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Water Policy in India: A Review

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While water remains one of the most abundant resources on earth but less than 1 percent of the total supply is reliably available for human consumption. Drinking-water is certainly essential for human survival but water-related illnesses are the most common health threat in the developing world. An estimated 25 000 people die every day as a result of water-related diseases Human existence depends on water. Water interacts with solar energy to determine climate and it transforms and transports the physical and chemical substances necessary for all life on earth.

In recent years, water issues have been the focus of increasing international concern and debate. International Conference on Water and the Environment (ICWE) in Dublin, Ireland called for innovative approaches to the assessment, development and management of freshwater resources. Further, the ICWE provided policy guidance for the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in June 1992 highlighted the need for water sector reforms throughout the world. The World Bank in 1993 through a policy paper defined the new objectives for the water sector. FAO also established an International Action Programme on Water and Sustainable Agricultural Development (IAP-WASAD). Similarly, the UNDP, WHO, UNICEF, WMO, UNESCO and UNEP are all concerned and are regularly coordinating or participating in special programmes related to water resources.

It is evident from the urgency shown by these agencies that water is an increasingly scarce and valuable resource and one of the principal concerns is our failure to recognize and accept that there is a finite supply of water. There is also a consensus that the growing water scarcity and misuse of freshwater poses serious threats to sustainable development.

Competition among agriculture, industry and cities for limited water supplies is already constraining development efforts in many countries including India. As populations expand and economies grow, the competition for limited supplies is most likely to intensify, resulting in potential conflict situation among water users in days to come. Despite shortages of water, its misuse is widespread, be it in small communities or large cities, farmers or industries, developing countries or industrialized economies every where the mismanagement of water resources is evident. Surface water quality is deteriorating in key basins from urban and industrial wastes.

Ground water is polluted from surface sources and irreversibly damages by the intrusion of salt water. Over exploited aquifers are losing their capacity to hold water and lands are subsiding. Cities are unable to provide adequate drinking water and sanitation facilities. Water logging and salinization are diminishing the productivity of irrigated lands.

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Decreasing water flows are reducing hydroelectric power generation, pollution assimilation and fish and wildlife habitats.

Despite the huge investments and subsidies, irrigation performance indicators are falling short of expectations for increasing yield, irrigated area and technical efficiency in water use. As much as 60 percent of the water diverted or pumped for irrigation is wasted.

Although some losses are inevitable, in too many cases this excess water percolate into the ground, causing water logging and salinity. As much as one-quarter of all irrigated land in developing countries suffers from varying degrees of salinization. Moreover, stagnant water and poor irrigation drainage escalate the incidence of water-related diseases, resulting in human suffering and increased health costs.

Agriculture is often unable to compete with cities and industries for water, as it is unable to pay more for water it needs. Further, irrigated agriculture is expected to produce much more in the future while using less water than it uses today. At present, 2.4 billion people depend on irrigated agriculture for jobs, food and income (some 55 percent of all wheat and rice output is irrigated). Over the next 30 years, an estimated 80 percent of the additional food supplies required to feed the world will depend on irrigation

These developments have put an enormous pressure on agricultural policy-makers and farmers, throughout the world. Primarily governments have the prime responsibility for ensuring food security as food production largely depends on irrigation, therefore, food security is closely linked with water security. Between 30 and 40 percent of the world's food comes from the irrigated area, 16 percent of the total cultivated land; around one-fifth of the total value of fish production comes from freshwater aquaculture; and current global livestock drinking-water requirements are 60 billion litres per day (forecasts estimate an increase of 0.4 billion litres per year). Food security in the next century will be closely allied to success in irrigation.

