

## **Section - VIII**

# **INFRASTRUCTURE**

## CHAPTER 8.1

# IRRIGATION, FLOOD CONTROL AND COMMAND AREA DEVELOPMENT

8.1.1 Rainfall in India, as in all tropical countries, is confined mainly to the southwest monsoon months of June to September. The rainfall is not even and has spatial and temporal variation causing droughts in some parts of the country and floods in others. The all India annual average rainfall is 1,170 mm but it varies from 100 mm (about five rain days) in the western deserts to 11,000 mm (about 15 rain days) in the northeastern region. Fifty per cent of the precipitation takes place in about 15 days and less than 100 hours altogether in a year. Irrigation has, therefore, since time immemorial, been recognised as a vital input for agriculture, contributing not only directly by meeting the evapotranspiration needs of plants, but also indirectly by recharging ground water. Understanding and addressing the irrigation sector's problems and assessing its performance is thus a *sine qua non* for shaping of the future irrigation strategy.

8.1.2 Irrigation constitutes the main use of water and is thus the focal issue in water resources development. As of now, irrigation use is 84 per cent of the total water use. However, due to growing population, the per capita availability of water is steadily going down, declining from 5,000 cubic metres a year at the time of Independence to about 2,000 cubic metres as of now, and many areas of the country are already facing water stress. This, coupled with urbanisation and industrialisation, has raised concerns about the deteriorating quality of surface and ground water. Any strategy for integrated development of water resources and its management will necessarily have to go beyond the technical issues to include economic, social and administrative issues.

8.1.3 On the economic front, rising costs of irrigation projects and the initiation of too many projects by the state governments, leading to the thin spread of scarce financial resources, have affected the pace of creation of irrigation potential.

Subsidised supplies of irrigation, drinking and industrial water have stretched the finances of the states beyond acceptable limits. Efforts need to be concentrated on the quick completion of ongoing projects, especially the old ones, and proper maintenance of the created infrastructure. The assistance programmes of the central government need to be restructured to encourage this. A list of on-going major projects in various states showing the Plan period in which they were started, latest estimated cost, expenditure till the end of the Ninth Plan, spillover cost, ultimate potential and potential created so far is at Annexure I.

8.1.4 The pricing structure for water needs a serious review to reflect the scarcity value of water. Water charges must ensure that the revenues earned by state governments cover the operation and maintenance (O&M) costs of irrigation and water supply systems. In the changed economic scenario, with the private sector already stepping into telecom, transport and power sectors, it is high time that the water sector also took appropriate steps to attract private investment as it may no longer be possible for State Governments to fund all water resources development projects.

8.1.5 On the administrative front, the oversized O&M set up in the states need to be pruned and this activity handed over to the Water User Associations. Although some states have increased water rates, the O&M allocations still have a large component of establishment cost. State Governments should be persuaded to set up River Basin Organisations for planning of the river basin as a hydrological unit. The subject of water resource development and management is handled by several ministries at the Central Government level viz. Water Resources, Agriculture, Rural Development, Urban Development, Power, Shipping, Environment and Forests. Bringing the various water related subjects under the control of

one ministry — the Ministry of Water Resources — should be done expeditiously.

8.1.6 On the technical front, while dams will continue to be the mainstay of irrigation development, other cost-effective options like rejuvenation of traditional water harvesting structures, ground-water development, development/restoration of surface minor irrigation systems, rain water harvesting in urban areas and watershed development should be taken up simultaneously. These options are less costly in terms of cost per hectare (ha) of development as compared to dams and do not involve other problems faced by dams like rehabilitation of displaced persons, submergence of forest land, land acquisition, long gestation period etc. While the per ha cost of development of irrigation through major irrigation projects is over Rs. 1 lakh, the cost/ha in respect of watershed schemes is Rs. 5,500, tank renovation schemes Rs. 15,000/ha. and ground water schemes Rs. 10,000/ha. However, dams have multiple benefits as compared to watershed structures.

8.1.7 It is important that the created potential be utilised to the maximum extent within a reasonable time frame. The Command Area Development Programme (CADP) was launched as a centrally-sponsored programme in 1974-75 with this objective. However, the programme needs to be restructured as it is presently confined to the construction of field channels, land levelling and warabandi. The programme should involve the stakeholders and cover main and intermediate drainage, water use efficiency promotion and system management and improvement.

8.1.8 The requirement of agricultural produce is expected to rise steeply by 2025. The net sown area has remained stagnant around 142 million hectares (m. ha). Given the constraint of land availability, India must necessarily concentrate on increasing the area under irrigation and significantly improving the productivity of both land and water to meet the food, fuel, fibre and timber needs of the population. A multi-pronged strategy, backed by a long-term vision for integrated water resources development and management, has thus to be carefully conceived. Another 30 m. ha can be added to the net sown area by tapping unutilised land. Trans-

basin diversions to even out the available water resources in the country and break the vicious cycle of droughts and floods would form an important component of such a strategy.

## AVAILABLE WATER RESOURCE

### Surface Water

8.1.9 India, which has 16 per cent of the world's population, has only 2.45 per cent of the world's land resources and 4 per cent of the world's fresh water resources. Monsoon rain is the main source of fresh water, with 76 per cent of the rainfall occurring between June and September under the influence of the southwest monsoon. The average annual precipitation in volumetric terms is 4,000 billion cubic metres (BCM). The average annual flow out of this is 1,869 BCM, the rest being lost in infiltration and evaporation. Due to topographical and other constraints, only 690 BCM can be utilised.

