In rural and urban water supply, the tendency is to project future needs on the basis of fairly high per capita norms, arrive at high figures, and then seek water from distant sources. Economies must be enforced on those (whether in rural or urban areas) that use too much water, and availability improved to groups or areas that receive too little. If this were

done, it might not be necessary to seek additional water from external sources.

(6.2.3) In industrial use of water, multiple recycling and reuse needs to be insisted upon, allowing minimal make-up water: the goal must be 'zero effluent' and a situation in which 90 per cent of the requirement of water for industry is met through recycling. It will not be easy to achieve that goal, but it is necessary and must be reached within a reasonable period.

(6.2.3.1) In the interim, while moving towards that goal, water-intensive industries should not be allowed to be set up in water-short areas.

(6.2.4) In all water uses, the generation of waste must be reduced, and a part of the waste generated must be recovered for certain uses.

(6.3) Appropriate legal and fiscal instruments must be devised for promoting efficiency, encouraging economy, minimising waste and recovering usable water from waste, in all uses.

7 Water Policy and Science: A Reorientation

(7.1) Science has a dual role in relation to water policy: a basic foundational role and an instrumental role.

(7.2) In the first role, it underlies and informs policy. Good water policy must be based on good water science and earth science. (Water science is not the same thing as water engineering. Good water engineering is not always good water science.)

(7.3) In the second role, it assists in the achievement of policy objectives. It is here that a major reorientation is called for. We have in the past assigned a Promethean role to Science and Technology, i e, to get more water and other 'resources' out of nature for human use. Science and Technology will now have to teach us how to reduce our draft on nature, i e, our water and ecological footprints, and learn to live in harmony with nature.

(7.4) This paragraph is about what is known as Science and Technology (s&t), but in relation to water, 'science' must include environmental sciences, ecology, and social sciences. Water policy and governance call for true interdisciplinarity.

8 Policy Reversal: Supply-Side

(8.1) Despite all measures of restraint on the growth of demand, some augmentation of 'supply', i e, water available for use, may be needed. There are only three ways in which this can be done: rainwater-harvesting, groundwater drilling and large projects for storage and transfer. Each of these would have its impacts and consequences. Some of those issues and the related policy aspects will be gone into later. This paragraph is concerned with the relative priorities of the three possibilities on the supply side.

(8.2) Primacy on the supply side will have to shift from large, centralised, technology-driven, capital-intensive 'water resource development' (WRD) projects with big dams and reservoirs and canal systems, to small, decentralised, local, community-led, water-harvesting and watershed-development programmes, with the big projects being regarded as projects of the last resort; and the exploitation of groundwater will have to be restrained in the interest of resource-conservation as well as equity.

(8.3) What is the justification for that reversal of the long-established thinking that treats big projects as the first choice?

First, local water augmentation through rainwater-harvesting and micro-watershed development is by no means secondary and supplementary, but holds considerable promise as a significant component of national water planning. Special emphasis needs to be laid on it, but that will not happen so long as the orientation continues to be towards big projects; a change in that orientation is therefore necessary. Secondly, the option of local augmentation, where available, seems preferable to bringing in water from large and distant storages, with related costs, losses and other problems, except where the latter is the only course open or the best of available options. Thirdly, big projects have formidable impacts and consequences (ecological, social, human); those of small local interventions are likely to be far more manageable. As mentioned above, some of these issues will be discussed later.

9 Water as Public Trust

(9.1) By judicial pronouncement the public trust doctrine (the doctrine that water is held in public trust by the state for the community) has been held to be part of Indian law. This implies that water is not private property or state property but a common pool resource.

(9.2) Water as public trust must be held sacred by the state, and must not be allowed to be abused by other agencies, public or private. In particular, the economic or commercial use of water by some must not adversely affect the lives and livelihoods of the community.

(9.3) The ultimate responsibility of the state as public trustee remains even if some of the functions of the state (such as water supply or sanitation) are entrusted to a Board or Corporation or other corporate body, public or private or joint.

(9.4) The public trust doctrine must apply to all forms of water. If water in any form (e g, groundwater) is under any other legal regime (e g, private property), this needs to be changed (see 18.4 below).

(9.5) The public trust doctrine must apply not merely between the state and civil society but also between present and future generations, between humanity and other forms of life, and between humanity and Nature in general. (In each of those pairs, the first has to regard itself as the trustee for the second.) The doctrine needs to be widened and given an ecological/philosophical underpinning.

10 Water as a Right

(10.1) The right to water needs to be distinguished from water rights. The right to water relates to the basic water requirement for life (i e, water for drinking, cooking, washing and personal hygiene, and the essential water needs of livestock), whereas 'water rights' is a term that is generally used in the context of water for irrigation, industrial or commercial use, etc; that is, economic uses of water.

(10.2) The right to water as defined above is a fundamental right by judicial interpretation. The state has a responsibility to ensure that this right is not denied to any citizen or group of citizens. (See also paragraphs 9.3 above and 23.2 below).

(10.3) The right to water must include the rights of access of certain tribal and other communities to forests, mountains,

ivers, etc; that is, the natural resource base on which they have for centuries depended for sustenance.

(10.4) Between a fundamental right (life-right) and a non-fundamental use-right, the former must always take precedence over the latter; and the exercise of economic rights by some must not be allowed to jeopardise the fundamental rights of others.

(10.5) Water-supply and sanitation are inter-connected. If there is a right to water, there must also be a right to decent sanitation.

11 Water Use: Priorities

(11.1) Humanity receives water from, and cannot presume to allocate water to, nature and ecology. It follows that nature and ecology come first, are anterior to human water use, determine the water available for allocation, and cannot figure within our system of priorities for water allocation.

(11.2) Within any such system of allocation, there can be only one absolute priority, namely water for life, as defined in 2.3 and 10.1 above.

(11.3) *Prima facie*, it seems reasonable to assign the second priority to 'water for livelihoods', if the difficulties of defining 'livelihoods', distinguishing 'livelihoods' from 'gainful occupation', and quantifying the water required for livelihoods, can be overcome.

(11.4) The relative priorities of all other uses, such as agriculture (beyond livelihoods), industry, commerce, recreation, etc, will depend on local circumstances and the right land-use for a particular area.

(11.5) An absolute priority, say, water for life and livelihoods, is a sequential priority, i e, it must be met first before any other use is considered. The relative priorities among those other uses are proportional, i e, a matter of sharing of what is available, with relative weights in the allocations to different uses.

(11.6) A crucial criterion for determining inter se priorities in a given case must be the use-to-damage ratio, i e, the benefit expected from the water-use and the damage likely to be caused to the resource and to the environment in the process.