Though, irrigation helps yield-enhancing innovations but it does not guarantee good crop yields. Performance of many mega irrigation projects due to poor scheme conception, inadequate construction and implementation or ineffective management, has been largely disappointing. This has also contributed to many socio-economic and environmental problems. Irrigation projects can contribute greatly to increased incomes and agricultural production compared with rain-fed agriculture. In addition, irrigation is more reliable and allows for a wider and more diversified choice of cropping patterns as well as the production of higher-value crops. Irrigation's contribution to food security in China, Egypt, India, Morocco and Pakistan is widely recognized. For example, in India, 55 percent of agricultural output is from irrigated land. Moreover, average farm incomes have increased from 80 to 100 percent as a result of irrigation, while yields have doubled compared with those achieved under the former rain-fed conditions; incremental labour days used per hectare have increased by 50 to 100 percent. In Mexico, half the value of agriculture production and two-thirds of the value of agricultural exports is from the one-third of arable land that is irrigated.

Thus, irrigation is a key component of the technical package needed to achieve productivity gains. However, as high levels of costly inputs are added to sustain increase in agricultural productivity, the security and efficiency of irrigated production will become even more important to agriculture in days to come. In future water will no

longer be plentiful and cheap but it would be scarce, expensive to develop and maintain, and valuable in use. For low-income countries, the high-cost water would be a major hurdle in sustaining their levels of agricultural production and ensuring livelihoods for ever increasing populations. However, a silver lining in this is that the high cost of water would force them to adopt measures which ensure efficient and economic use of their water resources. Moreover, if farmers can have opportunities in higher-value uses of water which ensure profits, both governments and farmers are likely to invest in efficient and water saving technologies which enhance water productivity.

To produce more in a sustainably with less use of water is a challenge before the planners and policy makers which requires the need for demand management mechanisms to reallocate existing supplies, encourage more efficient use and promote more equitable access. Policy-makers need to seriously think about the incentives, regulations, permits, restrictions and penalties that will help guide, influence and coordinate as to how people use water. At the same time they have to encourage innovations in water-saving technologies. Past experiences show that, supply-side approaches have dominated water management policies. Water has been physically managed through technical and engineering means that captured, stored, delivered and treated water. However, to meet the growing demand, developing new water supply sources has now limited application. Now the water resource management has shifted from capturing more water towards that to designing demand- and user-focused approaches that influence behaviour.

The Need for a National Water Policy

Water is a prime natural resource, a basic human need and a precious national asset. Planning and development of water resources need to be governed by national perspectives. It has been estimated that out of the total precipitation of around 400 million hectare meters in the country, the surface water availability is about 178 million hectare meters. Out of this about 50 % can be put to beneficial use because of topographical and other constraints. In addition there is a ground water potential of about 42 million hectare meters. The availability of water is highly uneven in both space and time. Precipitation is confined to only about three or four months in the year and varies from 10 cm in the western parts of Rajasthan to over 1000 cm at Cherrapunji in Meghalaya. Further, water does not respect state boundaries. Not merely rivers but even underground aquifers often cut across state boundaries. Water as a resources in one and indivisible: rainfall, river waters, surface ponds and lakes and ground water are all part of one system, water is also a part of larger ecological system.

Floods and drought affected vast areas of the country, transcending state boundaries. A third of the country is drought prone. Floods affect an average area of around 9 million hectares per year. According to the National Commission on floods, the area susceptible to floods is around 40 million hectares. The approach to the management of drought and floods has to be coordinated and guided at the national level. Even the planning and implementation of individual irrigation or multi purpose projects, though done at the state level, involve a number of aspects and issues such as environmental protection, rehabilitation of project- affected people and livestock, public health consequences of water impoundment, dam safety, etc. On these matters common approaches and weaknesses have affected a large number of projects all over the country. There have been substantial time and cost overruns on projects. In some irrigation commands,

problems of water logging and soil salinity have emerged, leading to the degradation of good agricultural land. There are also complex problems of equity and social justice in regard to water distribution. The development and exploitation of the country's groundwater resources also give rise to questions of judicious and scientific resource management and conservation. All these questions need to be tackled on the basis of common policies and strategies.

