

Water Resources

6.1 Water is an essential requirement for many reasons. Drinking water is the most essential requirement, even more than food, for sustaining human life. Water is also the most vital input for agriculture and increasingly also for industry. The Tenth Five Year Plan identified several issues that need to be tackled in the water sector including irrigation, flood control and command area development as also the requirement for rural and urban drinking water supply and rural and urban sanitation.

6.2 The National Common Minimum Programme (NCMP) has also endorsed the importance of this. It has indicated that public investment in irrigation is to be stepped up in a significant manner and that all ongoing projects are to be completed according to a strict time schedule. It has also laid stress on rain water harvesting, de-silting existing ponds and launching of a scheme for minor irrigation of all lands owned by dalits and adivasis. It also talks about pursuing, in a fully consultative manner, the interlinking of rivers. Other priority areas are: flood management, especially prevention of erosion in West Bengal; expansion of water supply, sewage treatment and sanitation. The major issues in this area identified in the Tenth Plan are summarised in Box 6.1.

PROGRESS IN THE TENTH PLAN

IRRIGATION AND FLOOD CONTROL

State Sector

6.3 Creation of irrigation potential the first two years of the Tenth Plan period was significantly below the levels projected by state governments and, therefore, scaling down of targets is unavoidable. (Table 6.1)

6.4 The shortfall in achievements of targets is a reflection of the fact that funds for irrigation, flood control and command area development (CAD) in the state sector fell short of the envisaged levels. Since the expenditure level in first two years of the Tenth Plan has been 30 per cent against a target of 40 per cent, the projected total Plan expenditure is expected to be 75 per cent of approved outlay. (Table 6.2)

Central Sector

6.5 The Ministry of Water Resources has incurred only 22 per cent expenditure out of the Plan outlay of Rs. 3,600 crore in the first two years of the Plan period. The percentage in the first three years, including the anticipated expenditure in 2004-05, is likely to increase to 41 per cent. Substantial savings are thus envisaged. However, the NCMP commitments relating to flood control require additional allocations, which can be met from within the overall savings by re-appropriation. No reduction in the Tenth Plan outlay of the Ministry is thus proposed.

WATER SUPPLY AND SANITATION

State Sector

6.6 The strategy for water supply and sanitation in the Tenth Plan was to provide potable drinking water to all villages. At the beginning of the Plan, a total of 1,49,103 habitations – 15,798 Not Covered (NC) and 1,33,305 Partially Covered (PC) – were yet to be provided drinking water or the required augmentation of supplies. In 2002-03 and 2003-04, 39,240 and 34,256 habitations have been respectively covered. Of the balance 75,607 habitations, 5,759 are NC category, with Rajasthan alone accounting for 2974 habitations. The strategy in the remaining part of the

Box 6.1
Issues in the water sector

The Tenth Plan has identified the following key issues in the water sector:

- An increasing demand for water accompanied by constraints on availability.
- A large number of on-going irrigation projects (388 major and medium irrigation projects) with a huge balance cost of Rs.90,634 crore.
- A gap of nearly 14 million hectares (m.ha.) between created and utilised irrigation potential.
- Low water use efficiency in irrigation (25 per cent to 35 per cent) and in urban water supply (30 per cent to 40 per cent losses).
- Low tariffs for both irrigation and urban water supply, which do not cover even the operation and maintenance (O&M) costs.
- Slow pace of take-over of irrigation systems by Water User Associations (WUAs).
- Overuse of groundwater and ineffectiveness of legislation to check this.
- Floods, drainage and water logging.
- Surface and groundwater pollution; problems of water quality.
- Providing potable water to all villages, which is one of the monitorable targets of the Tenth Plan.
- Low coverage of rural sanitation, leading to hygiene problems.
- Growing problem of urban solid waste management.
- Multiplicity of ministries/departments dealing with water.

Tenth Plan should be to cover these balance habitations.

6.7 It has been assessed that presently about 89 per cent of the urban population has got access to drinking water supply facilities. The

Census of India, 2001 indicates that out of a total of 53.69 million urban households, 36.86 million households had access to water supply from taps. Of these, 26.68 million had taps within the premises, 8.08 million near the premises and 2.09 million away from the

Table 6.1
Tenth Plan targets and achievement in irrigation sector

(in m.ha)

Sector	Tenth Plan target	Achievement		Target for 2004-05	Total	Percentage achievement	Proposed revised target
		2002-03	2003-04				
Major & medium irrigation	9.936	0.812	1.004	1.551	3.367	33	6.5
Minor irrigation	6.807	0.687	0.696	0.746	2.129	31	4.0
Total	16.743	1.499	1.700	2.297	5.496	32	10.5

Note: In the Ninth Plan, a potential of 4.12 m.ha in major and medium irrigation and 3.6 m.ha in minor irrigation was created (total 7.72m.ha)

Table 6.2
Outlay and expenditure on irrigation and flood control in Tenth Plan
 (in Rs. crore)

Sub Sector	Tenth Plan approved outlay	Actual expenditure / revised outlay		Total	Percentage expenditure
		2002-03	2003-04		
Major & medium irrigation	70861.78	9784.92	12264.28	22049.2	31
Minor Irrigation	13872.86	1656.36	2540.77	4197.13	30
CAD	2789.88	251.88	236.41	488.29	17.5
Flood Control	4619	507.68	500.41	1008.09	21.8
	92143.42	12200.84	15541.87	27742.58	30

premises (beyond 100 metres). The balance households had access to water supply from handpumps, tubewells etc.

6.8 The Tenth Plan approved outlay for both urban and rural water supply and sanitation in the State sector was Rs.44,206.55 crore. The actual expenditure for 2002-03 and revised approved outlay for 2003-04 were Rs.5795.97 crore and Rs.6356.03 crore respectively (total expenditure in first two years is 27 per cent of the approved outlay). Thus,

the Tenth Plan expenditure is likely to be around 70 per cent of the approved outlay.

Central Sector

6.9 The Department of Drinking Water Supply was allocated Rs.14,200 crore for rural water supply and sanitation in the Tenth Plan. The cumulative expenditure in the first two years of the Plan has been Rs.5011.8 crore or 36 per cent of outlay, which is expected to reach 60 per cent when the expenditure in

Box 6.2

Water and sanitation situation in rural north India

The results of a survey of 15,293 rural households in Uttar Pradesh, Rajasthan and Himachal Pradesh were extrapolated to rural north India as a whole. This threw up the following findings:

- 62 per cent of households do not have water supply in or near their homes;
- 71 million households spend 102 billion hours per year to collect water from outside the home.
- Only 7 per cent of households are connected with sewerage facilities.
- Only 9 per cent of households have toilet facility inside the house.
- Only 1 per cent of households use community toilets.

