

Appendix C: Indian National Water Policies

M.J. Peterson

Version 1; September 2010

Appendix Contents:

- 1.) [Hariyali \("Greening"\) Guidelines 2003](http://dolr.nic.in/hariyaliguide.htm) (<http://dolr.nic.in/hariyaliguide.htm>)
- 2.) [National Water Policy 1987](http://cgwb.gov.in/documents/nwp_1987.pdf) (http://cgwb.gov.in/documents/nwp_1987.pdf)
- 3.) [National Water Policy 2002](http://mowr.gov.in/writereaddata/linkimages/nwp20025617515534.pdf) (<http://mowr.gov.in/writereaddata/linkimages/nwp20025617515534.pdf>)

This case was created by the International Dimensions of Ethics Education in Science and Engineering (IDEESE) Project at the University of Massachusetts Amherst with support from the National Science Foundation under grant number 0734887. Any opinions, findings, conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. More information about the IDEESE and copies of its modules can be found at <http://www.umass.edu/sts/ethics>.

This case should be cited as: M.J. Peterson. 2010. "Narmada Dams Controversy." International Dimensions of Ethics Education in Science and Engineering. Available www.umass.edu/sts/ethics.



© 2010 IDEESE Project

Government of India Guidelines For Hariyali (2003)

Introduction

To involve village communities in the implementation of watershed projects under all the area development programmes namely, Integrated Wastelands Development Programme (IWDP), Drought Prone Areas Programme (DPAP) and Desert Development Programme (DDP), the Guidelines for Watershed Development were adopted [with effect from] 1.4.1995, and subsequently revised in August 2001. To further simplify procedures and involve the Panchayat Raj Institutions (PRIs) more meaningfully in planning, implementation and management of economic development activities in rural areas, these new Guidelines called Guidelines for Hariyali are being issued.

Applicability

New projects under the area development programmes shall be implemented in accordance with the Guidelines for Hariyali with effect from 1.4.2003. Projects under DPAP and DDP will be taken up in the blocks identified under the respective programme and projects under IWDP shall generally be taken up in the remaining blocks. Projects sanctioned prior to this date shall continue to be implemented as per the Guidelines of 2001.

Objectives

The objectives of projects under HARIYALI will be:

- 1.) Harvesting every drop of rainwater for purposes of irrigation, plantations including horticulture and floriculture, pasture development, fisheries etc. to create sustainable sources of income for the village community as well as for drinking water supplies.
- 2.) Ensuring overall development of rural areas through the Gram Panchayats and creating regular sources of income for the Panchayats from rainwater harvesting and management.
- 3.) Employment generation, poverty alleviation, community empowerment and development of human and other economic resources of the rural areas.
- 4.) Mitigating the adverse effects of extreme climatic conditions such as drought and desertification on crops, human and livestock population for the overall improvement of rural areas.
- 5.) Restoring ecological balance by harnessing, conserving and developing natural resources i.e. land, water, vegetative cover especially plantations.
- 6.) Encouraging village community towards sustained community action for the operation and maintenance of assets created and further development of the potential of the natural resources in the watershed.

- 7.) Promoting use of simple, easy and affordable technological solutions and institutional arrangements that make use of, and build upon, local technical knowledge and available materials.

Sanction of Projects

The projects will be sanctioned by the Department of Land Resources in the Ministry of Rural Development, Government of India as per procedure in vogue. The Department may amend or relax this procedure from time to time. For interpretation of any of the provisions of these Guidelines, the Department of Land Resources will be the final authority. The Department may sanction special projects for treatment of wastelands in Special Problem Areas such as high altitude regions, land slide areas, slopes having more than 30 degree gradient or for any other specified technical reason. These projects need not necessarily be implemented through participatory mode and may be implemented on intensive treatment specific, departmental approach.

Criteria for Selection of Watersheds

The following criteria may broadly be used in selection of the watersheds:

- 1.) Watersheds where people's participation is assured through contribution of labour, cash, material etc. for its development as well as for the operation and maintenance of the assets created.
- 2.) Watershed areas having acute shortage of drinking water.
- 3.) Watersheds having large population of scheduled castes/scheduled tribes dependent on it.
- 4.) Watershed having a preponderance of non-forest wastelands/degraded lands.
- 5.) Watersheds having preponderance of common lands.
- 6.) Watersheds where actual wages are significantly lower than the minimum wages.
- 7.) Watershed which is contiguous to another watershed that has already been developed/ treated.
- 8.) Watershed area may be of an average size of 500 hectares, preferably covering an entire village. However, if on actual survey, a watershed is found to have less or more area, the total area may be taken up for development as a project. In case a watershed covers two or more villages, it should be divided into village-wise sub-watersheds confined to the designated villages. Care should be taken to treat all the sub-watersheds simultaneously.

Development of Forest Lands in Watershed Areas

Some watersheds may encompass, in addition to arable land under private ownership, forestlands under the ownership of State Forest Department. Since nature does not recognize artificial boundaries of forest and non-forest lands in any watershed, the entire watershed is to be treated in an integrated manner.