12 Water: Conflicts, Allocations, Institutional Arrangements

(12.1) There is no comprehensive system of water entitlements or allocations to all water-users, but the appropriate authorities (municipal authorities, irrigation engineers, etc) provide connections or make commitments of supply in each kind of water use, i e, canal irrigation, industry, domestic use, etc. (The large numbers of private structures or installations for the extraction of groundwater are outside such supply systems.) Limits with reference to the overall carrying capacity of the system are rare, and there are no set provisions for inter se choices in times of difficulty. On such occasions, ad hoc decisions are made. There is generally no system or machinery for difficult choices or the prevention/resolution of disputes, except in the case of inter-State river-water disputes (see paragraph 13 below).

(12.2) Principles and institutional arrangements are necessary for such inter se choices and allocation decisions in the interest of equity, resource-conservation, protection of water sources,

determination of water tariffs, harmonisation of different water and land uses within an overall hydrological/ecological unit such as a basin or sub-basin, and the prevention and/or resolution of disputes.

(12.2.1) The institutional arrangements will have to cover three different kinds of functions: administrative or managerial, regulatory and adjudicatory. As mentioned in paragraph 15 below, these will have to be built from the micro-watershed level up to the basin level in the form of a nested set of institutions federating upwards. Links will need to be established with local governance institutions (PRIs).

(12.3) In making the decisions indicated in 12.2 above, the principles and priorities indicated in paragraphs 10 and 11 above will have to be kept in mind.

(12.4) If a State-level Water Resource Regulatory Authority is established, as has been done in some States, it is necessary to ensure the following:

(a) that it is a truly autonomous, professional, inter-disciplinary body, with managerial, professional (covering all the relevant disciplines), mediatory and adjudicatory capabilities built in;

(b) that the danger of bureaucratisation in personnel and functioning is avoided;

(c) that it does not become one more government department;

(d) that it is truly consultative and participatory in its composition and functioning, and that representatives of civil society are associated with it at all levels;

(e) that it does not run counter to the constitutional scheme of democratic decentralisation;

(f) that its overarching concern is with equity, social justice, resource-conservation and ecological sustainability;

(g) that it is guided by basin hydrology and ecology in its decisions; and

(h) that working relationships are established with basin-level institutions (if any) built up as the apex of a nested set of institutions from the bottom up, as envisaged in paragraph 15 below, or alternatively, that the regulatory authority or organisation itself is the apex of such a nested structure.

(12.5) Historically, regulatory authorities have been established to ensure fair competition among suppliers or service-providers and to protect the interests of the consumers. A Water Regulatory Authority, on the other hand, will be mainly concerned with regulating water-use in the interest of equity, social justice, ecological sustainability, and with the avoidance or resolution of disputes. This crucial difference must be clearly understood.

(12.6) A danger to be avoided is the implicit assumption that a Water Regulatory Authority is merely a means of establishing tariffs and tradable entitlements with a view to the eventual privatisation of water services and promotion of water markets.

13 Inter-State River-Water Disputes

(13.1) Among all water-related conflicts, inter-State river-water disputes are the most prominent, politicised and intractable. The following principles may help in the minimisation of such disputes.

(13.2) None of the States in a river-basin owns the river; all of them have use rights.

(13.3) All basin States in a river system are equal in rights status; there is no hierarchy of rights among them. This does not mean that they are entitled to equal shares in the river waters.

(13.4) Ideally, all basin States should join hands in the holistic, prudent and wise use of the river system for the benefit of all.

(13.5) If that ideal course is not feasible, the second best course would be a sharing of the waters. This implies a segmentation of the river. If determining shares becomes necessary, it should be governed by the principle of equitable sharing for beneficial uses, and not by other theories such as territorial sovereignty (the Harmon Doctrine), prior appropriation, prescriptive rights, etc.

(13.6) The principle of equitable sharing for beneficial uses implies that the upper riparian respects the rights, i.e., the legitimate needs and claims, of the lower riparian, and that the lower riparian recognises those of the upper riparian. The upper riparian should refrain from causing harm to the lower riparian, and the lower riparian should not seek a veto on upper-riparian use.

(13.7) The sharing should be only of what is available for sharing after the ecological functions of the river are ensured. These would include the sustaining of wildlife, aquatic life and vegetation; the maintenance of the river regime and the capacity of the river to cope with pollution and regenerate itself; the maintenance of the micro climate; the support of the lives and livelihoods of people dependent on the river on both sides of the political or administrative border; the recharging of aquifers; the preservation of wetlands; the protection of the health of the estuary; and so on.

(13.8) In any water-sharing agreement, the principles and modalities of sharing the waters in a difficult year of low flows must be clearly laid down. This is a matter for mutual agreement in each case with reference to all the relevant circumstances.

(13.9) Inter-State river-water disputes are often centred on a major (existing or planned) intervention in the river in question for diversion or storage. The best way of avoiding conflicts is for the upper riparian to adopt a cautious and minimalist approach to such interventions; undertake them where absolutely necessary with due regard to the interests of the lower riparians; provide advance information to the latter about plans for intervention; consult them at all stages on possible impacts; and take care to avoid significant harm or injury to them.

(13.10) When an inter-state river-water dispute seems likely to arise, efforts should be made through negotiations, conciliation, mediation, the good offices of respected persons of goodwill on both sides, etc., to obviate the dispute, resolve it quickly if it does arise, and avoid recourse to adjudication as far as possible. Institutional arrangements must exist for these purposes in every State. At the Centre, the Inter-State Council, a constitutional body, must play a crucial role in this regard.

(13.11) Adjudication is a necessary last-resort mechanism provided by Article 262 of the Constitution and the Inter-State Water Disputes Act 1956 as amended in 2002.

(13.11.1) It does not have to be adversarial in spirit. Adjudication must be pursued with goodwill and a willingness to find an acceptable answer to the dispute. The process of adjudication can also be used to explore possibilities of an agreed settlement.

(13.11.2) If the adjudication process is carried to a conclusion and results in an award by the tribunal, it must be accepted in good spirit by both sides. Where necessary, the provision in the Act for a further reference to the tribunal for a clarificatory or supplementary report can be used, but the effort must be to bring the process to a quick final conclusion.

(13.11.3) If the provision of an appeal to the Supreme Court (in partial modification of the bar on the jurisdiction of the courts) will help in ensuring finality to the adjudication process, that possibility may be worthy of consideration.

(13.11.4) Under the law as it stands at present, the parties to an adjudication under the ISWD Act are the State Governments. A more inclusive approach seems desirable so as to allow water-users (agriculture, industry, citizens, etc), as well as those likely to be affected by the projects in dispute, to be heard in the adjudication process.

(13.11.5) A change in the manner of functioning of the tribunals from following purely court-like procedures towards a committee-like problem-solving style seems desirable. The composition of the tribunals may also have to change from purely judicial to interdisciplinary.