The growth process and the expansion of economic activities inevitably lead to increasing demands for water for diverse purpose: domestic, industrial, agricultural, hydro-power, navigation, recreation, etc. So far, the principal consumptive use of water has been for irrigation. While the irrigation potential is estimated to have increased from 19.5 million hectares at the time of Independence to about 106 million hectares in the year 2010, further development of a substantial order is necessary if the food and fiber needs of a growing population are to be met. The country's population which is over1210 million at present is expected to reach a level of around 1620 million by 2050**.**

The drinking water needs of people and livestock have also to be met. In keeping with the objective of the International Drinking Water Supply and Sanitation Decade Programme (1981-1991) also envisaged to provide adequate drinking water facilities to entire population in both urban and rural areas however the achievement could be much less than the target set. Domestic and industrial water needs have largely been concentrated in or near the principal cities, but the demand from rural society is expected to increase sharply as the development programme improves economic conditions in the rural areas. The demand for water for hydro and thermal power generation and for other industrializes is also likely to increase substantially as result water which is already a scarce resource will become even scarcer in future. This underscores the need for the utmost efficiency in water utilization and a public awareness of the importance of its conservation.

Another important aspect is water quality. Improvements in existing strategies and the innovation of new techniques resting on a strong science and technology base will be needed to eliminate the pollution of surface and ground water resources, to improve water quality and to step up the recycling and re-use of water. Science and technology and training have also important roles to play in water resources development in general.

Water is one of the most crucial elements in developmental planning. As the country prepares itself to enter the 21st century, effect to develop, conserve, utilise and manage this important resource has to be guided by national perspectives. The need for a national water policy is thus abundantly clear: water is a scarce and precious national resource to be planned, developed and conserved as such, and on an integrated and environmentally sound basis, keeping in view the needs of the State concerned.

India: Draft National Water Policy 2012

Ministry of Water Resources, Government of India, in January 2012, released a draft National Water Policy for the consideration and opinion of state governments and other stakeholders. The need for a holistic national policy has its genesis in the changing patterns of water use across India – both personal and industrial use. This includes the

imperatives of providing both clean drinking water and adequate resources for irrigation; the move to look at renewable sources of energy like hydro power; and natural disaster management and rehabilitation following devastating floods and drought. The policy also seeks to offer economic incentives and penalties to reduce pollution and wastage.

India has more than 17 percent of the world's population, but has only 4 percent of world's renewable water resources with 2.6 percent of the world's land area. This policy seeks – to some extent – to address these inequities. Specifically, the draft policy has references to water pricing; the role of the state as a "facilitator" and "service provider", and that of the private sector in water-related services; institutional mechanisms that need to be set up to govern the responsible use of water; and its conservation and reuse.

As a note, unlike the 2002 policy which encouraged private sector participation in planning, development and management of water resources, the emphasis on private sector participation has been dropped from the 2012 draft. Instead, the current policy seeks to develop a public-private partnership model to effectively manage water resources. This is a result of public concern and opposition at the possibility that the private sector may own water assets.

Water – which is currently managed by individual states – will likely become a topic of national interest after the formulation of the legislation by the central government. The policy has been vociferously opposed by farmers in some states, as the proposed water policy intends to impose an official control on the use of ground water – something currently unregulated in most states.

Key items in the draft National Water Policy 2012 include

- Unlike the 2002 draft, "priorities" for water allocation have been done away with. Previous policy, water allocation priorities have broadly included drinking water; irrigation; hydro power; ecology; agro industries and non-agricultural industries; and navigation and other uses.
- The Centre would like water budgeting and auditing to be made mandatory and for each state government to put a regulator for water allocation, water use efficiency, and physical and financial sustainability of water resources, with a mechanism to establish water tariff system and fix the criteria for water charges.
- The draft is aimed to change the current attitude towards water recharging, both among the government agencies as well as the public, especially the farming communities.
- Currently, heavy under-pricing of electricity leads to wasteful use of both electricity and water which this draft also hopes to reverse.
- The "Service Provider" role of the state has to be gradually shifted to that of a regulator of services and facilitator for strengthening the institutions responsible for planning, implementation and management of water resources. The water related services should be transferred to community and/or private sector with appropriate "Public Private Partnership" model.