Though the criterion for selection of watersheds primarily remains predominance of non-forest lands, forestlands forming part of such watersheds may also be treated simultaneously as detailed below:

- 1.) The Divisional Forest Officer concerned should give technical sanction for the treatment plans.
- 2.) The treatment plans should as far as possible be implemented by Village Forest Committees in close coordination with the Village Panchayat.
- 3.) The Micro-watershed Development Plan for the forest areas should be in conformity with the Forest Conservation Act and the approved working plan of the area.
- 4.) Where a large portion of the watershed is covered by forestlands, Forest Department at the district level should be encouraged to take up the work of development as Project Implementation Agency.
- 5.) A forest official should invariably be included as a member of the Watershed Development Team wherever forestland falls within the watershed.

Project Commencement

The date of sanction of the project shall be date of project commencement for all purposes. The project shall be implemented over a period of five years from the date of its sanction. The projects under these Guidelines will be implemented, mainly, through the Zilla Parishads (ZPs)/District Rural Development Agencies (DRDAs). However, wherever it is expedient in the interest of the Programmes, the projects can be implemented through any Department of the State Government or an autonomous agency of the Central Government/State Government with the approval of the Department of Land Resources, Government of India.

Project Implementation Agencies

At the district level, ZP/DRDA shall be the nodal authority for implementation of all the area development programmes under the supervision and guidance of the State Government and the Government of India. It shall approve the selection of watersheds, the appointment of Project Implementation Agencies, approve the action plan/treatment plan of the projects etc. The CEO (ZP)/PD(DRDA) shall maintain the accounts of watershed projects and shall sign all statutory papers such as Utilization Certificates (UCs), Audited Statements of Accounts, Progress Reports, Bonds etc. The ZP/DRDA will be entitled to recover funds from any institution/ organization/ individual and take appropriate action under law if the project is not properly implemented or funds are misutilised or not spent as per these Guidelines. At the field level, the Gram Panchayats shall implement the projects under the overall supervision and guidance of Project Implementation Agencies (PIAs). An intermediate Panchayat may be the PIA for all the projects sanctioned to a particular Block/Taluka. In case, these Panchayats are not adequately empowered, then the ZP can either act as PIA itself or may appoint a suitable Line Department like Agriculture, Forestry/Social Forestry, Soil Conservation etc. or an Agency of the State Government/ University/ Institute as PIA.

Failing these options, the ZP/DRDA may consider appointing a reputed Non-Government Organization (NGO) in the district with adequate experience and expertise in the implementation of watershed projects or related area development works as the PIA after thoroughly checking its credentials. Nonetheless, the

State Governments should endeavor to empower the PRIs and build their capacities so that they may ultimately be in a position to take up the responsibility of independently implementing the watershed development projects as PIAs. An NGO-PIA shall normally be assigned 10-12 watershed projects covering an area ranging from 5,000-6,000 hectares. However, in exceptional and deserving cases, an NGO-PIA may be assigned a maximum of 12,000 hectares at a time including ongoing projects in all the Programmes of similar nature in a district and a maximum of 25,000 hectares in the State. An NGO is eligible for selection as PIA only if it has been active in the field of watershed development or any similar area developmental activities in rural areas for some years. The quantum of funds handled by an agency in the last 3 years may be taken into account for their selection as PIA by the ZP/DRDA. The NGOs blacklisted by CAPART or other Departments of State Government and Government of India should not be appointed as PIA.

The Project Implementation Agency (PIA) will provide necessary technical guidance to the Gram Panchayat for preparation of development plans for the watershed through Participatory Rural Appraisal (PRA) exercise, undertake community organization and training for the village communities, supervise watershed development activities, inspect and authenticate project accounts, encourage adoption of low cost technologies and build upon indigenous technical knowledge, monitor and review the overall project implementation and set up institutional arrangements for post-project operation and maintenance and further development of the assets created during the project period. The ZP/DRDA shall, normally, be the authority competent to decide on the suitability or otherwise of the Project Implementation Agency (PIA) for taking up projects under the watershed development programmes. However, the State Government may consider changing the PIA in any of the projects on specific grounds with prior concurrence of the Department of Land Resources, Govt. of India.

Each PIA shall carry out its duties through a multi-disciplinary team designated as the Watershed Development Team (WDT). Each WDT should have at least four members one each from the disciplines of forestry/plant sciences, animal sciences, civil/agricultural engineering and social sciences. At least one member of the WDT should be a woman. Preferable qualification for a WDT member should be a professional degree. However, the qualification can be relaxed by the ZP/DRDA in deserving cases keeping in view the practical field experience of the candidate in the relevant discipline. One of the WDT members shall be designated as the Project Leader. The PIA will be at liberty to either earmark its own staff exclusively for this work, or engage fresh candidates including retired personnel, or take people on deputation from government or other organizations. The WDT shall be located at the PIA/Block headquarters/any other town nearest to the cluster of selected villages. Honorarium to the WDT members shall be paid out of the administrative costs as indicated in Annexure-I. In order to avoid the tendency for over-emphasis on certain activities related to the specialty of the PIA selected, particularly in the case of Line Departments like Agriculture, Soil Conservation, Forestry etc., the ZP/DRDA should ensure that subject matter specialists from various Line Departments at the district and block levels are involved in the preparation of the plans. Gram Panchayats will execute the works under the guidance and control of the Gram Sabha. In States where there are Ward Sabhas (Palli Sabhas etc.) and the area to be treated is within that Ward, the Ward Sabha may perform the duties of the Gram Sabha. In 6th Schedule areas, where traditional Village Councils are functioning instead of Gram Panchayats, these Councils may be assigned the responsibilities of the Gram Panchayats/Gram Sabhas. In cases, where there is neither a Gram Panchayat nor the traditional Village Council, the existing provisions of Guidelines (2001) would apply.