(13.11.6) If these objectives require some amendments to the Act and to the Constitution, these must be considered and initiated quickly.

(13.12) The resolution of inter-State river-water disputes, whether by agreement or by adjudication, is not a one-time settlement but a continuous process of conformity to the spirit of the settlement. Standing institutional arrangements are necessary for the purpose. These can take the form of basin-level arrangements as outlined in paragraph 15 below.

14 Inter-Country Water Relations

(14.1) The approach and principles set forth in the previous paragraph in the context of inter-State river-water disputes will apply to water relations with neighbouring countries as well. In this context also the governing principles should be equitable sharing for beneficial uses, a cautious and minimalist approach on the part of the upper riparian to interventions in boundary/transboundary rivers, advance information to and consultation with the lower riparian about planned interventions, refraining from causing significant harm to the lower riparian, institutional arrangements for the avoidance of conflicts and for their resolution if they arise, and so on.

(14.2) Ideally, there should be institutional arrangements for consultation and coordination involving all the countries concerned with a particular boundary or transboundary river. Failing such a multilateral arrangement, the second-best course would be bilateral arrangements.

15 Basin-Level Coordination

(15.1) A river basin, as mentioned in paragraph (4.2) above, is an integral whole; it is both a hydrological system and an ecological system. Every water-related activity in any part of the basin, whether it is a large project involving a dam, a reservoir and a canal system, or a diversion barrage, or a small-scale local water-harvesting structure, may have impacts or consequences

elsewhere in the basin. Moreover, different parts of the basin may call for different land-use practices. It is therefore necessary to ensure that every intervention, large or small, centralised or decentralised, is guided by (a) the land-use appropriate to the area, and (b) an awareness of the basin (or sub-basin) hydrology and ecology, and in harmony with it.

(15.2) For this purpose, the basin States should come together to establish appropriate institutions. To avoid the dangers of centralisation and bureaucratisation, such arrangements should be built from the bottom up, starting from the village and the micro-watershed, and federating upwards in a set of nested institutions to the State level and beyond, up to the basin level, and should be representative and participatory at every level, involving all categories of water-users.

(15.3) Such basin-level institutional arrangements can, among other things, undertake the monitoring of the actual operation of an inter-State river-water agreement or award, and the resolution of the differences that might arise in that context.

16 Inter-Basin Transfers

(16.1) An inter-basin transfer assumes that one basin is 'surplus', i.e., has water to spare, and that another basin is 'deficit', requiring external water. Leaving aside the theoretical point that every drop of water flowing in a river is ipso facto performing a useful function, the calculation of the putative 'surplus' in a basin depends on a number of assumptions and parameters, any variation in which may turn the surplus into a deficit; it is therefore not a robust determination. On the other hand, the 'deficit' in a basin may be the result of poor or profligate water-use. Thus, the advocacy of inter-basin transfers rests on a very shaky basis.

(16.2) The preferred approach has to be the optimal utilisation of waters within a basin. An inter-basin transfer is often an escape from good intra-basin management. It needs strong justification.

(16.3) The Constitution recognises inter-State rivers but makes no reference to inter-basin transfers of river waters. It neither prohibits nor permits them. Any such transfer can be made only on the basis of the consent of the parties concerned.

(16.4) An inter-basin transfer can be a short transfer between two adjoining basins, or it can be a long-distance water transfer between two basins which are far apart. All inter-basin transfers, short or long, must necessarily involve the crossing in some manner of the physical barrier between two basins.

(16.5) A long-distance water transfer could be fraught with serious economic, financial, hydrological, meteorological, environmental, ecological, anthropological, public-health, social, human, and other implications and consequences. It must be approached with caution. Recourse to long-distance water transfer must be rare and exceptional rather than common or routine.

17 'Water Resource Development' (WRD) Projects

(17.1) This paragraph is concerned with large interventions in nature to store or divert waters for whatever purpose. 'Large' here is not a precisely defined technical term, but is used loosely in the sense of 'substantial' or 'significant'. The classification of irrigation/multipurpose projects as major, medium and minor is

unsatisfactory and will not be used here. This paragraph will also not go into issues of irrigation/agricultural policy (e.g., protective vs productive irrigation, irrigated vs rainfed agriculture, etc) or those of energy policy (the importance of hydroelectric power, its place vis-à-vis thermal or gas-based power in the energy economy, etc). However, please see (17.3) below.

(17.2) A cautious, minimalist approach to such interventions is necessary partly because they are apt to lead to conflicts (as mentioned in paragraph 13.9 above), and partly because of their environmental, ecological, social, human and other impacts and consequences.

(17.3) If there are strong ecological, social or human reasons for such a cautious, minimalist approach, then policies in the fields of agriculture and energy will need to be guided by that approach. It will be inappropriate to override that approach on the a priori ground that large projects are needed for irrigation water or for hydroelectric power.

(17.4) All options available for achieving the objectives in view must be considered and assessed, and a large project involving a major intervention in nature selected only if it is the unique solution or the best of all available options in the given case.

(17.5) The displacement of people for a project should preferably be avoided. Alternatives involving no displacement or less displacement should be preferred. Similarly, alternatives involving less environmental impacts should be preferred. Least environmental impact and zero or minimum displacement must be important selection criteria in the decision-making.

(17.6) Where some displacement is found to be necessary, it should be based on the free, informed prior consent of the people likely to be affected in any manner. There should be no forced displacement.

(17.7) The people likely to be displaced or otherwise affected in any manner by a project must be statutorily given the first claim on the benefits expected from the project.

(17.8) Environmental Impact Assessment studies must be made more credible, i.e., more truly independent and professional, and more rigorous, comprehensive and objective, than they are at present. This, however, goes beyond water and is applicable to industrial, mining, and other projects as well. It is a matter for separate consideration by the Ministry of Environment and Forests.

(17.9) It goes without saying that the planning, construction and operation of large WRD projects must conform to the requirements of the relevant policies and laws such as the Land Acquisition Act 1894, the Environment Protection Act 1986, National Environment Policy 2006, the EIA notifications in force, the Forest Conservation Act 1980, The Provisions of the Panchayats (Extension to the Scheduled Areas) Act, 1996 (PESA), the National Resettlement and Rehabilitation Policy 2007, the National Rehabilitation Act and the Land Acquisition Amendment Act (if these are enacted), etc.

(17.10) Assuming that some major projects are likely to be undertaken, a minimalist approach has been recommended above. However, there is in fact a strong case for a moratorium on new projects and an emphasis on the consolidation of what has already been done. The grounds for that statement are: (a) the conflict-creating potential of such projects; (b) their

environmental, ecological, social, human and other impacts and consequences; and (c) the fact that recent studies show that the massive investments in such projects have not produced commensurate results by way of additions to irrigated area. There is need for a serious reconsideration of canal irrigation. Reforms such as Participatory Irrigation Management in major project commands have not been strikingly successful, and they too need reappraisal.

