CHAPTER - 4

POLICIES GUIDELINES AND KEY INITIATIVES

The Ministry of Water Resources is nodal Ministry of Government of India for development and efficient management of water resources in India and has taken a large number of initiatives in this area .The Ministry has involved different organizations and has formulated required policies and various programs for achieving above objectives specially for promoting Rain Water Harvesting.

In view of the vital importance of water for human and animal life, for maintaining ecological balance and for economic and developmental 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. Concerns of the community need to be taken into account for water resources development and management. Accordingly a comprehensive and bible for management of water resource of country has been formulated by the ministry covering all the aspect of this precious and critical resource in 2002 .The main points of policy are as under:

NATIONAL WATER POLICY[28]

Need for a National Water Policy

1.1 Water is a prime natural resource, a basic human need and a precious national asset. Planning, development and management of water resources need to be governed by national perspectives.

1.2 As per the latest assessment (1993), out of the total precipitation, including snowfall, of around 4000 billion cubic metre in the country, the availability from surface water and replenishable ground water is put at 1869 billion cubic metre. Because of topographical and other constraints, about 60% of this i.e. 690 billion cubic metre from surface water and 432 billion cubic metre from ground water, can be put to beneficial use. Availability of water is highly uneven in both space and time. Precipitation is confined to only about three or four months in a year and varies from 100 mm in the western parts of Rajasthan to over 10000 mm at Cherrapunji in Meghalaya. Rivers and under ground aquifers often cut across state boundaries. Water, as a resource is one and indivisible: rainfall, river waters, surface ponds and lakes and ground water are all part of one system.

1.3 Water is part of a larger ecological system. Realising the importance and scarcity attached to the fresh water, it has to be treated as an essential environment for sustaining all life forms.

1.4 Water is a scarce and precious national resource to be planned, developed, conserved and managed as such, and on an integrated and environmentally sound basis, keeping in view the socio-economic aspects and needs of the States. It is one of the most crucial elements in developmental planning. As the country has entered the 21st century, efforts to develop, conserve, utilise and manage this important resource in a sustainable manner, have to be guided by the national perspective.

1.5 Floods and droughts affect vast areas of the country, transcending state boundaries. One-sixth area of the country is drought-prone. Out of 40 million hectare of the flood prone area in the country, on an average, floods affect an area of around 7.5 million hectare per year. Approach to management of droughts and floods has to be co-ordinated and guided at the national level.

1.6 Planning and implementation of water resources projects involve a number of socio-economic aspects and issues such as environmental sustainability, appropriate resettlement and rehabilitation of project-affected people and livestock, public health concerns of water impoundment, dam safety etc. Common approaches and guidelines are necessary on these matters. Moreover, certain problems and weaknesses have affected a large number of water

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[28] Government of India Ministry of Water Resources New Delhi
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resources projects all over the country. There have been substantial time and cost overruns on projects. Problems of water logging and soil salinity have emerged in some irrigation commands, leading to the degradation of agricultural land. Complex issues of equity and social justice in regard to water distribution are required to be addressed. The development, and overexploitation of groundwater resources in certain parts of the country have raised the concern and need for judicious and scientific resource management and conservation. All these concerns need to be addressed on the basis of common policies and strategies.

1.7 Growth process and the expansion of economic activities inevitably lead to increasing demands for water for diverse purposes: domestic, industrial, agricultural, hydro-power, thermal-power, navigation, recreation, etc. So far, the major consumptive use of water has been for irrigation. While the gross irrigation potential is estimated to have increased from 19.5 million hectare at the time of independence to about 95 million hectare by the end of the Year 1999-2000, further development of a substantial order is necessary if the food and fiber needs of our growing population are to be met with. The country's population which is over 1027 million (2001 AD) at present is expected to reach a level of around 1390 million by 2025 AD.

1.8 Production of food grains has increased from around 50 million tonnes in the fifties to about 208 million tonnes in the Year 1999-2000. This will have to be raised to around 350 million tonnes by the year 2025 AD. The drinking water needs of people and livestock have also to be met. Domestic and industrial water needs have largely been concentrated in or near major cities. However, the demand in rural areas is expected to increase sharply as the development programmes improve economic conditions of the rural masses. Demand for water for hydro and thermal power generation and for other industrial uses is also increasing substantially. As a result, water, which is already a scarce resource, will become even scarcer in future. This underscores the need for the utmost efficiency in water utilisation and a public awareness of the importance of its conservation.