The Gram Panchayat shall carry out the day-to-day activities of the project and will be responsible for coordination and liaison with the Watershed Development Team and the ZP/DRDA to ensure smooth implementation of the project. It shall be responsible for undertaking watershed development works and to make payments for the same. The Gram Panchayat shall maintain a separate account for the watershed project and all receipts from ZP/DRDA will be credited to this account. This account shall be operated jointly by the Gram Panchayat Secretary and Gram Panchayat Chairman. The Gram Panchayat Secretary will be responsible for convening meetings of the Gram Panchayat and Gram Sabha and for carrying out all their decisions. He will maintain all the records and accounts of project activities. If required, the Gram Panchayat may appoint two or three volunteers to provide assistance to the Gram Panchayat Secretary in the implementation of activities as per the action plan/treatment plan of the watershed project. The volunteers will be paid honorarium as per Annexure-I

Gram Sabha Meetings

The Gram Sabha will meet, at least twice a year to approve/improve the watershed development plan, monitor and review its progress, approve the statement of accounts, form User Groups/Self-Help Groups, resolve differences/disputes between different User Groups, Self-Help Groups or amongst members of these groups, approve arrangements for the collection of public/voluntary donations and contributions from the community and individual members, lay down procedures for the operation and maintenance of assets created and approve the activities that can be taken up with money available in the Watershed Development Fund.

Self-Help Groups

The Gram Panchayat shall constitute Self Help Groups (SHGs) in the watershed area with the help of WDT from amongst landless/assetless poor, agricultural labourers, women, shepherds, scheduled caste/scheduled tribe persons and the like. These Groups shall be homogenous groups having common identity and interest who are dependent on the watershed area for their livelihood. Separate Self-Help Groups should be organized for women, scheduled castes, scheduled tribes etc.

User Groups

The Gram Panchayat shall also constitute User Groups (UGs) in the watershed area with the help of WDT. These Groups shall be homogenous groups of persons most affected by each work/activity and shall include those having land holdings within the watershed areas. Each UG shall consist of landholders who are likely to derive direct benefits from a particular watershed work or activity. The UGs shall be responsible for the operation and maintenance of all the assets created under the project through which they derive direct or indirect individual benefits.

To take care of plantations on public/ community/ Panchayat lands, the Gram Panchayats may engage local unemployed youth from BPL families as *Van Rakshaks* on honorarium, which will be paid out of the administrative costs prescribed in Annexure-I. The Van Rakshaks and volunteers shall not be treated as employees of the Gram Panchayat/ PIA/ ZP/ State Government/ Government of India. The honorarium of Van Rakshaks may be increased or decreased by the Gram Panchayat keeping in view the survival rate of plantations. The Gram Panchayat shall also ensure usufructs for these Van Rakshaks.

Community Mobilization and Training

Community Mobilization and Training are pre-requisites for initiating development work in watershed projects. Prior sensitization and orientation training on Watershed Project Management should be imparted to all concerned functionaries and elected representatives at the district, block and village levels before they assume their responsibilities. In case ZP/ DRDA/ Line department is the PIA, it may involve NGOs for community mobilization and training. For this, approval of ZP/DRDA should be taken.

Activities for Watershed Development

A meeting of the Gram Sabha/ Ward Sabha shall be convened for preparation of the Action Plan/ Watershed Treatment Plan, on the basis of the information generated from the benchmark survey of the watershed areas and detailed PRA exercises. After general discussion, the Gram Panchayat will prepare a detailed Action Plan/ Treatment Plan for integrated development of the watershed area under the guidance of the WDT and submit the same to the PIA. The WDT should utilize various thematic maps relating to land and water resources development in the preparation and finalization of the Action Plan/ Watershed Treatment Plan. This Action Plan shall necessarily mention the clear demarcation of the watershed with specific details of survey numbers, ownership details and a map depicting the location of proposed work/activities. The PIA, after careful scrutiny, shall submit the Action Plan for Watershed Development for approval of the ZP/DRDA. The approved plan shall be the basis for release of funds, monitoring, review, evaluation etc. by the ZP/DRDA, State Government and Central Government. The Action Plan/Watershed Treatment Plan should be prepared for all the arable and non-arable land including degraded forestlands, government and community lands and private lands.

The items, inter-alia, that can be included in the Action Plan/Watershed Treatment Plan are:

- 1.) Development of small water harvesting structures such as low-cost farm ponds, nalla bunds, check-dams, percolation tanks and other ground water recharge measures.
- 2.) Renovation and augmentation of water sources, desiltation of village tanks for drinking water/irrigation/fisheries development.
- 3.) Fisheries development in village ponds/tanks, farm ponds etc.
- 4.) Afforestation including block plantations, agro-forestry and horticultural development, shelterbelt plantations, sand dune stabilization, etc.
- 5.) Pasture development either by itself or in conjunction with plantations.
- 6.) Land Development including in-situ soil and moisture conservation measures like contour and graded bunds fortified by plantation, bench terracing in hilly terrain, nursery raising for fodder, timber, fuel wood, horticulture and non-timber forest product species.
- 7.) Drainage line treatment with a combination of vegetative and engineering structures.
- 8.) Repair, restoration and up-gradation of existing common property assets and structures in the watershed to obtain optimum & sustained benefits from previous public investments.