The survey also showed the proportion of households willing to pay for various services:

- Clean drinking water : 7%
- Community-based drinking water supply : 25%
- Sewerage facilities : 28%
- In-house toilets : 29%
- Community toilets : 25%

Source: Jyoti Parikh, Kirit Parikh and Vijay Laxmi, India Development Report (2004-05)

2004-05 is included. Thus, the full outlay is likely to be utilised and this sector may, in fact, need a step-up.

6.10 The Ministry of Urban Development and Poverty Alleviation was allocated Rs.1,769 crore in the Tenth Plan for six schemes in urban water supply, urban sanitation and solid waste management. The cumulative expenditure in the first two years is Rs.365 crore (21 per cent of outlay). When the anticipated expenditure in 2004-05 is included, the percentage is likely to be 35 per cent. The Ministry has proposed a large scheme to cover all urban areas and hence the outlay of the Ministry will have to be stepped up.

6.11 It has been proposed that Plan assistance for urban development be made conditional to the implementation of a unified comprehensive scheme for all urban infrastructure projects with focus on urban reforms and e-governance.

PROBLEMS HIGHLIGHTED BY THE MID-TERM APPRAISAL

DEMAND AND SUPPLY OF WATER

6.12 While India has 16 per cent of the world's population, its share in the world's fresh water availability is only 4 per cent. A per capita availability of 1700 m³ is required in order to be free of water stress, while availability below 1000 m³ is termed as water scarcity. Per capita availability was about 5200 m³ in 1951 but it had fallen to 2200 m³ in 1991 and further to 1820 m³ in 2001, reflecting the effect of rising population. It is expected to fall further to 1340 m³ in 2025 and 1140 m³ in 2050. Average availability is therefore likely to fall below the water-stress level in the near future and given the wide variations across the country, water stress conditions already exist in many parts. The per capita storage in the country of about 207 m³ is way below the storage achieved in many of the countries such as Russia (6103 m³), Australia (4733 m³), Brazil (3145 m³), United States (1964 m³), Turkey (1739 m³), Spain (1410 m³), Mexico (1245 m³), China (1111 m³) and South Africa (753 m³). The country thus seems to be on the threshold of a grave water crisis in the none too distant future (Box 6.3).

6.13 Demand is linked to population growth and, at the macro level, an effective population policy is a *sine qua non* for demand management. There is also a need to review

Box 6.3 Looming Water Crisis

India is already on the verge of a grave water crisis as brought out below.

- Per capita availability below 1000 m³ is water scarce.
- This availability is made up of 200 m³ for domestic/industrial use, 200 m³ for ecology/maintaining minimum flows and 600 m³ for food security.
- A minimum per capita storage of 1000 m³ is thus required to meet all the three uses.
- Nine river basins with 20 crore population are already under water scarce condition.
- In India, the per capita availability now is 1820 m³ and per capita storage is 207 m³.
- 631 billion cubic metre (BCM) in Ganga- Brahmaputra is unutilisable. Hence actual per capita availability is only 1200 m³.
- Even if all ongoing and potential storages are completed, per capita storage will increase only up to 400 m³.
- Increasing population will vitiate both per capita availability and per capita storage.
- Improving water use efficiency through proper water management in both irrigated and rain fed areas, implementation of watershed programmes and artificial recharge of ground water, restoring the traditional water bodies, interlinking of rivers, maintaining the water quality standards through pollution abatement programmes and downward revision of water supply norms will somewhat improve the situation on the water front.

Box 6.4
Recommendations of the Inter-Ministry Task Group on
Efficient Utilisation of Water Resources

The Inter-Ministry Task Group on Efficient Utilisation of Water Resources made the following important recommendations:

- Further relaxation in Accelerated Irrigation Benefit Programme guidelines.#
- Taking up mega irrigation projects as national projects.#
- Introduce schemes for system rehabilitation, ground water development and artificial recharge.#
- Promote cropping patterns suited to specific agro-climatic zones.
- Include command area development works as part of the project.

Identified as inputs for Bharat Nirman to achieve one crore assured irrigation by 2009.

the per capita norms for water supply, something that many European countries have already done, and also to take steps to evolve rational pricing systems which would encourage moderation of demand in areas where at present there is wasteful use of water.

6.14 On the supply side, completion of on-going storages will add another 76 billion cubic meters (BCM) of storage and thus improve the per capita storage availability by 75 m³. Interlinking of rivers will enable the utilisation of about 170 BCM of water now running waste to the sea. Improvement in irrigation efficiency by about 10 per cent will add another 50 BCM to availability. Rehabilitation of irrigation systems needs to be taken up on a massive scale to achieve this. It is estimated that 20 to 25 m.ha. of irrigation systems needs rehabilitation. Such rehabilitation has to be linked to participatory irrigation management and raising of water tariff so water user associations can undertake proper maintenance. In urban areas, detection of leakage and water audits can add to available supplies. In many cities, additional needs can be met immediately by such measures and expenditure on augmentation of infrastructure can be temporarily deferred.

6.15 An inter-ministerial Task Group on Efficient Utilisation of Water Resources has, in

its report, suggested several measures for saving water in irrigation and urban water supply (See Box 6.4). These recommendations need to be implemented. Desalination of drinking water is already being planned along the Coromandel coast, starting with Chennai. Viable schemes with appropriate tariff structure need to be implemented.

INCOMPLETE IRRIGATION PROJECTS

6.16 Out of the gross sown area of about 192 m.ha. only 43 per cent is irrigated and rest 57 per cent is still totally dependent on rainfall. Even at the ultimate stage, only 70 per cent of the gross cropped area will be irrigated and 30 per cent will still be un covered. In this context the large number of incomplete irrigation projects is a matter of grave concern. According to the Central Water Commission (CWC), 388 projects (169 major and 219 medium projects) have spilled over from the Ninth Plan, with a liability of Rs.92,085 crore as of 1st April 2004. Of these, 103 major and 118 medium projects are approved projects and the rest are unapproved.¹ About 12.5 m.ha additional potential (12 per cent of the existing irrigation potential) is locked up in these projects. The Accelerated Irrigation Benefit Programme (AIBP) launched in 1996-97 has not accomplished its intended objective of completion of irrigation projects. Out of 181

¹ Unapproved projects are those which do not have the investment approval of the Planning Commission. Water being a State subject, state governments often do take up unapproved projects in anticipation of approval.

projects in the programme, only 32 have been completed. Also, only 2.66 m.ha. potential has been created under AIBP till March 2004 although there was scope to create 9 m.ha. potential. An amount of Rs.14,669 crore has been released under AIBP between 1996-97 and 2003-04.