1.9 Another important aspect is water quality. Improvements in existing strategies, innovation of new techniques resting on a strong science and technology base are needed to eliminate the pollution of surface and ground water resources, to improve water quality. Science and technology and training have to play important roles in water resources development and management in general.

Information System

2.1 A well developed information system, for water related data in its entirety, at the national / statelevel, is a prime requisite for resource planning. A standardised national information system should be established with a network of data banks and data bases, integrating and strengthening the existing Central and State level agencies and improving the quality of data and the processing capabilities.

2.2 Standards for coding, classification, processing of data and methods / procedures for its collection should be adopted. Advances in information technology must be introduced to create a modern information system promoting free exchange of data among various agencies. Special efforts should be made to develop and continuously upgrade technological capability to collect, process and disseminate reliable data in the desired time frame.

2.3 Apart from the data regarding water availability and actual water use, the system should also include comprehensive and reliable projections of future demands of water for diverse purposes.

Water Resources Planning

3.1 Water resources available to the country should be brought within the category of utilizable resources to the maximum possible extent.

3.2 Non-conventional methods for utilisation of water such as through inter-basin transfers, artificial recharge of ground water and desalination of brackish or sea water as well as traditional water conservation practices like rainwater harvesting, including roof-top rainwater harvesting, need to be practiced to further increase the utilisable water resources. Promotion of frontier research and development, in a focused manner, for these techniques is necessary.

3.3 Water resources development and management will have to be planned for a hydrological unit such as drainage basin as a whole or for a sub-basin, multi-sectorally, taking into account surface and groundwater for sustainable use incorporating quantity and quality aspects as well as environmental considerations. All individual developmental projects and proposals should be formulated and considered within the framework of such an overall plan keeping in view the existing agreements / awards for a basin or a subbasin so that the best possible combination of options can be selected and sustained.

3.4 Watershed management through extensive soil conservation, catchment-area treatment, preservation of forests and increasing the forest cover and the construction of check-dams should be promoted. Efforts shall be to conserve the water in the catchment.

3.5 Water should be made available to water short areas by transfer from other areas including transfers from one river basin to another, based on a national perspective, after taking into account the requirements of the areas / basins.

Institutional Mechanism

4.1 With a view to give effect to the planning, development and management of the water resources on a hydrological unit basis, along with a multi-sectoral, multi-disciplinary and participatory approach as well as integrating quality, quantity and the environmental aspects, the existing institutions at various levels under the water resources sector will have to be appropriately reoriented / reorganised and even created, wherever necessary. As maintenance of water resource schemes is under non-plan budget, it is generally being neglected. The institutional arrangements should be such that this vital aspect is given importance equal or even more than that of new constructions.

4.2 Appropriate river basin organisations should be established for the planned development and management of a river basin as a whole or sub-basins, wherever necessary. Special multi-disciplinary units should be set up to prepare comprehensive plans taking into account not only the needs of irrigation but also harmonising various other water uses, so that the

available water resources are determined and put to optimum use having regard to existing agreements or awards of Tribunals under the relevant laws. The scope and powers of the river basin organisations shall be decided by the basin states themselves.

Water Allocation Priorities

5. In the planning and operation of systems, water allocation priorities should be broadly as follows:

- Drinking water
- Irrigation
- Hydro-power
- Ecology
- Agro-industries and non-agricultural industries
- Navigation and other uses.

However, the priorities could be modified or added if warranted by the area / region specific considerations.

Ground Water Development

7.1 There should be a periodical reassessment of the ground water potential on a scientific basis, taking into consideration the qualit y of the water available and economic viability of its extraction.
7.2 Exploitation of ground water resources should be so regulated as not to exceed the recharging possibilities, as also to ensure social equity. The detrimental environmental consequences of overexploitation of ground water need to be effectively prevented by the Central and State Governments. Ground water recharge projects should be developed and implemented for improving both the quality and availability of ground water resource.