- 9.) Crop demonstrations for popularizing new crops/varieties or innovative management practices.
- 10.) Promotion and propagation of non-conventional energy saving devices, energy conservation measures, bio fuel plantations etc.

The WDT, while drawing up the Action Plan/ Watershed Treatment Plan should ensure that project works involve only low-cost, locally available technologies and materials, are simple, easy to operate and maintain. Emphasis should be on vegetative measures. Costly masonry/ cement works, use of machinery should be discouraged. While preparing the watershed treatment plan, the Gram Panchayats should give emphasis to rain water-harvesting activities and undertake massive plantation works on community as well as private lands. Where private lands are involved, these should belong, predominantly, to SC/ST and small/marginal farmers. Focus should be on employment and income generation activities that benefit the rural poor in the watershed project area. Impounded rainwater could also be used for income generating activities like fisheries.

While preparing the detailed action plan, technical requirements and feasibility of appropriate biophysical measures are to be carefully worked out by the WDT for long-term sustainable interventions for the entire area of the watershed. The Action Plan should specify, among others, the following:

- 1.) Physical targets to be achieved (year wise) under the project and the road map for achieving these targets;
- 2.) Definite time frame for each major activity;
- 3.) Technological interventions for the proposed activities;
- 4.) Specific success criteria for each activity; and
- 5.) Clear Exit Protocol.

After the detailed action plan is approved by the ZP/DRDA, it would be the responsibility of the PIA to get the same implemented through the Gram Panchayat with active support and supervision of the WDT members.

Exit Protocol

While preparing the detailed Action Plan/Treatment Plan, the Gram Sabha/Gram Panchayat, under the technical guidance of WDT, shall evolve proper Exit Protocol for the watershed development project. The Exit Protocol shall specify a mechanism for maintenance of assets created, augmentation including levy and collection of user charges, utilization of the Watershed Development Fund etc. Mechanism for equitable distribution and sustainability of benefits accrued under the watershed development project should also be clearly spelt out in the Exit Protocol. While approving the Action Plan for the watershed, the ZP/DRDA shall ensure that the detailed mechanism for such Exit Protocol forms part of the Action Plan/Treatment Plan.

Transparency

Transparency under the Programme would be promoted by various agencies as follows:

- Preparation of the Action Plan for the watershed by the Gram Panchayat in consultation with Self-Help Groups/User Groups with the assistance of WDT members.
- Approval of the Action Plan at the open meetings of the Gram Sabha.
- Display of approved Action Plan on a Notice Board at the Gram Panchayat Office, Village Community Hall and such other community buildings.
- Review of physical and financial progress of work during implementation phase through periodical meetings of the Gram Sabha.
- Payment to labourers directly and through cheques wherever possible.

Funding Pattern

The present cost norm is Rs 6000 per hectare. This amount shall be divided amongst the following project components subject to the percentage ceiling mentioned against each:

(i) Watershed Treatment/ Development Works/ Activities	85%
(ii) Community Mobilization and Training	5%
(iii) Administrative Overheads	10%
TOTAL	100%

Savings, if any, in the administrative costs can be utilized for undertaking activities under the other two heads viz. training and watershed works, but not vice-versa. Purchase of vehicles, office equipment, furniture etc., construction of buildings, and payment of salaries of government staff will not be permissible under administrative costs. General cost norm for watershed development projects will be as per Annexure-I. Cost estimates for each work item and project activity shall be worked out as per Standard Schedule of Rates (SSR) approved by the State Governments in representative areas.

Procedure for release of installments

Central Share of funds shall be released to the ZPs/ DRDAs in five installments over a period of 5 years. The State shall also release their corresponding share to the ZPs/ DRDAs accordingly. Further breakup of these installments is given in Annexure II. While the first installment of Central funds shall be released along with the Project Sanction unconditionally, further installments shall be released when the unutilized balance is not more than 50% of the previous installment released. The relevant release proposal should be submitted by the ZP/DRDA to the Department of Land Resources, through the State Government, along with Quarterly Progress Reports and Audited Statement of Accounts of the previous year. In addition, proposal for release of second installment shall be supported by details concerning village-wise area taken up for treatment, Project Profile, Action Plan approved by ZP/DRDA and other documents called for as and when necessary. The ZP/DRDA shall release funds to the PIAs and the Gram Panchayats within 15 days of receipt of funds from the Central and State governments.

After receipt of 45% of project funds in two installments, the State Government shall commission a Mid-Term Evaluation of the watershed development project through an independent evaluator from a Panel of

Evaluators maintained by the State Government with due approval of the Department of Land Resources. Release of the third installment of Central funds shall be made only after submission of a satisfactory Mid-Term Evaluation Report, besides all other requirements specified above. The State Government shall also commission a final evaluation of the project on its completion and submit the same to DoLR with the completion report.