6.17 The percentage funding for irrigation out of total State Plan was 23 per cent in the Fifth Plan and 20.85 per cent in the Sixth Plan. This declined to 15.9 per cent in the Eighth and Ninth Plans. Had the investments been at 20 per cent level, another Rs.22,450 cr. would have been made available to the irrigation sector in these two plans which would have considerably reduced the spill-over costs of on-going projects or even the numbers. As regards AIBP, the programme was not confined to only to truly last mile projects as the availability of funds permitted expansion in coverage to

other on-going projects also. Hence the low numbers of projects completed.

6.18 The cost of creating one hectare of irrigation potential in the major and medium irrigation sector has been increasing steadily, from about Rs.1,500 in the First Plan to between Rs.1,75,000 and Rs.2,50,000 in the Tenth Plan for storage projects. Table 6.3 indicates the cost per hectare of creation of irrigation potential for 11 approved on-going major irrigation projects on the basis of latest estimated cost.

6.19 The present criterion to judge the economic acceptability of an irrigation project is only the benefit-cost ratio. Suggestions made by the Nitin Desai Committee for calculating this ratio as far back as 1980 like use of opportunity costs for valuing goods and services which are part of the project, realistic

Table 6.3
Cost per hectare of creating irrigation potential

Project	State	Latest estimated cost (Rs crore)	Ultimate irrigation potential (in 000 ha)	Cost/hectare potential creation (Rs/ha)	Remarks
1 2	3	4	5	(col 4/col 5)	
1 Indira Gandhi Nehar Project (Stage II)	Rajasthan	3522.00	964.00	36540	Only canal
2 Western Kosi	Bihar	904.01	234.80	38500	Diversion scheme
3 Teesta Stage I Phase I	West Bengal	2068.00	533.22	38780	Diversion scheme
4 Dhansiri	Assam	355.00	83.37	42580	Diversion scheme
5 Thoubal	Manipur	390.00	33.40	116770	
6 Rengali	Orissa	2621.00	214.30	122310	Only canal
7 Indira Sagar	Madhya Pradesh	1522.00	123.00	123740	
8 Upper Krishna Project Stage I & II	Karnataka	8568.41	685.58	124980	
9 Gosikhurd	Maharashtra	3544.00	250.80	141330	
10 Sardar Sarovar	Gujarat	30823.00	1792.00	172000	
11 Srisaillam Right Bank Canal	Andhra Pradesh	1979.00	76.89	257380	

assumption of cropping pattern and yields, inclusion of non-agricultural benefits, use of discounted cash flow method etc. are still to be implemented. In view of scarcity of funds and to avoid spreading available resources thinly, project selection should be based on other economic indicators along with benefit-cost-ratio like financial return, cost per hectare of irrigation development, internal rate of return and the capacity of the state government to accommodate the new investment in the Plan without affecting progress on other projects.

6.20 State governments need to be persuaded to increase outlays on major and medium irrigation and not take up new projects till the ongoing ones are completed. Likely shortfalls in utilisation of Plan funds in the major and medium sector will compound the problem. The National Commission for Integrated Water Resources Development has suggested a format for prioritisation of ongoing projects for deciding allocations. This methodology needs to be adopted by all states. To utilise the AIBP effectively, states have been asked to identify projects which can be completed in 2005, then in 2006, 2007 and so on. AIBP provisions, project-wise, are to be re-scheduled thereafter to achieve the objective of time-bound completion of projects. States have also been asked to provide updated information on other approved/ongoing projects to work out a programme for crashing the completion schedule.

6.21 The Planning Commission is of the view that instead of emphasising only the completion of projects, attention must also be

paid to maximising potential creation at given cost. The balance potential and balance cost should also be kept in mind while selecting projects for inclusion in the AIBP. Since state governments are delaying release of AIBP funds to line departments, it may be necessary to work out a system where funds are placed with banks from where line departments can directly draw. Hundred per cent Central funding under AIBP without state government share could also be considered. Modern tools like use of satellite imageries should be used to monitor the progress of AIBP assisted projects.

6.22 In the early 1990s, the Ministry of Water Resources mooted a proposal for taking up certain large projects as 'National Projects' with 100 per cent Central funding. This proposal could be given a second look, as work on many large projects like Sardar Sarovar, Indira Sagar, Omkareshwar, Teesta Canal, Indira Gandhi Nahar, Upper Krishna can be speeded up if they are taken up as National projects. This should be linked to reforms in water sector like setting up of Water Regulators, empowering WUA to collect tariff and retain a part of it and differential water pricing linked to ground water status.

GAP BETWEEN CREATED AND UTILISED IRRIGATION POTENTIAL

6.23 The large gap of 14 m.ha. between potential created and potential utilised needs to be closed. The potential gap is due to many reasons like change in cropping pattern (shift to high water consuming crops), siltation of reservoirs and lack of field channels.

Box 6.5 Environmental clearance

Since irrigation projects are often held up because of delays in environment clearances, the following relaxations in such clearance for major irrigation projects can be considered:

- Increase in the cost limit of major projects needing environment clearance from Rs.100 crore to Rs.250 crore.
- Increase in the cultural command area limit for major projects needing environment clearance from 10,000 ha to 25,000 ha.
- Exemption of irrigation projects from the need to pay net present value of submerged forest area.

6.24 Project-wise review of both major and medium projects of potential created needs to be undertaken by states, as the figures assumed at the design stage may no longer be valid. The figure of potential created may thus come down from 94 m.ha. The CAD programme needs to be given a thrust, as state governments have not been providing adequate budget to this programme. The projects not included in the Centrally-sponsored CAD programme get lower priority in funding. Extension services with inputs from agriculture universities/state agricultural departments/Krishi Vigyan Kendras (KVKs)/Water & Land Management Institutes (WALMIs) need to be strengthened so that farmers take to cropping patterns that are ideally suited for each agro-climatic zone and appropriate pricing policies are followed.