7.3 Integrated and coordinated development of surface water and ground water resources and their conjunctive use, should be envisaged right from the project planning stage and should form an integral part of the project implementation.

7.4 Over exploitation of ground water should be avoided especially near the coast to prevent ingress of seawater into sweet water aquifers.

Irrigation

9.1 Irrigation planning either in an individual project or in a basin as a whole should take into account the irrigability of land, cost-effective irrigation options possible from all available sources of water and appropriate irrigation techniques for optimising water use efficiency. Irrigation intensity should be such as to extend the benefits of irrigation to as large a number of farm families as possible, keeping in view the need to maximise production.

9.2 There should be a close integration of water-use and land-use policies.

9.3 Water allocation in an irrigation system should be done with due regard to equity and social justice. Disparities in the availability of water between head-reach and tail-end farms and between large and small farms should be obviated by adoption of a rotational water distribution system and supply of water on a volumetric basis subject to certain ceilings and rational pricing.

9.4 Concerted efforts should be made to ensure that the irrigation potential created is fully utilised. For this purpose, the command area development approach should be adopted in all irrigation projects.

9.5 Irrigation being the largest consumer of fresh water, the aim should be to get optimal productivity per unit of water. Scientific water management, farm practices and sprinkler and drip system of irrigation should be adopted wherever feasible.

9.6 Reclamation of water logged / saline affected land by scientific and cost-effective methods should form a part of command area development programme.

Resettlement and Rehabilitation

10. Optimal use of water resources necessitates construction of storages and the consequent resettlement and rehabilitation of population. A skeletal national policy in this regard needs to be formulated so that the project affected persons share the benefits through proper rehabilitation. States should accordingly evolve their own detailed resettlement and rehabilitation policies for the sector, taking into account the local conditions. Careful planning is necessary to ensure that the construction and rehabilitation activities proceed simultaneously and smoothly.

Participatory Approach to Water Resources Management

12. Management of the water resources for diverse uses should incorporate a participatory approach; by involving not only the various governmental agencies but also the users and other stakeholders, in an effective and decisive manner, in various aspects of planning, design, development and management of the water resources schemes. Necessary legal and institutional changes should be made at various levels for the purpose, duly ensuring appropr iate role for women. Water Users' Associations and the local bodies such as municipalities and *gram panchayats* should particularly be involved in the operation, maintenance and management of water infrastructures / facilities at appropriate levels progressively, with a view to eventually transfer the management of such facilities to the user groups / local bodies.

Water Quality

14.1 Both surface water and ground water should be regularly monitored for quality. A phased programme should be undertaken for improvements in water quality.

14.2 Effluents should be treated to acceptable levels and standards before discharging them into natural streams.

14.3 Minimum flow should be ensured in the perennial streams for maintaining ecology and social considerations.

14.4 Principle of 'polluter pays' should be followed in management of polluted water.

14.5 Necessary legislation is to be made for preservation of existing water bodies by preventing encroachment and deterioration of water quality.

Water Zoning

15. Economic development and activities including agricultural, industrial and urban development, should be planned with due regard to the constraints imposed by the configuration of water availability. There should be a water zoning of the country and the economic activities should be guided and regulated in accordance with such zoning.

Conservation of Water

16.1 Efficiency of utilisation in all the diverse uses of water should be optimised and an awareness of water as a scarce resource should be fostered. Conservation consciousness should be promoted through education, regulation, incentives and disincentives.

16.2 The resources should be conserved and the availability augmented by maximising retention, eliminating pollution and minimising losses. For this, measures like selective linings in the conveyance system, modernisation and rehabilitation of existing systems including tanks, recycling and re-use of treated effluents and adoption of traditional techniques like mulching or pitcher irrigation and new techniques like drip and sprinkler may be promoted, wherever feasible.

Drought-prone Area Development

19.1 Drought-prone areas should be made less vulnerable to drought-associated problems through soilmoisture conservation measures, water harvesting practices, minimisation of evaporation losses, development of the ground water potential including recharging and the transfer of surface water from surplus areas where feasible and appropriate. Pastures, forestry or other modes of development which are relatively less water demanding should be encouraged. In planning water resource development projects, the needs of drought-prone areas should be given priority.