(17.10.1) Incidentally, even the 'run-of-the-river' (ROR) projects, supposed to be environmentally benign, cause serious harm to the river by rendering it dry between the point of diversion of waters to the turbines and the point of return of the waters to the river, with a series of such dry patches if there is a cascade of ROR projects.

18 Groundwater

(18.1) Surface water and groundwater are closely interlinked. Groundwater contributes to the base flows in rivers, and rivers recharge aquifers. Excessive extraction of groundwater may cause a reduction of flows in rivers, and the damming and diversion of rivers may reduce the recharging of aquifers.

(18.2) There is much concern at the alarming depletion of aquifers through uncontrolled exploitation in many parts of the country, a sense of a groundwater crisis, and general agreement that the regulation of groundwater use is urgently needed.

(18.3) The large number of tube wells (upwards of 20 million), mostly privately owned and operated essentially for 'self-supply', makes regulation extremely difficult. The conventional approach of legal compulsion may not be very effective. The prolonged efforts of the Central Groundwater Authority at bringing about regulation have not been highly successful. The model Groundwater Bill circulated by the CGWA has not resulted in much State-level legislation.

(18.3.1) One possibility is indirect control through the electricity tariff, but many States have followed the opposite course of subsidising electricity or providing it free to farmers.

(18.3.2) Another method of limiting groundwater extraction, tried with some success in Gujarat, is the restriction of the availability of electricity to a certain number of hours by the separation of the feeder for agriculture from the feeders for industry and domestic users. Possibilities of replicating this elsewhere will need to be explored.

(18.3.3) However, something more is needed. There is a growing convergence on the view that the best course would be to move towards the community management of groundwater as a common pool resource.

(18.4) Under existing Indian law, the ownership of land is understood to carry with it the ownership of the water under the land. This needs to change. Groundwater, like surface water, must be regarded as a community resource held in public trust by the state. This may call for amendments to some existing laws and perhaps some new legislation.

(18.5) All aquifers will have to be delineated and people dependent on each aquifer brought together into an aquifer-users' association. That arduous task must be undertaken all over the country as a prerequisite for the community-management of

groundwater. Action will lie primarily at the State and local levels, but where an aquifer crosses state boundaries, inter-State consultation will be necessary.

(18.6) The mapping of aquifers must be a participatory effort, drawing upon hydrogeology, engineering, satellite imagery, and local, traditional knowledge. The study of patterns of use will also involve social sciences.

(18.7) Aquifer users' associations may have to be given legal status on the analogy of Water Users' Associations under the Participatory Irrigation Management scheme (PIM).

(18.8) Regulation of use will then be through a combination of legal restrictions and social sanctions.

(18.9) There may be political difficulties in regulating groundwater use, but they will have to be overcome.

(18.10) Regulation may arrest the further depletion of aquifers, but the depletion that has already occurred could be offset to some extent by programmes for the artificial recharge of groundwater wherever feasible. However, care should be taken to see that the augmentation so achieved is not nullified by profligate use. The objective of artificial recharge is to offset a part of the depletion, and not to provide more water for wasteful use.

19 Local Water Augmentation

(19.1) It is now accepted government policy to encourage community initiatives in local mobilisation for rainwater-harvesting or micro-watershed development. In this context, certain questions arise.

(19.2) Is it better to capture the rain locally as it falls for in situ storage on the surface or underground in a dispersed, decentralised manner, or to go in for large centralised storage of runoff behind a big dam on a river after it has attained a substantial size? Both may be needed but primacy has to shift from the latter to the former, as stated in paragraph (8.3) above.

(19.3) Should the rainfall or runoff locally captured be used direct or conveyed to underground storage (aquifer) and used to raise the water-level in wells? The answer would depend on local circumstances, but in general the storage of the captured water underground seems the preferable course for minimising loss by evaporation.

(19.4) Is the local capture of rainfall or runoff likely to have downstream impacts? Any intervention is bound to have its impacts and consequences, but these are likely to be much greater in the case of large projects than in the case of small local interventions. Nevertheless, this aspect must always be considered. The suitability of the location chosen for water-harvesting structures, possible downstream impacts, harmony with basin hydrology and ecology, and the soundness of the proposed land-use, are matters on which local community knowledge and traditional wisdom must be combined with modern science.

(19.5) What threats do such local initiatives face? There could be conflicts among the different users of the locally augmented water; wasteful use; water-intensive cropping patterns; or extraction by the rich and powerful through tubewells and borewells. Institutional arrangements and the use of social sanctions may be necessary (a) to ensure the prudent, economical, equitable and resource-conserving use of the water harvested by

diligent effort by the local community, (b) for avoiding or minimising disputes and resolving them when they arise, and (c) for protecting the harvested water from appropriation by some.

(19.6) If it is government policy to encourage such local initiatives, a degree of legal recognition of and backing to them may be needed. Further, there should be a good working relationship between the informal community institutions and the formal institutions of local governance, i e, the Panchayati Raj Institutions.

20 Water-use and Land-Use

(20.1) Water-use and land-use are closely connected. In a number of places this policy statement has stressed the importance of determining water-use priorities with reference to the land-use appropriate to the area in question (paragraphs 6.2.1.2; 11.4; 12.2; 15.1; 19.4). Inverting that proposition, it can also be said that the availability of water must determine the proper land-use for an area.

(20.2) Master plans and land-use plans for cities as well as plans for developing industrial and energy hubs must recognise the fragility of the water ecosystem within and plan for protecting the resource. Water must be made the organising principle for settlements and industries. In land allocation for various purposes, water sources, catchments, and drainage paths must be protected and made sacrosanct.

21 Desalination of Sea Water

(21.1) In recent years the desalination of sea water is being advocated as a promising route for the augmentation of supply. However, this holds no promise for the uplands and drylands of India that are far from the sea. As for coastal areas, the west coast gets an abundant monsoon. It is only on the east coast, i e, in Tamil Nadu, that desalination seems worth considering, but Tamil Nadu has an average rainfall of 1,000 mm which can be captured. Under the circumstances, the desalination of sea water seems unnecessary.

(21.2) Moreover, even if the cost of desalination comes down and the technology improves, the recovery of usable water from the sea must necessarily result in the generation of waste (brine, perhaps warm) needing to be disposed of, and this is bound to have an adverse impact on aquatic life. There seems to be no case for the desalination of sea water as a means of augmenting supply in India.