6.25 There is also discrepancy between irrigation statistics on net area basis collected by the Department of Agriculture and on gross basis compiled by the Planning Commission and the Ministry of Water Resources. The Minor Irrigation Census undertaken by the Ministry of Water Resources has to report various categories of schemes separately viz. tanks, surface diversion, surface lift, State tubewells and private groundwater structures. The ultimate irrigation potential of 139.9 m.ha. will also need a review as some states have already reached their ultimate potential viz. Tamil Nadu for major and medium irrigation and Uttar Pradesh for minor irrigation.

6.26 Further, with a view to gainfully utilise the created potential, it is also necessary to revive and restore the traditional water bodies, particularly those which are linked to agriculture.

WATER TARIFF RATIONALISATION

6.27 Irrigation water charges in most states are not even adequate to meet the O&M costs. While Gujarat and Maharashtra have now been able to meet full O&M costs from the revenue earned through water tariff, the situation is unsatisfactory in most States. The establishment cost takes up a large part of the meagre O&M allocation, leaving very little for works.

Similarly in urban water supply, the domestic tariff in most towns/ cities is very low, with the result that urban local bodies (ULBs)/ municipalities find it difficult to maintain the pipelines properly as the revenue earned is used up either in meeting the establishment cost or the power tariff. Delhi does not provide water round the clock even though per capita quantity of water is higher than the norm. The quality of a water supply system can be improved only when appropriate water charges are levied and collected. Intermittent supply results in water quality problems due to seepage from sewage lines and imposes additional costs on the user who has to augment availability from private sources.

6.28 The government of Maharashtra has decided to set up a water regulator for advising on water tariff for various uses. The government of Gujarat are also considering setting up a regulator. It may be easier for state governments to accept and implement the recommendations of such a regulator, which will base its suggestions on a detailed analysis of the O&M costs and the revenue earned. All state governments will be advised to set up regulators on the Maharashtra model. The collection of water charges has also been unsatisfactory in most states, as only a fraction of the water charges is recovered. The collection machinery has to be geared up to improve the situation.

PARTICIPATORY IRRIGATION MANAGEMENT

6.29 Eight states - Andhra Pradesh, Karnataka, Goa, Rajasthan, Madhya Pradesh, Orissa, Tamil Nadu and Kerala - have enacted exclusive Acts for implementing participatory irrigation management (PIM). Gujarat, Haryana, Assam and Maharashtra have taken steps for enactment of such legislation. WUAs have been formed in many states and, so far, there are about 55,000 WUAs, covering 10 m.ha. This would have to increase eight to ten times in order to cover all the irrigated areas. WUAs were to take over the role of collection of water charges from the Revenue Department but this has not happened in most states and Revenue Departments are still collecting the charges and passing on a certain portion to WUAs for system maintenance. Thus, in most

states, the WUA remain powerless, with neither management of irrigation systems nor the collection of water charges being entrusted to them. Gujarat could be cited as an exception where WUA in Sardar Sarovar Project are empowered to collect water tariff. While there are isolated instances of success, by and large, PIM has not achieved its intended objective.

6.30 A comprehensive review of PIM is, therefore, needed to identify the lacunae that prevent it from achieving its intended objectives. In order to enable WUAs to take over irrigation systems, they should be simultaneously rehabilitated, as they will not be in a position to invest in infrastructure repairs and improvement. WUAs should also be associated in the rehabilitation of tertiary level canals and be empowered to set tariff and retain a part of it.

Box 6.6

Gender issues in water management

Women are involved in various ways in the management of irrigation systems and rural water supply. Sub groups of women assist village water and sanitation committees. The pani panchayat in the Anuli irrigation project in Orissa is managed entirely by women. In Gujarat, the Self Employed Women's Association (SEWA) has trained women in the maintenance of hand pumps. The involvement of women self-help groups in water management needs to be promoted in a major way.

MINOR IRRIGATION ON LANDS FOR DALITS AND ADIVASIS

6.31 The database in the states relating to acreage of unirrigated land owned by scheduled caste/scheduled tribe (SC/ST) farmers is very weak. The NCMP envisages launching of a comprehensive national programme for minor irrigation of all lands owned by dalits and adivasis and also assures that the rights of tribal communities over water resources as laid down by law will be safeguarded.

6.32 Addressing the concern for creation of minor irrigation assets on lands of dalits and adivasis, the Inter-Ministry Task Group on Development of Scheduled Castes and Scheduled Tribes on selected agenda items in NCMP has made several important recommendations:

- State governments must realistically estimate the acreage of unirrigated land owned by SC/ST farmers.
- At least one minor irrigation work should be taken up in every SC/ST village.
- Central government should meet some portion of the cost of modernisation and computerisation of land revenue administration.
- Self help groups (SHGs) of SC/ST farmers should be constituted and these can be given subsidy for boring tubewells and loans for purchase of pumpsets in joint ownership.
- On-farm development works should be taken up in SC/ST villages where canal irrigation facilities are available.
- A block-wise programme for minor irrigation for SC held lands should be prepared by the state governments for 150 identified districts in the first phase.
- A national policy on assignment of water rights should be formulated by the Ministry of Water Resources through the Pani Panchayat mechanism.

These recommendations need to be operationalised in the form of schemes/projects.

GROUNDWATER

6.33 The dynamic groundwater resource (recharged annually by rainfall) is 432 BCM. Out of the ultimate irrigation potential of 81.42 m.ha. in the minor irrigation sector, 64 m.ha. is from groundwater. A potential of 43.3 m.ha. has so far been created. As much as 80 per cent of India's rural population manage to get their own domestic water supply and three-fourths of the irrigated area in the country is through private sources - mostly

groundwater. India is the largest user of ground water (200 BCM) followed by the United States (100 BCM) and China (90 BCM). However, groundwater resources are either over exploited or are in the critical zone in certain pockets – Tamil Nadu, Haryana, Punjab, Gujarat, Rajasthan. According to the Central Ground Water Board (CGWB), out of the 7,928 blocks/talukas/watersheds, 673 are over exploited where the level of development is more than the quantum that can be replenished and 425 are dark/critical (where the level of development is between 85 per cent to 100 per cent of the quantum that can be replenished). The provision of free or subsidised power to agriculture sector in many states is one of the factors responsible for indiscriminate use of groundwater. The NCMP has stated that subsidies should be made explicit and provided through the budget. This implies that power supply to the agriculture sector should be metered instead of based on a fixed charge related to pumping capacity as at present. Only then can the actual consumption, and the subsidy provided, become explicit.