Watershed Development Fund

One of the mandatory conditions for selection of villages in Watershed Development Programmes is people's contribution towards Watershed Development Fund (WDF). The contributions to WDF shall be a minimum 10% of the cost of works executed on individual lands. However, in case of SC/ST and persons identified below the poverty line, the minimum contribution shall be 5% of the cost of works executed on their lands. Contribution to the Fund in respect of community property may come from all the beneficiaries, which shall be a minimum of 5% of the development cost incurred. It should be ensured that the contribution comes from the beneficiary farmers and is not deducted from the wages paid to the labourers who are engaged to treat the private lands. These contributions would be acceptable either in cash/ voluntary labour or material. A sum equivalent to the monetary value of the voluntary labour and materials would be taken from the watershed project account and deposited in this Fund.

The Gram Panchayat shall maintain the Watershed Development Fund separately. The Chairman and Secretary, Gram Panchayat will operate the WDF account jointly. Individuals as well as charitable institutions should be encouraged to contribute generously to this Fund. The proceeds of this Fund shall be utilized in maintenance of assets created on community land or for common use after completion of project period. Works taken up for individual benefit shall not be eligible for repair/maintenance out of this Fund.

User Charges

The Gram Panchayat shall impose user charges on the User Groups for use of common utilities like water for irrigation from village tanks/ponds, grazing from community pastures etc. While one-half of the user charges so collected may be credited to the WDF for maintenance of assets of the projects, the remaining one-half may be utilized by the Panchayat for any other purpose as it may deem fit.

Revolving Fund for SHGs

The Gram Panchayat will set up a revolving fund not exceeding Rs. one lakh to be given as seed money for vocational development by the Self-Help Groups (SHGs) at a rate not exceeding Rs.10,000/- per SHG for undertaking income generating activities. This seed money must be recovered from the SHG members in a maximum of 6 installments on a monthly basis. This could be reinvested in the same or other SHGs.

Convergence of Programmes

As the Watershed Development Programmes aim at holistic development of watershed areas, the convergence of all other non-land based programmes of Government of India, particularly those of the Ministry of Rural Development would enhance the ultimate output and lead to sustainable economic development of the village community. The ZP/DRDA, therefore, shall take all possible measures to ensure convergence of other programmes of the Ministry of Rural Development such as the Sampoorna Grameen Rozgar Yojana (SGRY), the Swarnjayanti Gram Swarozgar Yojana (SGSY), the Indira Awas

Yojana (IAY), the Total Sanitation Campaign (TSC) and the Rural Drinking Water Supply Programme in the villages chosen for the implementation of the watershed development projects. It would also be worthwhile to converge programmes of similar nature of the other Ministries e.g. Health & Family Welfare, Education, Social Justice and Empowerment and Agriculture, as also of the State Governments, in these villages.

Credit Facility

The general cost norms for watershed development projects shall remain as per Annexure I. However, the ZP/DRDA shall explore and encourage availing of credit facilities provided by banks or other Financial Institutions by the SHGs, UGs, Panchayats and individuals for further developmental activities in watershed areas.

Monitoring & Review

The Gram Panchayat shall submit a quarterly progress report to the PIA after it is scrutinized and approved by the WDT. The PIA shall submit quarterly progress reports to the ZP/DRDA for further submission to the DoLR through the State Govt. At district level, ZP/DRDA shall monitor the implementation of the projects. At the State level, Secretary of the Department concerned shall be responsible for regular monitoring of these projects as well as mid-term and final evaluation of projects. The Department of Land Resources may also appoint independent institutions/ individuals to carry out concurrent as well as post-project evaluations/ impact studies of the watershed development projects. District and State level Vigilance and Monitoring committees may also review the progress of the watershed projects.

Queries

Queries may be addressed to the following:

At the District level: Chief Executive Officer, Zila Parishad/Project Director, District Rural Development Agency.

At the State level: Secretary /Commissioner/Director, Rural Development.

At the National level: Department of Land Resources, Ministry of Rural Development, NBO Building, G Wing, Nirman Bhavan, New Delhi – 11001.

ANNEXURE-I

THE WATERSHED DEVELOPMENT PROJECTS MAY BE SANCTIONED AT THE RATE PRESCRIBED BY THE CENTRAL GOVERNMENT FROM TIME TO TIME. THE PREVALENT RATE WITH EFFECT FROM 1ST APRIL 2000, IS Rs. 6,000 PER HECTARE.