22 Role of PRIs in Water Management

(22.1) The devolution of local water management, in terms of the 73rd and 74th amendments to the Constitution and Schedules 11 and 12, must become a reality soon. Apart from conformity to the constitutional scheme of democratic decentralisation, devolution is also called for by the subsidiarity principle, i e, that decisions must be taken at the lowest appropriate level.

(22.2) PRIs and nagarpalikas must be enabled and empowered to perform their constitutional role in relation to water by the necessary financial provisions, staffing and capacity-building. They will then be concerned with local water 'governance' in all aspects. These must include local water augmentation, economy in water use, avoidance or resolution of conflicts, protecting

water sources, ensuring water quality, preserving local knowledge and traditional/cultural systems and practices relating to water, and so on. All such local water-related activities must be guided by a sensible combination of local, traditional knowledge on the one hand and modern knowledge and good professional advice on the other. While the preservation of traditional knowledge, wisdom and culture is important, negative features of the past, such as social injustices, exclusions, and discrimination, need to be avoided.

(22.3) Informal local groups and village watershed committees are often engaged in rainwater-harvesting and micro-watershed-development activities. In such cases there should be good working relationships between them and PRIs.

(22.4) Such local efforts and initiatives, whether by informal village committees or by gram sabhas or other PRIs, must be inclusive, non-discriminatory, and with space for all: rich and poor, privileged and disadvantaged, men and women, landowning and landless, 'upper' castes and dalits, and so on.

(22.5) While decentralisation and the subsidiarity principle are important, it is equally important to ensure harmony with basin-level (or, in a large basin, sub-basin-level) knowledge and concerns.

23 Corporatisation/Privatisation of Water Supply

(23.1) The citizen has the right to expect his or her elected representatives at the local level to be responsible for water supply, which is an essential service and a fundamental right.

(23.2) If for any reason the state wishes to entrust this service to a Board or corporation or company, public or private, the following must be kept in mind.

(23.2.1) The entrustment of the water supply service to an autonomous or corporate body must in no way compromise every citizen's basic right (fundamental or human) to water as life support. (The supplier must supply rich and poor areas alike, and must not be allowed to 'cherry-pick' the former; and whatever pricing principles are adopted, no one should be denied water because he or she cannot afford the tariff.)

(23.2.2) The state's ultimate responsibility in this regard will remain despite corporatisation or privatisation.

(23.2.3) The privatisation of the service must not lead to the privatisation of the resource.

(23.2.4) The corporatisation/privatisation of water services is generally likely to be accompanied by certain conditions (including social obligations), such as renovation of old systems, extension of service to more (perhaps poorer) areas, longer hours of supply, better water quality, subsidised pricing for the poor, etc. The normal corporate primacy to profitability should not be allowed to override those social conditions and obligations.

24 Water Markets

(24.1) The economic prescription "Define water rights and make them tradable" is highly problematic.

(24.2) Water for life and livelihoods, water as an inseparable part of a people's landscape, water as part of culture and history, and water as a sacred substance, cannot be tradable.

(24.3) Even in economic uses, the tradability of water is very limited. Temporarily, a farmer or an industrial unit may have

water to sell, but on a long-term basis a farmer or industrialist cannot become a water-seller. When a particular use (say, irrigation or industrial use) has ceased, the use-right to water cannot continue as a tradable property right.

(24.4) Those who extract groundwater essentially for sale and not for their own use are selling water which they do not really own.

(24.5) Water markets exist and serve some purposes but they have to be carefully regulated in the interests of equity, social justice, resource-conservation and the protection of the aquifer.

25 Water Pricing

(25.1) **There are two conflicting ideas:** (a) that water is a basic need and right and therefore must be free and (b) that water is an economic good and must be priced accordingly to ensure 'full cost recovery'. Neither can be maintained in an absolute manner.

(25.2) For domestic water supply, a graded pricing system may have to be adopted, with 'full cost recovery' pricing for the middle-income and high-income groups, affordable pricing for those below that level, and a modicum of free supply to the very poor. Alternatively, a minimal quantum of water may be supplied free to all (as in South Africa).

(25.3) There is a strong case for penal pricing beyond a certain limit to discourage profligate use, and perhaps even the denial of service beyond a further limit.

(25.4) In economic uses (agriculture, industry, commerce), the case for full economic pricing is clear. The underpricing of canal water for irrigation leads both to wasteful use and to excessive demand.

(25.5) What applies to industry and commercial agriculture may not apply to subsistence agriculture or modest livelihoods; water pricing may have to be kept at an affordable level for these.

(25.6) These are broad guidelines. There will no doubt be practical difficulties in making them operational. It will be for the State Governments and local bodies (PRIs and nagarpalikas) to decide on actual pricing systems and their operation.

26 Water and Women

(26.1) The concept of the right to water (paragraph 10 above) implicitly assumes that the basic water needs of men and women are the same. It is necessary to recognise that women have some special water and sanitation needs.

(26.2) In many villages, the burden of having to fetch water for the household from long distances falls on women. Leaving aside the implicit assumption that this is essentially a woman's task, the answer to this problem is to improve the access of the village to a nearer source of water, making it unnecessary for women to bring water from distant sources.

(26.3) Women play important roles as providers and managers of water in the household context. In some instances, they are also farmers, farm workers, managers and entrepreneurs. However, they are hardly consulted in water-policy or water-management decisions. Most 'participatory' schemes recognise only men as economic agents. This must change. Women must be participants in all water-related institutions (managerial, policymaking) at all levels.

(26.4) The inclusion of women in such bodies must be non-exclusionary, with no reference to title to property or other restrictive criteria; the participation must be real and effective and not nominal or illusory; and there must be programmes to enhance their effectiveness.

27 Water Quality/Pollution

(27.1) It is clear enough that there is a serious water quality problem in this country. Many rivers and aquifers are polluted and contaminated; the water that comes out of taps in most cities is not potable; and even rainwater gets polluted as it comes down through a foul atmosphere. What can a water policy statement say in this regard?

(27.2) A first recommendation applicable to all water uses is: reduce water use. As mentioned at the outset, water is not destroyed; every drop of water supplied for any category of use returns to plague us as waste. The greater the quantum of water supplied, the greater the generation of waste. This is a strong argument against the ready recourse to supply-side projects.

(27.3) Secondly, insofar as industrial use is concerned, the recommendation made earlier of multiple use of the same water and a medium-term goal of 'zero effluent' will not merely reduce the 'demand' for water but will also reduce the problem of pollution of water sources by industrial effluents. That approach may not be easy for small industrial units; a number of them may have to be clustered together and assisted.

(27.4) The problem of industrial fouling of the atmosphere will remain, and the atmospheric pollution may get transferred to water sources through rain. The answer to this problem may have to be sought in process improvement and innovation.