19.2 Relief works undertaken for providing employment to drought-stricken population should preferably be for drought proofing.

Monitoring of Projects

20.1 A close monitoring of projects to identify bottlenecks and to adopt timely measures to obviate time and cost overrun should form part of project planning and execution.

20.2 There should be a system to monitor and evaluate the performance and socio-economic impact of the project.

Water Sharing / Distribution amongst the States

21.1 The water sharing / distribution amongst the states should be guided by a national perspective with due regard to water resources availability and needs within the river basin. Necessary guidelines, including for water short states even outside the basin, need to be evolved for facilitating future agreements amongst the basin states.

Performance Improvement

22. There is an urgent need of paradigm shift in the emphasis in the management of water resources sector. From the present emphasis on the creation and expansion of water resources infrastructures for diverse uses, there is now a need to give greater emphasis on the improvement of the performance of the existing water resources facilities. Therefore, allocation of funds under the water resources sector should be re-prioritised to ensure that the needs for development as well as operation and maintenance of the facilities are met.

Maintenance and Modernisation

23.1 Structures and systems created through massive investments should be properly maintained in good health. Appropriate annual provisions should be made for this purpose in the budgets.

23.2 There should be a regular monitoring of structures and systems and necessary rehabilitation and modernisation programmes should be undertaken.

23.3 Formation of Water Users' Association with authority and responsibility should be encouraged to facilitate the management including maintenance of irrigation system in a time bound manner.

Safety of Structures

24. There should be proper organisational arrangements at the national and state levels for ensuring the safety of storage dams and other water-related structures consisting of specialists in investigation, design, construction, hydrology, geology, etc. A dam safety legislation may be enacted to ensure proper inspection, maintenance and surveillance of existing dams and also to ensure proper planning, investigation, design and construction for safety of new dams. The Guidelines on the subject should be periodically updated and reformulated. There should be a system of continuous surveillance and regular visits by experts.

Science and Technology

25. For effective and economical management of our water resources, the frontiers of knowledge need to be pushed forward in several directions by intensifying research efforts in various areas, including the following:

- hydrometeorology;
- snow and lake hydrology;
- surface and ground water hydrology;
- river morphology and hydraulics;
- assessment of water resources;
- water harvesting and ground water recharge;
- water quality;
- water conservation;
- evaporation and seepage losses;
- recycling and re-use;
- better water management practices and improvements in operational technology;
- crops and cropping systems;
- soils and material research;
- new construction materials and technology (with particular reference to roller compacted concrete, fiber reinforced concrete, new methodologies in tunneling technologies, instrumentation, advanced numerical analysis in structures and back analysis);
- seismology and seismic design of structures;
- the safety and longevity of water-related structures;
- economical designs for water resource projects;
- risk analysis and disaster management;
- use of remote sensing techniques in development and management;
- use of static ground water resource as a crisis management measure;
- sedimentation of reservoirs;
- use of sea water resources;
- prevention of salinity ingress;
- prevention of water logging and soil salinity;
- reclamation of water logged and saline lands;
- environmental impact;
- regional equity.

Training

26. A perspective plan for standardized training should be an integral part of water resource development. It should cover training in information systems, sectoral planning, project planning and formulation, project management, operation of projects and their physical structures and systems and the management of the water distribution systems. The training should extend to all the categories of personnel involved in these activities as also the farmers.

To achieve the desired objectives, State Water Policy backed with an operational action plan shall be formulated by each state in a time bound manner.

CENTRAL GROUND WATER BOARD

(TRANSFERRED TO MINISTRY OF WATER RESOURCES(1982))

This is Premier National Organization to cover all aspects of ground water surveys, exploration, development and management .The Central Ground Water Board was constituted as the national apex organization in 1970. The main activities of the Board include macro-level hydro geological investigations, deep exploratory drilling coupled with remote sensing studies, geophysical studies and pumping tests to study the subsurface hydro geological features and nation-wide monitoring of the behavior of water table and water quality through a network of 15,640 hydrograph stations. This includes a total of 2,239 purpose built piezometers constructed under Hydrology Project.. 1200 piezometers are fitted with Digital Water Level Recorder (DWLR) to get continuous ground water levels at desired intervals. The data generated from these investigations provide a scientific base for preparation of ground water development schemes by the state Governments. In areas having problem of ground water pollution, sea-water ingress, groundwater depletion, etc., special studies are undertaken to assess the magnitude of the problem and suggest remedial measures. Besides advising the States on planning, financing and administration of groundwater development schemes, the Board undertakes research and development schemes, water balance studies, conjunctive use studies and artificial recharge studies. The Board also organizes training of personnel of different disciplines from related Central and State Government organizations.