CEILING ON ADMINISTRATIVE OVERHEADS

1. At ZP/DRDA Level

WDT Members Training (For 10 WDPs)	Rs. 30,000
(i.) Proportionate Expenditure for one WDP	Rs. 3,000
(ii) Miscellaneous Expenditure/WDP	Rs. 3,000
(A) Total for one Watershed Project	Rs. 6,000

2. At PIA/WDT Level (For 10 WDPs)

(i.) WDT Members honorarium	Rs. 7,50,000
(ii.) TA/DA	Rs. 4,50,000
(iii.) Office Staff/Contingencies	Rs. 2,70,000
Total for 10 WDPs	Rs. 14,70,000
(B) Expenditure for One WDP	Rs. 1,47,000

3. At Village Level

(i.) Volunteers'/Van Rakshaks' Honorarium	Rs. 1,20,000
(ii.) TA/DA	Rs. 15,000
(iii.) Office Contingencies	Rs. 12,000
(C) Total for each Watershed	Rs. 1,47,000

TOTAL COST CEILING ON ADMINISTRATIVE
OVERHEADS (A+B+C) PER WATERSHED OF 500 Ha. Rs. 3,00,000

ANNEXURE-II

RELEASE OF PROJECT FUNDS BY ZP/DRDA TO PROJECT IMPLEMENTATION AGENCY (PIA) &
GRAM PANCHAYAT (GP)

Year	Installment	%	Agency	%	Component Breakup	% Breakup
1 st	1 st	15%	PIA	4%	Adm. Cost	1%
					Community Development & Training	3%
			GP	11%	Adm. Cost	1%
					Works	10%
2 nd	2 nd	30%	PIA	2%	Adm. Cost	1%
					Community Development & Training	1%
			GP	28%	Adm. Cost	1%
					Works	27%
3 rd	3 rd	30%	PIA	2%	Adm. Cost	1%
					Community Development & Training	1%
			GP	28%	Adm. Cost	1%
					Works	27%
4 th	4 th	15%	PIA	1%	Adm. Cost	1%
			GP	14%	Adm. Cost	1%
					Works	13%
5 th	5 th	10%	PIA	1%	Adm. Cost	1%
			GP	9%	Adm. Cost	1%
					Works	8%

<end>

MINISTRY OF WATER RESOURCES

National Water Policy, 1987

Need for a National Water Policy

1.1 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.

1.2 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 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; water is a part of a larger ecological system.

1.3 Floods and drought affect 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.

1.4 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 guidelines are necessary. Moreover, certain problems 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.

1.5 The growth process and the expansion of economic activities inevitably lead to increasing demands for water for diverse purposes: 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 68 million hectares at the end of the Sixth Plan, 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 over 750 million at present is expected to reach a level of around 1000 million by the turn of the century.

1.6 The production of food grains has increased from around 50 million tons in the fifties to about 150 million tons at present, but this will have to be raised to around 240 million tons by the year 2000 A.D. The drinking water needs of people and livestock have also to be met. In keeping with the objectives of the International Drinking Water Supply and Sanitation Decade Programme (1981-1991), adequate drinking water facilities have to be provided to the entire population in both urban and rural areas and sanitation facilities to 80 % of the urban population and 25 % of the rural population by the end of the decade. 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 programmes improve economic conditions in the rural areas. The demand for water for Hydro & Thermal power generation and for other industrial uses is also likely to increase substantially. As a result what which is already a scarcer in future. This under scores the need for the utmost efficiency in water utilisation and a public awareness of the importance of its conservation.

1.7 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.

1.8 Water is one of the most crucial elements in developmental planning. As the country prepares itself to enter the 21st century, efforts to develop, conserve, utilise and manage this important resource have 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 States concerned.

Information System

2. The prime requisite for resource planning is a well-developed information system. A standardized 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. There should be free exchange of data among the various agencies and duplication in data collection should be avoided. Apart from the data regarding water availability and actual water use, the system should also include comprehensive and reasonably reliable projections of future demands for water for diverse purposes.

Maximizing availability

3.1 The water resources available to the country should be brought within the category of utilizable resources to the maximum possible extent. The resources should be conserved and the availability augmented by measures for maximizing retention and minimizing losses.

3.2 Resource planning in the case of water has to be done for a hydrological unit such as a drainage basin as a whole, or for a sub-basin. All individual developmental projects and proposals should be formulated by the States and considered within the framework of such an overall plan for a basin or sub-basin, so that the best possible combination of options can be made.

3.3 Appropriate organisations should be established for the planned development and management of a river basin as a whole. Special multi-disciplinary units should be set up in each state to prepare comprehensive plans taking into account not only the needs of irrigation but also harmonizing various other water uses, so that the available water resources are determined and put to optimum use having regard to subsisting agreements or awards of Tribunals under the relevant laws.

3.4 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.

3.5 Recycling and re-use of water should be an integral part of water resource development

Project Planning

4.1 Water resource development projects should as far as possible be planned and developed as multipurpose projects. Provision for drinking water should be a primary consideration. The projects should provide for irrigation, flood mitigation, hydro-electric power generation, navigation, pisciculture and recreation wherever possible.

4.2 The study of the impact of a project during construction and later on human lives, settlements, occupations, economic and other aspects should be an essential component of project planning.

4.3 In the planning, implementation and operation of projects, the preservation of the quality of environment and the ecological balance should be a primary consideration. The adverse impact, if any, on the environment should be minimised and should be off-set by adequate compensatory measures.

4.4 There should be an integrated and multi-disciplinary approach to the planning, formulation, clearance and implementation of projects, including catchment treatment and management, environmental and ecological aspects, the rehabilitation of affected people and command area development.

4.5 Special efforts should be made to investigate and formulate projects either in, or for the benefit of, areas inhabited by tribal or other specially disadvantaged groups such as Scheduled Castes and Scheduled Tribes. In other areas also, project planning should pay special attention to the needs of Scheduled Castes and Scheduled Tribes and other weaker sections of society.