- Even while it is recognized that States have the right to frame suitable policies, laws and regulations on water, there is a need to evolve a broad overarching national legal framework of general principles on water.
- The cost of rehabilitation and compensation to affected families should partly be borne by project-benefited families through "adequate pricing of water".
- The draft policy calls for the abolition of all forms of water subsidies to the agricultural and domestic sectors, but says "subsidies and incentives" should be provided to private industry for recycling and reusing treated effluents.

An Overview of key aspects of the Draft Policy

Below is an in depth review of the draft policy's approach and focus on key issues regarding water access, pricing, and other issues across India currently.

The PREAMBLE of this draft policy states that**,** Water is a natural resource, fundamental to life, livelihood, food security and sustainable development. It is also a scarce resource. India has more than 17 percent of the world's population, but has only 4% of world's renewable water resources with 2.6% of world's land area. There are further limits on utilizable quantities of water owing to uneven distribution over time and space. In addition, there are challenges of frequent floods and droughts in one or the other part of the country.

With a growing population and rising needs of a fast developing nation as well as the given indications of the impact of climate change, availability of utilizable water will be under further strains in future with the possibility of deepening water conflicts among different user groups. Low public consciousness about the overall scarcity and economic value of water results in its wastage and inefficient use. In addition, there are inequitable distribution and lack of a unified perspective in planning, management and use of water resources.

The objective of the National Water Policy is to take cognizance of the existing situation and to propose a framework for creation of an overarching system of laws and institutions and for a plan of action with a unified national perspective

The Policy Draft further mentions about the present scenario of water resources and their management in India, which have given rise to several concerns, important amongst them are;

(i) Large parts of India have already become water stressed. Rapid growth in demand for water due to population growth, urbanization and changing lifestyle pose serious challenges to water security.

(ii) There is wide temporal and spatial variation in availability of water, which may increase substantially due to climate changes, causing more water crisis and incidences of water related disasters, i.e., floods, increased erosion and increased frequency of droughts, etc.

(iii) Climate change may also increase the sea levels. This may lead to salinity intrusion in ground water aquifers / surface waters and increased coastal inundation in coastal regions.

(iv) Access to safe drinking water still continues to be a problem in some areas. Skewed availability of water between different regions and different people in the same regions is inequitous and has the potential of causing social unrest.

(v) Groundwater, though part of hydrological cycle and a community resource, is still perceived as an individual property and is exploited inequitably and without any consideration to its sustainability leading to its over-exploitation in several areas.

(vi) Water resources projects, though multi-disciplinary with multiple stakeholders, are being planned and implemented in a fragmented manner without giving due consideration to optimum utilization, environment sustainability and holistic benefit to the people.

(vii) Inter-State and inter-regional disputes in sharing of water hamper the optimum utilization of water through scientific planning on basin/sub-basin basis.

(viii) The existing water resources infrastructure is not being maintained properly resulting in under-utilization of available resources.

(ix) Natural water bodies and drainage channels are being encroached upon, and diverted for other purposes.

(x) Growing pollution of water sources is affecting the availability of safe water besides causing environmental and health hazards.

(xi) Low public consciousness about the overall scarcity and economic value of water results in its wastage and inefficient use.

(xii) The lack of adequate trained personnel for scientific planning, utilizing modern techniques and analytical capabilities incorporating information technology constrains good water management.

(xiii) A holistic and inter-disciplinary approach at water related problems is missing.

(xiv) The public agencies in charge of taking water related decisions tend to take these on their own without consultation with stakeholders

Basic Principles of the Draft Water Policy

The draft also lays down the basic principles which would be required to govern the water policy, so that there is some commonality in approaches in dealing with planning, development and management of water resources. These are:

(i) Planning, development and management of water resources need to be governed by national perspectives on an integrated and environmentally sound basis, keeping in view the human, social and economic needs.