(27.5) Thirdly, turning to agriculture, it has to be recognised that the kind of agriculture that came to prevail after the Green Revolution is not only consuming huge quantities of water, but also poisoning the water sources. Some thinkers have been urging a change from high-energy, high-chemical-input, capital-intensive agriculture to low-energy sustainable agriculture (LESA). The critics may say that LESA will not be able to feed the projected future population, but that scepticism should not be readily accepted. Alternatives to the old Green Revolution agriculture need to be carefully explored, not summarily dismissed.

(27.6) The only effective answer to the problem of chemical fertilisers and pesticides getting into water will be a phasing out of those chemicals and a shift to bio-fertilisers and bio-pesticides, or to organic farming. This may appear unrealistic, but perhaps less so today than a decade ago. Global warming is in any case compelling us to think the unthinkable in many directions. If the shift seems too radical, gradualism may be in order; but a movement in the indicated directions is necessary.

(27.7) Fourthly, in domestic use, the water supply norms for urban areas need to be reduced; a more equitable distribution must be ensured, and excessive use by the affluent strongly discouraged and penalised. A dual supply system may have to be introduced, separating water for drinking and cooking from water for other uses; in human waste, liquid waste and solid waste may have to be separated; water for some uses may have to be extracted from the treated liquid waste; the use of freshwater

for the transportation of human waste will have to be greatly reduced by replacing flushing toilets by alternative systems. 'Ecosan' possibilities need to be seriously explored.

(27.8) The 'polluter pays' principle is often advocated as a means of minimising pollution. This would apply to all uses. The principle is unexceptionable but there is need to be wary of two dangers. First, payment may not be a serious disincentive for the rich. The meaning of 'polluter pays' may change from 'if you pollute, you must pay' to 'if you pay, you may pollute'. Second, the administering authorities may develop an interest in the revenue from such payments, and may not be averse to letting pollution increase.

(27.9) So far, the discussion has been about minimising the generation of waste. That must be the first and most important element in the strategy for pollution control. However, despite all such efforts, some waste is bound to be generated. It has to be treated to acceptable standards, and it has to be ensured that nothing that does not meet certain stringent standards enters water sources. The standards themselves need to be tightened further and effectively enforced. Where standards do not exist, they will have to be prescribed.

(27.10) Laws and enforcing institutions exist (Water Prevention and Control of Pollution Act, the Central and State Pollution Control Boards), but it is evident that they are not working well. This is a matter of 'governance', not one of policy, but this Policy Statement cannot but emphasise strongly that the weaknesses should be identified and remedied and effective enforcement ensured. The proposition that laws cannot be enforced is unacceptable.

(27.11) As things stand, only a small percentage of the waste that is generated gets treated. Untreated waste continues to go into water sources. If (as mentioned earlier) the generation of waste is the first and most important problem, the second most important problem is the non-treatment of a large part of that waste. This needs urgent attention.

(27.12) Despite every effort, rivers and aquifers cannot be wholly protected from the entry of pollutants and contaminants. They have to be cleaned. The most effective cleaning will be by the rivers and aquifers themselves. For this purpose, there must be enough water in the river and the aquifer. Abstraction of water from rivers and extraction of water from aquifers must be limited with reference to this principle.

(27.13) In the case of rivers that are already heavily polluted, a major effort at cleaning up will be necessary. Such efforts have not been very successful, as evidenced by the state of the Ganga and the Yamuna. Alternatives to the methods that have failed need to be explored. Studies of the kind are going on in IRTS and elsewhere. Bioremediation has been tried and found promising. The short point is that all such possibilities must be seriously tried, and up-scaled if successful.

(27.14) An intensive national campaign to revive dead rivers, rescue dying rivers, and prevent other rivers from dying is called for. As a first step, a system of River Health Index and Aquifer Health index must be introduced.

(27.15) Whatever be the system and technologies of pollution control, monitoring is very important. There must be frequent, regular monitoring of water quality, and mandatory proactive

public disclosure of results. Statutory monitoring, if any, by pollution control personnel needs to be supplemented by decentralised monitoring with community participation.

(27.16) Many other things need to be done, including the reduction or banning of the use of plastics in packaging; avoiding the dumping of waste on the ground (e.g., landfills) as pollutants may seep underground into aquifers; provision of at least a modicum of water and sanitation infrastructure in rapidly urbanising areas; inexpensive and easily accessible water-quality testing and water-filtering technologies for rural areas, with the associated supply chain and training and servicing needs; and so on.

(27.17) Finally, pollution, contamination and the accumulation of waste in rivers and water bodies arising from cultural or religious customs and practices, such as the immersion of idols, the throwing of garlands and flowers into rivers, the floating of small ritual flames on leaves, the disposal of dead bodies, cremations near rivers or water bodies, and so on, need to be brought under control (not by police methods but by education and persuasion). Needless to say, defecation near or into rivers must be checked (once again, through social control).

28 Drought

(28.1) There are water-short or arid or drought-prone areas in many States (e.g., Madhya Pradesh, Maharashtra, Gujarat, Karnataka, Andhra Pradesh, Tamil Nadu). In all these places, there must be area-specific studies of water needs and local water availability, and possibilities of local water augmentation through rainwater-harvesting, micro watershed development, groundwater use, and such other means as are available.

(28.2) Possibilities of what can be done locally have been demonstrated in many places, as for instance by the efforts of Anna Hazare (Ralegan Siddhi), Sarpanch Papat Pawar (Hivre Bazar), Crispino Lobo (WOTR, Pune), Rajendra Singh (Tarun Bharat Sangh, Alwar District, Rajasthan), Samaj Pragati Sahyog (Madhya Pradesh), Sadguru Foundation, Viksat and other NGOs in Gujarat, and others. In the southern States, DHAN foundation has been engaged in efforts to revive, restore and strengthen traditional local tanks.

(28.3) Many of the drylands and uplands of this country are far away from rivers and some may be at higher elevations. Water from distant rivers is therefore not a promising answer to the needs of those areas.

(28.4) The answer to the problems of water-short, arid or drought-prone areas has to be primarily local. It is only after exploring all local possibilities, or determining that there are no such possibilities, that recourse to water from external sources must be considered.

29 Floods

(29.1) Not all floods are natural; not all floods are disastrous; and not all floods are unavoidable.

(29.2) Flash floods, sudden cloudbursts, glacier lake outburst floods, coastal floods because of cyclones, hurricanes or tsunamis, etc, are natural and unavoidable events. Their impact, sometimes disastrous, is often aggravated by human action such as the destruction of protective coastal mangrove belts for 'developmental'

purposes. These are matters of disaster prevention, preparedness and management and not issues of water policy.