The Central Ground Water Board carries out exploratory drilling aided by geophysical and remote sensing studies to decipher the potentiality of various geological formations. The Board has drilled 26756 exploratory wells till 31st March, 2007. The successful exploratory wells have been offered to the State Governments. The Central Ground Water Board has earmarked substantial number of rigs for construction of tubewells to assist the State Governments for mitigating the drinking water problems in the drought-affected areas of the country.

To meet the two-fold challenge before the country of increased water demands and reduced in availability of fresh water, the Central Ground Water Board has promoted the practice of artificially recharging ground water including rain water harvesting. During the Ninth Plan, the Central Ground Water Board implemented a Central Sector Scheme on "Study of Recharge to Ground Water" under which 165 recharge projects in various hydro geological conditions spreading over 27 States/UTs were taken up for implementation, out of which 153 projects have been completed. The projects implemented by the Board have resulted in rise in ground

water levels, reduction in pumping lifts, leading to energy savings and providing additionality to the water resources in benefited areas.

The Central Ground Water Board also provides technical know-how for construction of rainwater harvesting structures in various parts of the country free of cost. To create awareness, the Board has got incorporated a chapter on Water Resources in NCERT textbook, which has been modified to include "Artificial Recharge and Rain Water Harvesting".

The Board regularly publishes scientific reports and maps for its fruitful utilization by the concerned State Governments and user agencies engaged in ground water development and management of the country. Recently, the Board has published Hydro geological Map of India; Master Plan on Artificial Recharge to Ground Water, Guidelines on Artificial Recharge to Ground Water, etc. The Board prepared user friendly "Ground Water Maps" of 500 districts.

CENTRAL GROUND WATER AUTHORITY

Central Ground Water Authority was constituted in 1997 (under the environment protection act following directions of hon'ble supreme court of India) To regulate and control, the development and management of ground water in the country. Central Ground Water Authority organizes mass awareness programmes at different locations of the country. Till now Central Ground Water Authority has conducted 344 mass awareness programmes on Rain Water Harvesting and Artificial Recharge of Ground water throughout the country involving Central/State/NGO's VO's, resident welfare organizations, educational institutions, industries and individuals. The Authority has also conducted 259 Training programmes to generate resource persons as a measure of capacity building for designing Rain Water Harvesting structures to augment ground water in different terrains and diverse hydro geological conditions in the country. Awareness generated through printing of Meghdoot post cards in Hindi and English, slogans on mall vans and letter-boxes through Department of Posts. Spots and talks highlighting the importance of ground water conservation, protection and augmentation were broadcasted in AIR, AIR FM and Doordarshan. Films were produced on Rain water harvesting in Urban areas, Rain water harvesting in Rural areas, Ground Water Pollution etc. and shown during various mass awareness and training programmes. Material on Rain Water Harvesting to Augment Ground Water has been integrated into Vidya Vahini Portal.

Ground Water Estimation and Management System (GEMS)

Water Policy envisaged a well-developed standardized National Information System comprising network of databanks and databases, Improving the quality of data and processing capabilities and Promoting free exchange of data among the various user agencies. To achieve the above objectives the concept of building a Hydrological Information System (HIS) mooted under World Bank Aided Hydrology Project and a need for developing a Dedicated Software for Ground Water Data Processing Centers felt.

The Dedicated software so developed for ground water data processing centers of CGWB and State Ground Water Organization was named as Ground Water Estimation and Management System (GEMS)..

The GEMS is Modular Software adjustable to the requirement at the level of office, Various module have been customized as per users requirement to form integrated software. The software has got 4 modules namely, Basic module, Groundwater Assessment Module, GIS Module & Advanced GIS Module. The software is fully integrated with GIS layers.