4.6 The planning of projects in hilly areas should take into account the need to provide assured drinking water, possibilities of hydro-power development and the proper approach to irrigation in such areas, in the context of physical features and constraints such as steep slopes, rapid run-off and the incidence of soil erosion. The economic evaluation of projects in such areas should also take these factors into account.

4.7 Time and cost overruns and deficient realization of benefits characterizing most irrigation projects should be overcome by upgrading the quality of project preparation and management. The under-funding of projects should be obviated by an optimal allocation of resources, having regard to the early completion of on-going projects as well as the need to reduce regional imbalances.

Maintenance and Modernisation

5.1 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.

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

Safety of Structures

6. There should be proper organizational arrangements at the national and state levels for ensuring the safety of storage dams and other water-related structures. The Central guidelines on the subject should be kept under constant review and periodically updated and reformulated. There should be a system of continuous surveillance and regular visits by experts.

Ground water Development

7.1 There should be a periodical reassessment on a scientific basis of the ground water potential, taking into consideration the quality of the water available and economic viability.

7.2 Exploitation of ground water resources should be so regulated as not to exceed the recharging possibilities, as also to ensure social equity. Ground water recharge projects should be developed and implemented for augmenting the available supplies.

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

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

Water Allocation Priorities

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

Drinking water
Irrigation
Hydro-power
Navigation
Industrial and other uses.

However these priorities might be modified if necessary in particular regions with reference to area specific considerations.

Drinking Water

9. Adequate drinking water facilities should be provided to the entire population both in urban and in rural areas by 1991. Irrigation and multipurpose projects should invariably include a drinking water component, wherever there is no alternative source of drinking water. Drinking water needs of human beings and animals should be the first charge on any available water.

Irrigation

10.1 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. The 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 maximize production.

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

10.3 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.

10.4 Concerted efforts should be made to ensure that the irrigation potential created is fully utilised and the gap between the potential created and its utilisation is removed. For this purpose, the command area development approach should be adopted in all irrigation projects.

Water Rates

11. Water rates should be such as to convey the scarcity value of the resource to the users and to foster the motivation for economy in water-use. They should be adequate to cover the annual maintenance and operation charges and a part of the fixed costs. Efforts should be made to reach this ideal over a period, while ensuring the assured and timely supplies of irrigation water. The water rates for surface water and ground water should be rationalized with due regard to the interests of small and marginal farmers.

Participation of farmers and voluntary agencies

12. Efforts should be made to involve farmers progressively in various aspects of management of irrigation systems, particularly in water distribution and collection of water rates. Assistance of voluntary agencies should be enlisted in educating the farmers in efficient water use and water management.

Water Quality

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

Water Zoning

14. 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

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

Flood Control and Management

16. There should be a master plan for flood control and management for each flood prone basin. Sound watershed management through extensive soil conservation, catchment-area treatment, preservation of forests and increasing the forest area and the construction of check-dams should be promoted to reduce the intensity of floods. Adequate flood-cushion should be provided in water storage projects wherever feasible to facilitate better flood management. An extensive network for flood forecasting should be established for timely warning to the settlements in the flood plains, along with the regulation of settlements and economic activity in the flood plain zones, to minimize the loss of life and property on account of floods. While physical flood protection works like embankments and dykes will continue to be necessary, the emphasis should be on non-structural measures for the minimization of losses, such as flood forecasting and warning and flood plain zoning, so as to reduce the recurring expenditure on flood relief.

Land erosion by sea or river

17. The erosion of land, whether by the sea in coastal areas or by river waters inland, should be minimized by suitable cost-effective measures. The States and Union territories should also undertake all requisite steps to ensure that indiscriminate occupation and exploitation of coastal strips of land are discouraged and that the location of economic activities in areas adjacent to the sea is regulated.

Drought Management

18.1 Drought-prone areas should be made less vulnerable to drought-associated problems through soil-moisture conservation measures, water harvesting practices, the minimization of evaporation losses, the development of the ground water potential 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.

18.2 Relief works undertaken for providing employment to drought-stricken populations should preferably be for drought proofing.

Science and Technology

19. 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 :

- hydro-meteorology;
- assessment of water resources;
- snow and lake hydrology;
- ground water hydrology and recharge;
- prevention of salinity ingress;
- water-harvesting;
- evaporation and seepage losses;

- economical designs for water resource projects;
- crops and cropping systems;
- sedimentation of reservoirs;
- the safety and longevity of water-related structures;
- river morphology and hydraulics;
- soils and material research;
- better water management practices and improvements in operational technology;
- recycling and re-use;
- use of sea water resources.

Training

20. A perspective plan for standardized training should be an integral part of water resource development. It should cover training in information systems, sector 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.

Conclusion

21. 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. 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.



Government of India
Ministry of Water Resources

NATIONAL WATER POLICY

New Delhi
April, 2002

NATIONAL WATER POLICY 2002

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 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 over-exploitation 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.

1.10 National Water Policy was adopted in September, 1987. Since then, a number of issues and challenges have emerged in the development and management of the water resources. Therefore, the National Water Policy (1987) has been reviewed and updated.

Information System

2.1 A well developed information system, for water related data in its entirety, at the national / state level, 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 utilisable 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 ground water 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 sub-basin 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.