(29.3) Urban floods during heavy rains are often the result of drainage-congestion attributable to bad maintenance or non-renovation of old systems, and/or interferences with natural drainage through the processes of urbanisation (buildings, roads, highways, etc). Such floods, sometimes disastrous, are entirely man-made and avoidable. These again are matters of urban administration, not issues of water policy. However, if there are ill-considered interferences with water bodies or diversions of natural channels for 'urban development' purposes, those will indeed be inconsistent with good water policy.

(29.4) Periodical river floods are natural phenomena. They are not avoidable. If we respect the river, allow it space to spread when the flood comes (as it will from time to time), refrain from blocking natural drainage, and also refrain from occupying the flood-plain, then natural periodical river floods need not be disastrous. They could even be benign because they bring silt and may render the land fertile.

(29.5) River floods could be unusually heavy at intervals (once in a certain number of years) but even these need not be disastrous if there are good, timely flood-warning systems in place, giving the people and the authorities time to take preparatory, precautionary and damage-minimising action. It is the absence of these, and the excessive human occupation of and activity in the river's floodplain, that cause loss and damage during floods.

(29.6) The attempts to 'control' floods often increase the danger and damage. 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. If the flood cushion is overlooked and the reservoirs are kept full at the beginning of the flood-season (for irrigation or power-generation), there will be no space to accommodate the floods when they come; in the interest of the safety of the dam the gates and sluices will have to be opened and the flood waters released, causing more flooding downstream than might have occurred in the absence of the dam.

(29.7) As for embankments, they have to be repeatedly rebuilt 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.

(29.8) Flood control projects, if any, and embankments, if considered necessary, must be subject to the requirement of an EIA.

(29.9) The policy prescriptions (relating to river floods) that follow from the above are:

Learn to live with periodical river floods and minimise loss and damage; install adequate and timely advance warning systems; be ready with disaster avoidance and management plans; learn relevant lessons from traditional coping practices; be wary of the idea of "flood control"; if dams are built for flood moderation among other purposes, ensure that a flood cushion is built in

and actually maintained; as far as possible, refrain from jacketing a river within embankments; flood control and embankment projects, if any, must also be subject to the requirement of EIAs.

(29.10) There are already a number of flood-forecasting stations, but many more are needed, and they need to be better equipped. A vast, well-equipped, technologically advanced network of stations for observing and analysing precipitation and flows and drawing conclusions, and for the instant ('real time') communication of such information and predictions to downstream areas, is needed. What exists needs to be greatly expanded, improved in quality and technological status.

(29.11) Timely knowledge should be followed by prompt, adequate, efficient and humane response. The humaneness of the response is as important as its promptness and adequacy. People, their livestock and their essential belongings have to be moved to safe places before the flood arrives, so as to minimise loss and damage. When the disaster actually strikes, relief measures must immediately swing into operation. These would include the provision of shelter, clothing, blankets, food, water, public health services, medicines, cash grants, and so on. Measures of this kind would be needed whatever the nature of the disaster.

(29.12) The thrust of the relief programme must be, not to reduce people to a state of dependence, but to enhance their ability to help themselves.

30 Climate Change and Water

(30.1) There is general agreement that climate change will lead to increased precipitation in some places, increased variability in that precipitation (with the probability of more rain falling in fewer hours, leading to greater flooding), and the increased incidence of drought in other areas. However, exactly what will happen, when, and where, is not known in any detail. Research on this is going on in many institutions. It is only on the basis of more detailed, precise and area-specific information that policy responses can be formulated.

(30.2) There are many paragraphs in this policy statement which will remain valid despite climate change and its impacts: for instance, an overarching ecology-cum-social-justice perspective,

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the need to restrain the growth of demand for water, the treatment of water as a public trust, the recognition of the right to water, water-use priorities, water-sharing principles, the river-basin or the aquifer as the basis for planning and management, the subsidiarity principle, the need to empower women, and so on. No change in these will be warranted.

(30.3) It is only on the approach to the question of storing water or dealing with the incidence of floods or droughts that fresh thinking may be called for on the basis of new knowledge generated by the ongoing research on the impact of climate change. To repeat, fresh thinking will have to wait for the new knowledge. The instant, ill-considered (knee-jerk) response to the predicted variability, i.e., “build more storages” will be unwise. The kind of variability that climate change may bring about will be entirely different from the sort of seasonal or cyclical variability that has been experienced in the past.

(30.4) Meanwhile, however, the fact that some areas and settlements (for instance, coastal or low-lying areas) will be highly vulnerable to the predicted changes is known. While further studies of their vulnerabilities will have to continue, anticipatory action for mitigation and adaptation need not wait; they must be taken in hand now.

31 Information System, Research

(31.1) Against the background of all that has been stated in the earlier paragraphs, the crucial importance of a good national water information system (NWIS) is evident.

(31.1.1) Ideally, the NWIS must cover all forms, aspects and manifestations of water; all sources; all uses; all scales; all decision-making at various levels and by various agencies; and all relationships around water.

(31.1.2) A multiplicity of disciplines will be involved: ecology, hydrology, hydrogeology, glaciology, meteorology, engineering, earthquake studies, agriculture, economics, financial analysis, sociology, social anthropology, and so on, including the sciences involved in pollution control.

(31.1.3) The data and information will emanate from various levels (local, district, State, national, regional); scales (watershed, sub-basin, basin); government sources (Central Ministries, State Government Departments and their agencies); non-government bodies (the village watershed committees, farmers' or industry associations, NGOs); and academic and research institutions (IITs, IIMS, agricultural universities, water resource centres of universities, private research institutions including those of industry), etc.

(31.1.4) The data and information will converge at certain points at different levels going up to the State, basin and national levels, where they will be collated, interpreted, analysed and published.

(31.1.5) They will be in the public domain and available not only for policy-formulation and decision-making by the Governments, Central and State, but also for academic studies and research, civil society initiatives, and decisions by farmers, entrepreneurs, managers and ordinary citizens.

(31.2) It is clear that kind of comprehensive, coherent, structured, open and accessible NWIS does not exist now. In the past,

the collection and study of water data was essentially in the context of the formulation of particular projects. There has indeed been some movement beyond that, but not enough.

(31.2.1) Academic and other commentators have complained about inadequate use of the available data, gaps in the availability of data, overestimation of the available water resources, lack of study of some important aspects, lack of openness because river-flow data are treated as confidential (severely limiting possibilities of research), poor organisation, fragmentation of information among multiple agencies, hardly any networking, no constructive relationship between water bureaucracies and the academic community, and decision-making on a shaky basis.

(31.3) Important remedial measures would include the following.

(31.3.1) The density of the observation stations of the meteorology department (rainfall), the Central Water Commission (river-flows, flood forecasting) and corresponding State Government observation points, should be greatly increased, and the stations improved in personnel and equipment. Information based on actual measurements is always better than information generated by extrapolation or formulae or rule of thumb methods.