(ii) Principle of equity and social justice must inform use and allocation of water.

(iii) Good governance through informed decision making is crucial to the objectives of equity, social justice and sustainability.

(iv) Water needs to be managed as a community resource held, by the state, under public trust doctrine to achieve food security, livelihood, and equitable and sustainable development for all.

(v) Access to safe and clean drinking water and sanitation should be regarded as a right to life essential to the full enjoyment of life and all other human rights. As such, water for such human needs should have a pre-emptive priority over all other uses.

(vi) Water, over and above the pre-emptive need for safe drinking water and sanitation, should be treated as an economic good so as to promote its conservation and efficient use.

(vii) Water is essential for sustenance of eco-system, and therefore, ecological needs should be given due consideration.

(viii) All the elements of the water cycle, i.e., evapo-transpiration, precipitation, runoff, river, lakes, soil moisture, and ground water, sea, etc., are interdependent and the basic hydrological unit is the river basin, which should be considered as the basic unit for planning.

(ix) Water quality and quantity are interlinked and need to be managed in an integrated manner, consistent with broader environmental management approaches inter-alia including the use of economic incentives and penalties to reduce pollution and wastage.

(x) The impact of climate change on water resources availability must be factored into water management related decisions.

Some of the important aspects of the draft **National Water Policy 2012** are discussed below **(**Sonalee Borgohain 2012):

Water Pricing

(i) Over and above the pre-emptive uses for sustaining life and eco-system, water needs to be treated as an economic good and therefore, may be priced to promote efficient use and maximizing value from water. While the practice of administered prices may have to be continued, economic principles need to increasingly guide the administered prices.

(ii) There should be a mechanism in every State to establish a water tariff system and fix the criteria for water charges, preferably on volumetric basis, at sub-basin, river basin and State level after ascertaining the views of the beneficiary public, based on the principle that the water charges shall reflect the full recovery of the cost of administration, operation and maintenance of water resources projects taking into account the cross subsidy, if any.

(iii) Recycle and reuse of water, after treatment to specified standards, should be encouraged through a properly planned tariff system, in which there is a cost

for the quantity withdrawn, a refund for properly treated water returned for reuse, and heavy fines for returning polluted waters.

(iv) Water Users Associations should be given statutory powers to collect and retain a portion of water charges, manage the volumetric quantum of water allotted to them and maintain the distribution system in their jurisdiction.

(v) Heavy under-pricing of electricity leads to wasteful use of both electricity and water. This needs to be reversed.

Institutional Arrangements

(i) A Water Regulatory Authority should be established in each State, to fix and regulate the water tariff system and charges, in general, according to the principles stated in this Policy in an autonomous manner. The Authority may also have functions other than tariff systems, such as regulating allocations, monitoring operations, reviewing performance and suggesting policy changes, etc. Water Regulatory Authority in a State may also assist in resolving intra-State water-related disputes.

(ii) There should be a forum at the national level to deliberate upon issues relating to water and evolve consensus, co-operation and reconciliation amongst party States. A similar mechanism should be established within each State to amicably resolve differences in competing demands for water amongst different users of water, as also between different parts of the State.

(iii) A permanent Water Disputes Tribunal at the Centre should be established to resolve the disputes expeditiously in an equitable manner. The paths of Arbitration and Mediation may also to be tried in dispute resolution.

(iv) The "Service Provider" role of the state has to be gradually shifted to that of a regulator of services and facilitator for strengthening the institutions responsible for planning, implementation and management of water resources. The water related services should be transferred to community and / or private sector with appropriate "Public Private Partnership" model.

Water Framework Law

(i) Even while it is recognized that States have the right to frame suitable policies, laws and regulations on water; there is a need to evolve a broad over-arching national legal framework of general principles on water to lead the way for essential legislation on water governance in every State and devolution of necessary authority to the lower tiers of government to deal with the local water situation.