Project Planning

6.1 Water resource development projects should as far as possible be planned and developed as multipurpose projects. Provision for drinking water should be a primary consideration.

6.2 The study of the likely impact of a project during construction and later on human lives, settlements, occupations, socio-economic, environment and other aspects shall form an essential component of project planning.

6.3 In the planning, implementation and operation of a project, the preservation of the quality of environment and the ecological balance should be a primary consideration. The adverse impact on the environment, if any, should be minimised and should be offset by adequate compensatory measures. The project should, nevertheless, be sustainable.

6.4 There should be an integrated and multi-disciplinary approach to the planning, formulation, clearance and implementation of projects, including catchment area treatment and management, environmental and ecological aspects, the rehabilitation of affected people and command area development. The planning of projects in hilly areas should take into account the need to provide assured drinking water, possibilities of hydro-power development and the proper approach to irrigation in such areas, in the context of physical features and constraints of the basin such as steep slopes, rapid run-off and the incidence of soil erosion. The economic evaluation of projects in such areas should also take these factors into account.

6.5 Special efforts should be made to investigate and formulate projects either in, or for the benefit of, areas inhabited by tribal or other specially disadvantaged groups such as socially weak, scheduled castes and scheduled tribes. In other areas also, project planning should pay special attention to the needs of scheduled castes and scheduled tribes and other weaker sections of the society. The economic evaluation of projects benefiting such disadvantaged sections should also take these factors into account.

6.6 The drainage system should form an integral part of any irrigation project right from the planning stage.

6.7 Time and cost overruns and deficient realisation of benefits characterising most water related projects should be overcome by upgrading the quality of project preparation and management. The inadequate funding of projects should be obviated by an optimal allocation of resources on the basis of prioritisation, having regard to the early completion of on-going projects as well as the need to reduce regional imbalances.

6.8 The involvement and participation of beneficiaries and other stakeholders should be encouraged right from the project planning stage itself.

Ground Water Development

7.1 There should be a periodical reassessment of the ground water potential on a scientific basis, taking into consideration the quality 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 over-exploitation 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.

Drinking Water

8. Adequate safe drinking water facilities should be provided to the entire population both in urban and in rural areas. Irrigation and multipurpose projects should invariably include a drinking water component, wherever there is no alternative source of drinking water. Drinking water needs of human beings and animals should be the first charge on any available water.

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.

Financial and Physical Sustainability

11. Besides creating additional water resources facilities for various uses, adequate emphasis needs to be given to the physical and financial sustainability of existing facilities. There is, therefore, a need to ensure that the water charges for various uses should be fixed in such a way that they cover at least the operation and maintenance charges of providing the service initially and a part of the capital costs subsequently. These rates should be linked directly to the quality of service provided. The subsidy on water rates to the disadvantaged and poorer sections of the society should be well targeted and transparent.

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 appropriate 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.

Private Sector Participation

13. Private sector participation should be encouraged in planning, development and management of water resources projects for diverse uses, wherever feasible. Private sector participation may help in introducing innovative ideas, generating financial resources and introducing corporate management and improving service efficiency and accountability to users. Depending upon the specific situations, various combinations of private sector participation, in building, owning, operating, leasing and transferring of water resources facilities, may be considered.

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.

Flood Control and Management

17.1 There should be a master plan for flood control and management for each flood prone basin.

17.2 Adequate flood-cushion should be provided in water storage projects, wherever feasible, to facilitate better flood management. In highly flood prone areas, flood control should be given overriding consideration in reservoir regulation policy even at the cost of sacrificing some irrigation or power benefits.

17.3 While physical flood protection works like embankments and dykes will continue to be necessary, increased emphasis should be laid on non-structural measures such as flood forecasting and warning, flood plain zoning and flood proofing for the minimisation of losses and to reduce the recurring expenditure on flood relief.

17.4 There should be strict regulation of settlements and economic activity in the flood plain zones along with flood proofing, to minimise the loss of life and property on account of floods.

17.5 The flood forecasting activities should be modernised, value added and extended to other uncovered areas. Inflow forecasting to reservoirs should be instituted for their effective regulation.

Land Erosion by Sea or River

18.1 The erosion of land, whether by the sea in coastal areas or by river waters inland, should be minimised by suitable cost-effective measures. The States and Union Territories should also undertake all requisite steps to ensure that indiscriminate occupation and exploitation of coastal strips of land are discouraged and that the location of economic activities in areas adjacent to the sea is regulated.

18.2 Each coastal State should prepare a comprehensive coastal land management plan, keeping in view the environmental and ecological impacts, and regulate the developmental activities accordingly.

Drought-prone Area Development

19.1 Drought-prone areas should be made less vulnerable to drought-associated problems through soil-moisture 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.

21.2 The Inter-State Water Disputes Act of 1956 may be suitably reviewed and amended for timely adjudication of water disputes referred to the Tribunal.

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 standardised 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.

Conclusion

27. 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 needs to be taken into account for water resources development and management. The success of the National Water Policy will depend entirely on evolving and maintaining a national consensus and commitment to its underlying principles and objectives. To achieve the desired objectives, State Water Policy backed with an operational action plan shall be formulated in a time bound manner say in two years. National Water Policy may be revised periodically as and when need arises.