(31.3.2) The collection of information must cover a wide range of sources and disciplines: information emanating from the local community, information generated by technical or professional agencies (hydrological, engineering, agricultural, economic, sociological and other specialised information from public, private, academic, industry-related institutions), and the best of IT and remote-sensing based information.

(31.3.2.1) There should be better coverage of small irrigation/diversion sources – not just sources connected to water charges – and more information aggregating small-scale traditional (or modified traditional) water management.

(31.3.2.2) If information comes from multiple and diverse sources, there should be some attempt at synchronisation as well as compatibility.

(31.3.3) There should be para-professionals at the village and district levels.

(31.3.4) The voluminous existing/historical data should be compiled and digitised with a view to rescuing it for actual use for research and for learning lessons from past policies and experience.

(31.3.5) The problem of confidentiality should be removed. All information must be open and accessible to all.

(31.4) To remedy all deficiencies, and to design and build an excellent, functional information system, a National Water Information Agency (NWIA) should be set up.

(31.4.1) As suggested earlier in relation to water management institutions (paragraphs 12 and 15 above), the NWIA should also be built from the bottom up in the form of a nested set of institutions federating upwards.

(31.5) The water information system must have close linkages with the other related information systems, such as those relating to meteorology, land, forests, agriculture, tribal communities, industries, etc.

(31.6) Insofar as research is concerned, it does not seem necessary for the government to lay down a detailed list of areas or topics for the guidance of research institutions. Once the water

policy has been stated, research institutions, public and private, and individual scholars can be trusted to identify the areas of research and specific themes and topics within those areas.

(31.6.1) However, attention is drawn to some areas that have been indicated in the earlier paragraphs: (i) possibilities of reduction of the country's water footprint (paragraphs 6.1.1 and 7.3); (ii) a number of points in the paragraph on water pollution (paragraph 27); and (iii) the location-specific study of the impacts of climate change (paragraph 30).

(31.6.2) Inter-disciplinary research needs to be encouraged and promoted.

(31.6.3) There may be some research related to specific projects or programmes, but there is need for more research with a wider perspective.

(31.6.4) There should be much greater public funding of water-related research, though there may also be some privately funded research. The results of public-funded research should be in the public domain.

32 Conclusion: Towards a Holistic View

(32.1) There are multiple perspectives on water: the rights perspective, social-justice/equity perspective, women's perspective, community perspective, the state perspective, hydrological perspective, engineering perspective, citizen/water-user perspectives, economic perspective, legal perspective, environmental or ecological perspective, and the historical, cultural and sacred perspectives. If these perspectives are to be integrated and harmonised into a coherent whole, we need an overarching, governing perspective subsuming all other perspectives.

(32.2) It has already been suggested that the ecological and social justice perspectives will have to be the overarching perspectives (paragraph 3.4). The ecological and social justice perspectives can in turn be combined into a Moral Responsibility perspective, or in other words, an Ethical or Dharma perspective. In particular, it is necessary to go beyond the language of rights (paragraph 10) and think in terms of obligations or responsibilities. Consider the following pairs:

- Men – Women
- The rich – the poor
- The privileged – the disadvantaged
- Urban area – rural area
- People in one state or country – people in another state or country
- Present generation – future generations
- Humankind – other species
- Humanity – Nature/Planet Earth

In each of these pairs, in addition to the rights of the second, we need to think of the duty or responsibility or obligation or dharma of the first to the second. That is the route not merely to the avoidance of conflict but to harmony: harmony between groups; uses; sectors; areas; States; countries; generations; species; and between humanity and Nature or Planet Earth.

(32.3) In line with that approach, and in place of the current advocacy of Integrated Water Resource Management or IWRM, it seems desirable to adopt the alternative formulation of Responsible, Harmonious, Just and Wise Use of Water as our slogan or mantra, though that phrase cannot be abbreviated into a catchy

anagram. The term IWRM has come to stay, but it should really be understood to mean the formulation proposed above.

33 Water Policy and the Laws

In considering water policy issues, a number of legal questions arise. For instance: (i) statutory backing for the National Water Policy itself, or alternatively, a National Water Framework Law; (ii) the question of moving water to the Concurrent List; (iii) explicit constitutional recognition of the right to water; (iv) explicit recognition of water as a common pool resource held in public trust by the state for the community; (v) bringing groundwater also within the ambit of CPR held in trust by the state for the community; (vi) a National Resettlement and Rehabilitation Act and related amendments to the Land Acquisition Act 1894 (to be enacted); (vii) further amendments to the ISWD Act 1956, as amended in 2002; (viii) reactivating the River Boards Act 1956; and so on. It has also been suggested by some that there should be a constitutional declaration on water. All these need early consideration.

34 Water Policy and Other Policies

Some non-water policies create difficulties for good water policy. For instance, electricity tariff policies encourage the over-exploitation of groundwater; price support and procurement policies encourage the cultivation of wheat and paddy and discourage changes in cropping patterns; trade policies encouraging exports may lead to exports of virtual water (water-intensive products), or the pollution and contamination of water sources (leather products, textiles, etc); and so on. These policy relationships need to be considered and harmonised so that different policies work together and not against one another.

35 Beyond Water Policy

At the heart of all water-related conflicts lies a competitive, unsustainable demand for water. That demand, leaving aside the basic water requirements of a human being, is for water for various uses – industrial, commercial, agricultural, etc – and these in turn arise from the pursuit of 'development'. Restraining the growth of demand for water would therefore require changes in our ideas of development and of the good life. The water crisis is part of a civilisational crisis. Our relationship to nature and Planet Earth must change, and this calls for a major transformation in our ways of living. This goes beyond water policy.

[In this document, 'State' with a capital 'S' refers to States in the Indian Union, and 'state' with a lower case 's' refers to state in the abstract (e.g, 'state' as distinguished from 'citizen'.]

Appendix: List of Persons Consulted (Consultative Group)

Participants in the Meeting on 9 March 2011	Others Consulted
Ajit Mozoomdar, R Rangachari,	A Latha, Shripad Dharmadhikari,
Paritosh Tyagi, G N Kathpalia,	Himanshu Thakkar,
A K (Dunu) Roy, Nimmi Kurian,	Jayanta Bandyopadhyay,
M S Vani, Navroz Dubhash,	S Janakarajan, Tushaar Shah,
Indira Khurana, Philippe Cullet,	Chandan Mahanta, Dinesh Kumar Mishra,
Rajeswari Raina, Sudha Mohan,	Priya Sangameswaran, Partha Das,
Manoj Misra, Suresh Babu,	Ranjan Panda, A Vaidyanathan,
Sunita Nadhamuni, and K J Joy	K C Sivaramakrishnan, Rohini Nilekani and T N Narasimhan