6.34 Under the Easement Act of 1882, groundwater is considered an easement connected to land. Ownership of groundwater thus falls to the landowner, who is free to extract and use it as she/he deems fit. Tenancy laws govern groundwater uses and groundwater rights cannot be transferred to others. When the Easement Act was promulgated, the popular and prevalent means of withdrawal of groundwater were dug-wells and only use of draught power was envisaged. With the advent of electrically powered pumps, the premise does not hold good anymore. Intensive economic activity, coupled with increase in population, has accentuated the demand for groundwater manifold. Between 1951 and 1992, dug-wells increased from 3.86 million to 10.12 million, shallow tube-wells from 3,000 to 5.38 million, public tubewells from zero to 68,000, electric pumps from zero to 9.34 million and diesel pumps from 66,000 to 4.59 million. In the Eighth Plan period, there was a further addition of 1.71 million dug-wells, 1.67 million shallow tube-wells, 1,14,000 deep tube-wells, 2.02 million electric pumps and 4,20,000 diesel pumps.

6.35 In 1970, the Ministry of Water Resources had prepared and circulated to the states a model Bill to regulate and control the development of groundwater. This was re-circulated in 1992, 1996 and 2005. So far only five states/Union Territories – Andhra Pradesh, Goa, Tamil Nadu, Lakshwadeep, Kerala – have enacted some form of legislation. The Bill has been passed but not notified in four states/Union Territories – Gujarat, Maharashtra, West Bengal and Pondicherry). Thirteen states/Union Territories have initiated action, while four feel a Bill not necessary and nine have not responded. The model Bill seeks to regulate new developments in notified areas while the existing users are free to continue their (riparian) uses. An element of injustice thus creeps in – a small or marginal farmer, although he has a right over the groundwater below his farm, will be prohibited from using this resource if he is in a notified area because other prior users in the area have overexploited the groundwater. Policing of the legislation, even if enacted, will be difficult as existing users can deepen their wells or increase pump capacity without attracting attention. This is a major flaw in the Bill.

6.36 Even where legislation relating to groundwater has been enacted, it has remained largely a paper exercise. In Maharashtra and Andhra Pradesh, not a single conviction was reported for violation of the Act/Bill. There is no let-up in the expansion of groundwater structures. The subsidised free electricity for the agriculture sector has compounded the problem. In peninsular India, electricity has replaced diesel as the source of power for pumping groundwater due to steep fall in groundwater levels. The situation is somewhat better in the eastern parts of the country, where diesel is still being predominantly used. Large water markets exist already in the groundwater sector and this was also a reason for over exploitation. Regulation and pricing of power may be one of the effective tools to control unbridled groundwater exploitation.

6.37 The CGWB was constituted as Central Ground Water Authority (CGWA) in January 1987 under the Environment (Protection) Act, 1986 for regulating and control of groundwater

development. The Authority has taken initiatives in notifying areas as protected areas from the point of view of groundwater overexploitation. The other functions of the Authority are monitoring of groundwater contamination, registration of agencies involved in construction of wells, registration of persons/agencies engaged in sale and supply of mineral water, clearance to groundwater based projects, conducting mass awareness programmes and training in rainwater harvesting.

6.38 The CGWB has prepared a master plan for artificial recharge of ground water at a cost of Rs.24,500 crore to recharge 36 BCM of surplus non-committed run-off. Except for small pilot projects in the Eighth and Ninth Plan periods and the first two years of the Tenth Plan, no large-scale recharge scheme has been launched by the Central government. The NCMP has mandated that rain water harvesting be adopted.

6.39 The National Water Policy, 2002, has advocated that groundwater recharge projects should be developed and implemented for improving both the quality and availability of ground water resources. The policy also advocated exploitation of groundwater resources so as not to exceed recharge possibilities. The Ministry of Water Resources has already prepared and submitted, as a part of the second green revolution project of the Ministry of Agriculture, a scheme for groundwater development in 5.2 m.ha (loan-cum-subsidy cost of Rs.15,310 crore) and another for artificial recharge of 3.9 BCM of water (at a cost of Rs.3,000 crore). Compared to 4,000 BCM rainfall/snowfall in the country and 1,869 BCM run off, recharge of this small quantity of groundwater will not adversely affect the existing hydrology of rivers and streams. The Ministry of Water Resources had also submitted a new state sector scheme costing Rs.175 crore for artificial recharge in various parts of the country, which would serve as a demonstration exercise for various types of recharge structures.

6.40 Since legislation has not provided the answer to the groundwater problem in the country, the whole issue of ownership of

groundwater needs a re-look as an alternative to legislation, since groundwater rights are presently linked to land rights. There is one view that a landowner may be permitted to use only that quantum required for his use but the balance resource available to him should be a community resource. There is another view that the shallow part of the aquifer could be attached to the land but the deep aquifer should be community resource. It is therefore necessary to first generate a public debate on ownership of groundwater.

6.41 Over-exploitation of groundwater and its attendant externalities such as resource depletion, quality deterioration, drying up of wetlands and lean season flows in streams and rivers is a critical issue in several countries including Mexico, China (especially the North China plains), the United States, Spain, Iran and Jordan. All these countries have tried a variety of strategies to control groundwater overdraft by farmers. Mexico's new water law made groundwater a national property. China, which does not have private ownership rights on farmland, has always treated groundwater as national property. In the United States, groundwater regulation is a state subject but began 50 years earlier in some states. Urban groundwater depletion has been dealt with effectively in many countries.

6.42 However, in no country has regulation of groundwater use for agriculture been very effective. In China, the new water law mandates that tubewell owners in villages have to get a water withdrawal permit and pay a fee. However, the actual enforcement of this law has proved to be a logistical nightmare. China has 4.5 million agricultural tubewells; so enforcing the permits is administratively difficult. But Mexico has only 90,000 agricultural tube wells; and even there the government has found it impossible so far to enforce a system of concessions on private tubewells.

6.43 From these experiences, it is clear that regulating groundwater draft through administrative and legislative means would be difficult in India, which has some 20 million agricultural wells. Internationally, pressure on

groundwater resource has eased only when alternative water resources – usually surface water transported from a distance – are offered as a substitute for groundwater. During the past decade, many cities in North China have been able to ease pressure on urban aquifers by first developing a captive surface water reservoir to supply the cities. This is then followed by a campaign to decommission urban tubewells. In the United States, too, California, Arizona and many other states in the western part of the country have been able to ease pressure on groundwater only by organising long distance transport of new surface water and supplying it to farmers and towns. In Mexico, recognising the impossibility of enforcing groundwater quotas on farmers, the government has begun using pricing and supply of electricity as an indirect lever to regulate pumping of groundwater. Farmers have to pay a penal charge for power they use for pumping water beyond their stipulated quota of groundwater draft. This is seen to be working.