(ii) Such a framework law must recognize water as a scarce that needs to be managed as a community resource held, by the state, under public trust doctrine to achieve food security, livelihood, and equitable and sustainable development for all.

(iii) The Indian Easements Act, 1882 may have to be modified accordingly in as much as it appears to give proprietary rights to a land owner on groundwater under his/her land.

(iv) Legislation is also needed to, inter alia, deal with and enable establishment of basin authorities with appropriate powers to plan, manage and regulate utilization of water resource in the basins.

Uses of Water

(i) After meeting the minimum quantity of water required for survival of human beings and ecosystem, water must be used as an economic good with higher priority towards basic livelihood support to the poor and ensuring national food security.

(ii) In the water rich eastern and north eastern regions of India, the water use infrastructure is weak and needs to be strengthened in the interest of food security.

(iii) Community should be sensitized and encouraged to adapt to utilization of water as per local availability of waters. Community based water management should be institutionalized and strengthened.

Demand Management and Water Use Efficiency

(i) Meeting future needs will depend more on demand management, which needs to be given priority, especially through (a) evolving an agricultural system which economizes on water use and maximizes value from water, and (b) bringing in maximum efficiency in use of water and avoiding wastage.

(ii) An institutional arrangement for promotion, regulation and controlling efficient use of water will be established for this purpose at the national level.

Resettlement & Rehabilitation

(i) The identification, resettlement & rehabilitation of project affected families shall be given due consideration right at the beginning of the project formulation. In addition to compensation for loss of land, house and sustenance livelihood, the project affected families should be made partners in progress and given a share in the benefits comparable to project benefited families.

(ii) The cost of rehabilitation and compensation to the project affected families should partly be borne by project benefited families through adequate pricing of water.

(iii) The resettlement & rehabilitation policy for water resources project should conform to the national act / guidelines in this regard.

Preservation of River Corridors, Water Bodies and Infrastructure

(i) Sources of water and water bodies should not be allowed to get polluted. System of third party periodic inspection should be evolved and heavy penalty should be imposed on the basis of polluter pays principle. The money recovered thus may be put in a fund for facilitating water treatment.

Project Planning and Implementation

(i) Being inter-disciplinary in nature, water resources projects should be planned considering social and environmental aspects also in addition to techno-economic considerations in consultation with project affected and beneficiary families.

(ii) Concurrent monitoring at project, State and Centre levels should be undertaken for timely interventions to avoid time and cost over-runs.

(iii) Local governing bodies like Panchayats, Municipalities, Corporations, etc., and Water Users Associations shall be involved in planning and implementation of the projects.

(iv) All water resources projects, including hydro power projects, should be planned to the extent feasible as multi-purpose projects with provision of storage to derive maximum benefit from available topology and water resources.

Water Supply and Sanitation

(i) There is a need to remove the large disparity between stipulations for water supply in urban and rural areas.

(ii) In urban and industrial areas, de-salinization, wherever techno-economically feasible, should be encouraged to increase availability of utilizable water. Water supply bills should include sewerage charges.

(iii) Industries in water short regions may be allowed to either withdraw only the make – up water or should have an obligation to return treated effluent to a specified standard back to the hydrologic system.

(iv) Subsidies and incentives should be implemented to encourage recovery of industrial pollutants and recycling / reuse, which are otherwise capital intensive.

Critical assessment of the various provisions of the National Water Policy 2012

Some of the provisions of the policy draft which are likely to have a larger impact on water scenario in India have been examined by various experts and some of them are critical to the provisions of the draft document. They argue that policy draft does mention the need to arrest declining groundwater levels with improved technologies of water use, efficiency in usage and community involvement in managing aquifers. They also add that there are no concrete steps to proactively rebalance groundwater extraction levels in line with recharge. More broadly, the pressing need for massive investment in water infrastructure, not just for storage given only a few weeks of intense annual rainfall but also for treatment, sewers and sewage plants, is also not adequately highlighted. (Economic Times, 2013)

They add about the need for improved governance in the use of water resources and the provision of water services. The fact is that there is "enormous backlog of deferred maintenance" in our irrigation systems, as observed in a recent expert report. The policy

framework, again, does not sharpen focus on the area. Given the generally poor quality of public irrigation and water supply services, there's much recourse to groundwater via tube wells.