The software is Capable of Data Entry/editing, Entry Checks/validation, Comprehensive Data Processing, Statistical Analysis, Data Retrieval, Reporting, Graphic/map Outputs, Data Transfer & Dissemination, Data Security and Backup facility in respect of Water Level, Water Quality, Hydromet, Geophysics, Exploratory Details.

Under section 15 of Environment (Protection) Act 1986, Central ground Water Authority (Ministry of Water resources) has made it mandatory to adopt rain water harvesting system for certain types of building/institutions located in specified regions of National Capital territory.

In Chennai, rain water harvesting has been made compulsory. In Delhi, Building bye-laws have been modified making rain water harvesting mandatory for new buildings erected on plots of more than 100 sq. mtrs.

Delhi Government has come up with an incentive scheme to reimburse 50% cost of rain water harvesting structure (maximum Rs. 50,000/-) to certain colonies in Delhi area.

POLLUTION

Pollution is very important area in managing water resources and environment of any country in India following important pollution control acts and regulations[29] Exists

In 1976, when the Indian parliament passed the 42nd amendment to its constitution safeguarding the environment, it became the first country in the world to do so. The amendment was to "endeavor to protect and improve the environment and to safeguard the forests and wild life of the country." It imposes a duty on every Indian citizen "to protect and improve the natural environment including forests, lakes, rivers, and wild life, and to have compassion for living creatures."

According to the Environment Protection Act of 1986, Environment is that which includes the "inter-relationship which exists among and between water, air, and land and human beings, other living creatures, plants, micro-organism and property."

Essentially, The Water (Prevention & Control) Act, 1974 can be considered to be truly the first regulations. It has been amended many times since then.
Basically, there are seven Pollution regulations.
1. The Water (Prevention & Control of Pollution) Act, 1974, and its amendments;
2. The Water (Prevention & Control of Pollution) Cess Act, 1974 and its amendments;
3. The Air (Prevention & Control of Pollution) Act, 1981 and its amendments;
4. The Environment (Prevention) Act, 1986 and its amendments,
(a) National Environmental Tribunal Act of 1995 and
(b) National Environmental Appellate Authority Act of 1997;
5. Hazardous Waste (Management and Handling) Rules, July 1989 and
6. The Public Liability Insurance Act, 1991.

The Public Liability Insurance Act 1991 has been included as the sixth environmental regulation because it is the first regulation which gives some teeth to the other five pollution regulations listed above.

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[29]Harish C. Sharma "ENVIRONMENTAL POLLUTION COMPLIANCE", CBS Publishers, New Delhi, India. 1994.

THE CENTRAL AND STATE BOARDS

It was the Water Act of 1974 which established a Central Pollution Board and a State Pollution Control Board. Subsequently, the same Boards have been given the power to govern all the pollution regulations passed since then and any other to be put in regulations in the future.

THE WATER (PREVENTION AND CONTROL OF POLLUTION) ACT, 1974 AND ITS AMENDMENTS

The purpose of this act is "to provide for the prevention and control of water pollution and the maintenance or restoring wholesomeness of water for the establishment, with a view to carrying out the purpose of aforesaid of Boards for the prevention and control of water pollution, for conferring on and assigning to such Boards powers and functions relating thereto and for matters connected therewith." This is the Act that established the Central and a State Board and also the authority and power to constitute as many committees as it feels essential to carry out specific functions for it.

The Act specifically prohibits "any poisonous, noxious or polluting matter' into any stream or well. A consent from the State Board is required for any type of new discharge into any new stream or well. This also includes consent for" temperature" discharges as done by cooling tower users. In general, this means that a State consent or permit is required for all types of intake and/or discharge of any type of liquid or water either from a running stream or well. Under these rules, "effluent standards to be complied with by persons while causing discharge of sewage or sullage or both" have been specified. Standards for small scale industries have been specified separately. Penalties for non-compliance with the permit or polluting in any way are imprisonment for three months and fine of Rs.10,000 (One US Dollar equals about thirty six Indian Rupees) or fine up to Rs. 5,000 per day of violation or both plus any expenses incurred by the Board for sampling, analysis, inspection etc. In case of the government, department head could be held liable.