6.44 In India too, appropriate power supply policies can be a possible instrument for regulating agricultural groundwater draft. Another method could be targeted subsidies for micro irrigation (drip and sprinkler) schemes. Liberal subsidies can be given for developing micro irrigation in over exploited/dark block. Back-ended subsidy schemes for ground water development should be promoted in potential areas.

6.45 Exploratory surveys need to be taken up for assessing the static ground water resources available in the Ganga basin at large depths as also in off-shore groundwater reservoir. Groundwater development in potential areas needs to be supported through back-ended subsidy schemes like the Million Tubewells programme of Bihar, the Samridha Krishak Yojana of Assam and the on-farm management project in eastern India. Groundwater recharge will have to be taken up on a mission mode at least from the Eleventh Plan period.

6.46 The Planning Commission proposes to set up an Expert Group comprising officials from concerned Ministries/Departments, NGOs, academicians and experts to review the

whole issue of ground water ownership keeping in view international practices and suggest a line of action for implementation in the Eleventh Plan

FLOOD MANAGEMENT

6.47 The recent floods in Assam and Bihar have accentuated the need for a comprehensive flood policy covering both long-term and short-term solutions. The NCMP has adequately dealt with this problem, especially the need for evolving long-term solutions through construction of dams in neighbouring countries and short-term solutions to help the states to tackle erosion problems especially in the Ganga-Padma basin in West Bengal. The NCMP also envisages a Flood Prone Area Development Programme. Till long-term solutions are put in place, the country will have to cope with floods and take recourse to short-term structural and non-structural measures.

6.48 Flood Plain Zoning is an effective non-structural measure to reduce damage to life and property due to floods. The CWC had circulated a model Bill in 1975. However, Manipur is the only state to have enacted the legislation so far.

6.49 A Task Force for Flood Management and Erosion Control headed by the Chairman, CWC was constituted to examine the causes of recurring floods and erosion in Assam and other neighbouring states as well as in Bihar, West Bengal and eastern Uttar Pradesh, to review the measures undertaken so far to combat floods and erosion, to suggest short-term and long-term measures for management of floods and to examine related international dimensions. The Task Force has submitted its report and the recommendations it contains will have to be given due consideration (See Box 6.7). The north-eastern states face two problems - sharing the flood control component of proposed multipurpose reservoirs and maintaining the existing embankments. The latter is a problem in the case of Orissa, Bihar, West Bengal and Uttar Pradesh also. Since this Task Force has been set up and made some recommendations, the Tenth Plan's recommendation for setting up a Flood

Management Commission could be deferred for consideration in the Eleventh Plan.

Coastal erosion is affecting most of the coastal states. The present assistance to the states in the form of Centrally Sponsored Scheme or additional Central assistance is a very limited one. There is a need to prepare a National Project for seeking external assistance.

6.50 State governments should be persuaded to enact Flood Plain Zoning legislation and also effectively enforce its implementation.

6.51 As part of the Flood Prone Area Development Programme, flood-prone districts in the country will be identified and existing infrastructure and poverty alleviation programmes will be focused and strengthened in these districts. There does not appear to be any need to launch a new programme now.

6.52 In view of the NCMP, the ongoing Centrally sponsored schemes (CSS) for erosion control in the Ganga basin will have to be expanded to include more priority schemes.

RURAL DRINKING WATER SUPPLY

6.53 In 2002, 15,798 of the country's 14.22 lakh habitations still remained to be covered and 1,33,305 partially covered habitations needed to be upgraded to the fully covered category. In view of this, the Tenth Plan outlay for the rural water supply programme was stepped up from Rs.8,150 crore to Rs.13,245 crore.

6.54 The 95% reported coverage in rural drinking water supply notwithstanding, even today 5,368 habitations, mainly in Rajasthan, do not have water supply. A large number of habitations have slipped from being fully covered to partially covered status and from partially covered to not covered status. About 2.17 lakh habitations are affected by water quality problems like arsenic, fluoride, nitrate, iron and salinity. Of these, the arsenic problem in West Bengal is most acute and it is reportedly spreading to parts of Bihar and eastern Uttar Pradesh. While the annual maintenance requirement of assets created is Rs.6000 crore, the allocation is a few hundred crore only.

Box 6.7

Important recommendations of the Task Force on Floods

The Task Force has made several recommendations for long term and short term measures to mitigate the impact of floods. The important recommendations are as follows:

- Change in funding pattern of existing Centrally sponsored schemes for erosion control in Ganga from Centre:state ratio of 75:25 to 90:10.
- Setting up of the North Bengal River Management Board.
- Provision of funds to states as additional Central assistance for maintenance of embankments.
- Provision of a Rs.50 crore revolving fund to the Ministry of Water Resources annually for funding flood protection schemes.
- Full Central funding of the flood storage component in storage dams.
- Inter-state, intra-state and international storage projects affording flood control benefits should be vigorously pursued for implementation.
- State governments should be persuaded to implement flood plain zoning.
- Community participation in maintenance of embankments should be encouraged.
- Immediate measures costing Rs.316.14 crore are to be implemented before the 2005 monsoon in Bihar, Uttar Pradesh, West Bengal, Assam and other north-eastern states. Certain short term measures costing Rs.2030.15 crore have also been recommended for taking up in 2005-06 and 2006-07. These are beyond the resource capability of state governments and hence liberal Central assistance would be required.

6.55 The twin problems of sustainability and water quality need to be tackled. There has been over reliance so far on groundwater to meet rural drinking water supply needs. The focus needs to shift to surface water supply schemes, both from considerations of sustainability and water quality. 'Not covered' habitations need to be given priority in allocation. The community participation 'Swajaldhara' scheme needs to be evaluated before more funds are committed to it. To deal with the problem of arsenic in groundwater, testing methods need to be standardised and proper survey conducted of the people actually affected.

6.56 The Department of Drinking Water Supply has estimated a large gap in resources to the tune of Rs.6,800 crore to tackle the problems of sustainability and water quality. Between 10 per cent and 15 per cent step up in each annual allocation for rural drinking water supply should continue to narrow this gap. External assistance will be needed to meet the remaining gap. Water quality being an important issue, separate need-based allocation needs to be made for this under the Accelerated Rural Water Supply Programme (ARWSP) instead of clubbing it with the formula-based allocation as is being

done now. Since 90 per cent of habitations facing problems of water quality are in nine states – Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal – focussed attention under the ARWSP programme is necessary.