It is further added that, though a conducive, legal framework is desirable, the way ahead is for the political executive to propose norms and guidelines that are forward-looking, scientifically sound and designed for the greater good, to tackle recurring issues like; inter-state water sharing. They say that the policy calls for a permanent national Water Disputes Tribunal, but here again to begin with it would make perfect sense to evolve appropriate state and river basin-specific institutional arrangements to resolve issues of entitlement, provide transparent regulation and generally modernize the water economy of the country.

Another group finds that the Policy does address the issue of efficiency of water use; however, instead of building in provision for encouraging (often capital intensive and exclusive) technology improvements, the policy should only spell out that water use efficiency should be improved, and losses, inefficiencies, and pilferages in distribution systems should be minimized.

With the intent of further enhancing the availability of water for use, the NWP proposes encouragement of inter-basin water transfers. While doing so, vital safeguards for environmental carrying capacity and sustainable and secured lives and livelihoods should not be excluded from the policy.

Conclusions

In view of the vital importance of water for human and animal life, for maintaining ecological balance and for economic and development activities of all kinds, and considering its increasing scarcity, the planning and management of this resource and its optimal, economical and equitable use has become a matter of the utmost urgency The success of the national water policy will depend entirely on the development and maintenance of a national consensus and commitments to its underlying principles and objectives.

The need for reduction of distribution losses and pilferages is even more underscored in the context of water tariffs. The lesser the losses and pilferages, the more the availability of water, and the lower the per-unit water tariff would be. The policy needs to clearly establish this inter-linkage. Further, such efficient handling of water on the supply side as well as on the demand side may also reduce the pressing need for the ‘multi-purpose’ water resource projects mentioned in the Policy, which are large and complex, may involve high inefficiencies, and have large negative social, environmental, and financial and economic implications.

One way to ensure appropriateness of various aspects of water management is a water regulatory authority. The concerns and critiques about, and the lacunae and improvements required in the current models of Independent Water Regulatory Authorities must be addressed. At the same time, a separate system is actually required to resolve the local as well as universal issues related to water governance. This resolution needs to be from the political, economic, financial, social, and cultural aspects. Therefore,

instead of suggesting establishment of mere water regulatory authorities, the policy should explicitly recommend water regulatory authorities that operate in a transparent, participatory, and a more responsible way, and that truly reach out to all the stakeholders. In addition to addressing these and such specific points, the policy needs to incorporate at an overarching level the principles of Transparency, Accountability, and Participation for all decision-making in the water sector (Tejas Pol, 2012).

For reversing the usual approach of projecting a future demand and bringing about a supply-side response to meet that demand, we must start from the fact that the availability of fresh water in nature is finite, and learn to manage our water needs within that availability. This means a restraint on the growth of 'demand' for water (other than basic needs) which will be difficult and will involve painful adjustments; but this has become inevitable. So, to have a more equitable and inclusive water resources management, the primacy has to shift from large, centralized, capital-intensive 'water resource development' (WRD) projects with big dams and reservoirs and canal systems, to small, decentralized, 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 severely restrained in the interest of resource-conservation as well as equity. (Ramaswamy, 2010)

There is also a need to understand the water in relation to rivers, from massive interventions in flows and maximal abstraction of waters to letting the rivers flow and keeping interventions to the minimum so that these perennial sources are least disturbed. Instead of killing rivers and then trying to revive them, we must learn to keep rivers alive, flowing and healthy. Another aspect which would require our attention, relates to be in the relative roles of the state and the community (from 'eminent domain' or sovereign powers of the state to the state as trustee holding natural resources in public trust for the community). There may have to be many other aspects, but all is not possible to be discussed here.

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