6.57 At the current rate of expansion of ARWSP, it is estimated that the Tenth Plan outlay of Rs.13,245 crore may have to be increased by another Rs.3,500 crore to meet the needs of 2005-06 and 2006-07.

Some success stories in rural water supply are given in Box 6.8.

RURAL SANITATION

6.58 Coverage in rural sanitation is very low, at 28 per cent. The Millennium Development Goal of the United Nations envisages halving the number of people not having access to potable water or sanitation by 2015. The Centrally-sponsored Total Sanitation Campaign is being implemented in 451 districts. The concerned ministry wants to expand this to all the districts. The Ninth Plan outlay of Rs.500 crore for rural sanitation was stepped up to Rs.955 crore in the Tenth Plan.

Box 6.8 Rural Drinking Water Supply – Success Stories

In rural water supply, success stories can be found in Uttar Pradesh & Gujarat.

Uttar Pradesh

- World Bank assisted Swajal Project implemented in about 1200 villages of Uttar Pradesh and Uttaranchal.
- This project is a pioneer in sector reforms.
- Community contributed 10% capital cost.
- Community took over operation and maintenance of completed schemes.

Gujarat

- 14000 villages (and 154 towns) to be covered under Surface Water Scheme-mainly from Sardar Sarovar Narmada Canal and under Sujalam Sufalam programme.
- Rs. 13800 cr, 2700 km. single grid of water supply line under implementation – largest in the world.
- Capacity building, people's participation, public private partnership and cost recovery by Pani Samithis/local bodies envisaged.

6.59 Mere provision of Plan funds will not solve the problem unless it is supported by a vigorous information, education, communication (IEC) campaign. A study conducted in the Vizianagaram district of Andhra Pradesh has shown that IEC is the missing link in rural sanitation. Some villagers flatly refused to construct individual sanitary toilets on the grounds that the house is meant for eating and it must be clean. Those who had constructed them were not using them due to foul smell, fear of mosquitoes or lack of cleaning facilities for the soak pits when it gets filled. The twin-pit-pour-flush, developed and promoted by Sulabh International, has had a good response. To promote rural sanitation, unemployed youth/non-government organisations (NGOs) should be trained and used for IEC. Focus should be on areas where irrigation facilities exist, as lack of sanitation will lead to pollution, and also where land is a constraint for open defecation.

6.60 To ensure coverage of all rural areas by sanitation, the gap in resources of Rs.5,486 crore would have to be met partly by increased Plan outlays and partly by external assistance. The outlay of Rs.955 crore in Tenth Plan will not be adequate to meet the needs of 2005-06 and 2006-07 and may have to be increased by another Rs.1,350 crore.

URBAN WATER SUPPLY AND SANITATION

6.61 Urban sanitation coverage has been reported at 63 per cent – 30 per cent with sewerage system and 33 per cent with low cost sanitation. The Census of India, 2001, indicates that out of 53.69 million urban households, 37.8 million have in-house sanitation facilities including 7.84 million pit-latrines, 24.76 million water closets and 6.8 million other latrines. The problem of manual scavenging is mainly an urban problem. Lack of urban sanitation directly affects the quality of river water and also contaminates urban water supply. The percentage of sewage treated is also very low – only 30 per cent. Untreated sewage again finds its way into rivers and natural water bodies. The Sulabh International has been doing commendable service in urban areas in maintaining pay and use community toilets.

6.62 Since the water requirement for flushing of waste is very high, it will be necessary to move away from centralised sewage treatment to low cost local solutions to save water and also for increasing the percentage of sewage that is treated. Residential colonies are ideally suited for introducing waste water recycling and localised sewage treatment. The National Action Plan prepared by the Planning Commission in 2002 for the eradication of manual scavenging by 2007 is making slow progress. States have not even taken up the task of identifying the scavengers due to lack of funds.

6.63 The Ministry of Urban Development's Urban Infrastructure Development Scheme for small and medium towns is meant to cover all urban areas with water supply and sanitation. The funding is proposed through a combination of loans from financial institutions, Central grants and state share. Public-private partnership is proposed to be encouraged in this new scheme with incentives for the adoption of innovative technology, promotion of institutional reform and efficient governance. The project envisages structural and administrative reforms, including levying of appropriate water charges.

SOLID WASTE MANAGEMENT

6.64 At a per capita solid waste generation rate of 0.4kg/day, an urban population of 278 million generates 42 million tonnes solid waste annually. The only solution now adopted in urban areas is dumping in open landfills. Medical wastes and even hazardous chemical wastes are dumped in landfills, leading to serious health hazards through groundwater pollution. The concept of sanitary landfills and segregation of bio-degradable and recyclable waste at the household level is totally absent.

6.65 E-waste, or refuse from discarded electronic devices which contain poisonous chemicals like lead, cadmium, mercury, are dumped in poorly managed landfills and pose major problems contamination problems. It is estimated that 1,050 tonnes of electronic scrap is being produced annually.

6.66 An Urban Sanitation Mission was to be launched in the Tenth Plan, with an outlay of Rs.2,000 crore, but this has not been done yet due to lack of funds. Central assistance is considered necessary, as most ULBs are not in a financially sound position to tackle this. The unbridled use of plastic bags, which make up 4 per cent of urban solid waste and are the main cause of choking of urban storm water drains, needs to be regulated. An effective IEC campaign, segregation of waste at the household level and expanded Centrally assisted schemes for waste-to-energy projects need focused attention.

6.67 A comprehensive E-waste management policy covering legislation to regulate import of electronic scrap, incentives for developing 'greener' computers, training in e-waste management and pilot projects to demonstrate e-waste management is the need of the hour.

SURFACE AND GROUND WATER POLLUTION

6.68 Both surface and ground water sources are getting polluted due to low coverage of rural sanitation, low level of treatment of urban sewage, problems of urban solid waste management and indiscriminate use of fertilizers, pesticides, insecticides etc., in agricultural operations. Pollution levels of the Yamuna river at Okhla in Delhi, for instance, are reported as 569 mg/l (milligram per litre) total dissolved solids, biochemical oxygen demand (BOD) 52 mg/l and coliform count of 85000 MPN (maximum probable number) per 100 ml against the norm of BOD 3 mg/l and coliform count of 5000 MPN/100 ml. Out of the 2.17 lakh quality affected habitations in rural water supply, about 37,000 are affected by salinity and nitrate mainly due to anthropogenic factors.

6.69 The problem of quality of rural water is proposed to be tackled in a big way from 2005-06 by switching to surface water sources in 90 per cent of the quality-affected habitations. Cleaning of all major polluted rivers by 2007 and other notified stretches by 2012 is one of the monitorable targets of the Tenth Plan.

6.70 The National River Conservation Programme of the Ministry of Environment and Forests is already addressing the problem of untreated urban sewage. Improvement of rural sanitation coverage and urban solid waste management will significantly reduce pollution levels in groundwater. The proposed Urban Infrastructure Development Scheme for small and medium towns will improve urban sanitation coverage.

6.71 The pollution control norms need strict enforcement in industries to ensure that effluents are treated to required standards before they are let into water bodies. Use of fertilizers, pesticides, weedicides, insecticides need to be regulated to ensure that only minimum required doses are applied, as otherwise these find their way into surface and groundwater bodies. Their subsequent removal becomes a costly affair involving sophisticated technology.

PRIVATE SECTOR PARTICIPATION

6.72 Promotion of private sector participation in the surface irrigation sector has been constrained both by the high capital cost of irrigation infrastructure (about Rs.1 lakh per ha. of irrigation) and the absence of a working model. The water charges of a few hundred rupees do not cover even the interest charges on the capital invested. Hence the private sector is not confident of getting adequate returns from users of water. Not many examples of private sector participation in irrigation can be found even in other developing countries. However, the decreasing investments in irrigation by states necessitates tapping private sector funds in select areas of irrigation development and management. Therefore, a proper package of incentives will have to be worked out to attract investors. A combination of innovative funding and water pricing policies covering promoter's equity and financial institutions participation thus needs to be worked out.

6.73 The National Water Policy has a provision relating to 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.”

6.74 In July 1995, the Ministry of Water Resources constituted a High Level Committee under Shri P.V. Rangayya Naidu, Union Minister of State for Water Resources, to examine the feasibility of private sector participation in irrigation and multi-purpose projects. The Committee recommended introduction of the concept on a pilot basis for select projects.

6.75 The private sector is already participating in irrigation projects in some limited areas. These are:

- Development of hydropower on canals. A royalty for water is paid to the irrigation department.
- Pisciculture in reservoirs on a long and short-term lease basis.
- Promotion of tourism in recreation parks created in vicinity of dams, including boating.

6.76 In January 2004, the Ministry of Urban Development issued guidelines for successful public-private partnerships and sector reforms for the urban water supply and sanitation sectors. While public-private partnership in urban drinking water supply would be a welcome step from the point of view of investment, there is an apprehension in the public mind that this will ultimately lead to privatisation and commercialisation of water. There are also concerns that the private sector may not accept the national priorities fixed for various uses of water. The new policy needs to take care of this and allay such fears.

6.77 A beginning can be made in the irrigation sector by handing over parts of the system like a branch canal or a few water supply zones to the private sector. There is immediate scope for private sector participation in urban water supply activities like billing, operation of sewage treatment plants, leak detection and water supply through tankers. Apprehensions that the poorer sections will be denied water if water supply is privatised are misplaced. Many African cities like Abidjan and Dakar have successfully privatised water supply. In view of the low rate of collection of irrigation water charges by the Revenue Department, there is scope for privatising this activity with in-built incentives both for the collector and the farmer in order to improve revenue collection. With WUAs taking over irrigation systems for maintenance, the private sector has immense scope for taking over this function from the Irrigation Departments. Computerised maintenance of water-related data like water levels, inflows and canal withdrawals can also be entrusted to the private sector.

INTER MINISTERIAL COORDINATION

6.78 The Tenth Plan brought out the fact of multiplicity of Ministries/Departments dealing with various aspects of water. An inter-ministerial coordination committee at the level of Secretaries was to be set up under Member, Planning Commission.

6.79 Although some measure of coordination does, in fact, exist, there is scope for improvement of coordination among Ministries/Departments. Examples are coordination between the ministries of Agriculture and Water Resources in areas like CAD and major irrigation; between the ministries of Water Resources and Power in hydropower; between Water Resources and Drinking Water Supply in rural water supply; between Water Resources and Urban Development in urban water supply; between Water Resources and Shipping in navigation; between Water Resources and Rural Development in watershed; between the Department of Science and Technology and the Ministry of Water Resources in research and development and between the Department.

of Space and Ministry of Water Resources in use of satellite data for water resources planning and management. An empowered Standing

Committee for Inter-Ministerial Coordination needs to be set up.

THE WAY FORWARD

- Improve water use efficiency in order to bridge the gap between supply and demand of water. The recommendations of the inter-ministry Task Group on Efficient Utilisation of Water Resources need to be implemented.
- The AIBP needs to focus not only on completing projects but also maximising creation of potential at a given cost. The programme could be reviewed to provide 100 per cent Central funding without state share and placing of funds directly with project authorities through banks instead of routing them through states. Modern tools like use of satellite imageries should be adopted for monitoring.
- Fund the large irrigation projects as national projects to enable their speedy completion.
- Review the ultimate irrigation potential of all major and medium irrigation projects keeping in view actual cropping pattern, siltation, condition of canal systems, hydrology etc.
- States should set up water regulators on the lines of that being set up in Maharashtra to advise on water tariff for irrigation and water supply.
- Review Participatory Irrigation Management, as its intended objectives have not been achieved. PIM groups should be empowered to set tariff and retain a part of it.
- Implement the recommendations relating to irrigation of the Inter-Ministry Task Group on Development of SC & ST.
- Review the issue of ownership rights on groundwater, as legislation to control over-exploitation has not been successful. Free power to agriculture should be discouraged.
- Implement the recommendations of the Task Force for Flood Management and Erosion Control.
- Provide additional requirement of funds in the Tenth Plan for urban and rural water supply and sanitation in order to achieve the Millennium Development Goal relating to drinking water supply and sanitation.
- Encourage a gradual change in dependence from groundwater to surface water for rural water supply to tackle the problems of sustainability and water quality.
- Design and launch schemes to assist states in urban solid waste management.
- Improve inter-ministerial coordination on water. Irrigation, rural drinking water and land resources should ideally be dealt with in one ministry.
- Prepare guidelines for public-private partnership in irrigation and launch pilot projects.