### Ground Water

8.1.10 The ground water recharge is principally governed by the intensity of rainfall as also the soil and aquifer conditions. The distribution and potential for ground water development thus varies from region to region. The annual replenishable ground water resources in the country are estimated at 432 BCM. This is a dynamic resource and is replenished every year from natural precipitation, seepage from surface water bodies and conveyance systems, return flow from irrigation water etc. Prudence lies in confining the utilisation in each region/area to a quantity within the replenishable limit of that region to avoid problems of water quality and high energy costs of pumping due to falling water table.

8.1.11 The total availability for use from surface and ground water sources is thus 1,122 BCM (690 + 432 BCM).

## ESTIMATED IRRIGATION POTENTIAL

### Major and Medium

8.1.12 The ultimate irrigation potential of the country from major and medium projects is estimated as 58.46

m.ha. A project with a culturable command area (CCA) of more than 10,000 ha. is categorised as a major project and that with area between 2,000 ha. and 10,000 ha. as a medium project.

### Minor

8.1.13 The ultimate irrigation potential of the country from minor irrigation projects is estimated as 81.43 m. ha, of which 17.38 m.ha. is from surface water minor irrigation schemes and 64.05 m.ha. from ground water schemes. A project with culturable area less than 2,000 ha. is a minor irrigation project.

8.1.14 The total ultimate irrigation potential is thus 139.89 m.ha. (58.46 + 81.43). By trans-basin diversions, it is estimated that another 25 m. ha. potential can become available through surface and 10 m.ha. through groundwater sources.

## ACHIEVEMENTS IN IRRIGATION DEVELOPMENT

### Major and Medium

8.1.15 Before the commencement of planned development in 1951, the irrigation potential created through the major and medium sector was 9.70 m. ha. In the First Five-Year Plan, the country launched a major irrigation programme to offset the loss in irrigation area due to Partition and to solve the problem of perpetual food shortage necessitating large-scale imports. A number of major and multipurpose projects like Bhakra Nangal, Nagarjunasagar, Kosi, Chambal, Hirakud, Kakrapara and Tungabhadra dams were taken up. This trend continued till the Fourth Plan, when the emphasis shifted to the completion of ongoing projects, modernisation and integrated use of surface and ground water. The Fifth Plan saw the launch of the CADP. Till the end of the Eighth Plan, a potential of 32.96 m. ha. had been created in this sector. The Plan-wise creation of potential is at Annexure 2. State-wise creation of potential is at Annexure 3.

8.1.16 The storage due to major and medium projects already completed in the country is 177 BCM. Projects under construction are likely to add

another 75 BCM. The contribution expected from projects under consideration is 132 BCM.

8.1.17 A total of 295 major and 967 medium projects were taken up for construction till the end of Eighth Plan. Of these, 124 major and 708 medium projects have been completed leading to a spillover of 171 major and 259 medium projects into the Ninth Plan. The Plan-wise position of taking up of new projects and their completion is at Annexure 5. A total investment of Rs. 1,01,649 crore has been made in the major and medium sector till the end of Ninth Plan. Plan-wise expenditure is at Annexure 4.

8.1.18 The Working Group for formulation of the Ninth Plan had recommended an outlay of Rs. 60,058 crore for creation of 9.81 m. ha. potential in the major and medium irrigation sector. However, the actual outlay provided was Rs. 42,959.34 crore, with the target being kept as 9.81 m. ha. The expenditure during the Ninth Plan is expected to reach Rs. 49,043.18 crore. It is expected that the potential creation up to the end of Ninth Plan would have risen to 37.08 m. ha. or 63 per cent of the ultimate potential of the major and medium sector.

8.1.19 The Working Group for the Tenth Plan has assessed that 171 major, 259 medium and 72 Extension, Renovation and Modernisation (ERM) projects were ongoing projects in the Ninth Plan. Besides, 13 major, 37 medium and 36 ERM projects were taken up in the Plan period. The likely completion during the Ninth Plan are 25 major, 45 medium and 14 ERM projects. Thus, a total of 159 major, 242 medium and 89 ERM projects are estimated to spillover into the Tenth Plan, after reclassification of a few projects. A further 67 major, 130 medium and 34 ERM projects are expected to be taken up in the Tenth Plan. The Working Group has proposed an outlay of Rs. 1,09,025 crore (Rs. 1,07,327 crore under State Plan and Rs. 1,698 crore under Central Plan) for the Tenth Plan for ongoing projects and new projects. With this investment, 103 major, 240 medium and 62 ERM projects are expected to be completed in the Tenth Plan and 11.14 m. ha. created.

### MINOR IRRIGATION

8.1.20 The minor irrigation potential, which was 12.90 m.ha. during the pre-Plan period (6.40 m.ha.

from surface water and 6.50 m.ha. from ground water) made steady progress during various Plan periods. Till the end of the Eighth Plan, a potential of 53.30 m.ha. was created utilising Rs. 40,426.57 crore through State Plan outlay (Rs. 24,298.8 crore) and institutional finance (Rs. 16,127.77 crore). Plan-wise expenditure is at Annexure 4.

8.1.21 The Working Group for Minor Irrigation for the Tenth Plan has estimated that in the Ninth Plan, a potential of 3.64 m. ha. had been created till 1999-2000 with a total investment of Rs. 36,229.79 crore, taking the total potential created to 56.90 m.ha. which is 70 per cent of the ultimate potential of 81.43 m.ha. It has, further, recommended an investment of Rs. 35,050 crores in the Tenth Plan in the State Sector and Rs. 1,150 crores in the Central Sector to create 8 m.ha. potential, of which 3 m.ha. is from surface water and 5 m.ha. from ground water. The cumulative potential created till the end of the Ninth Plan is 56.90 m. ha as per figures reported by State Governments in their Tenth Plan documents.

### Flood Management

8.1.22 According to statistics of flood damage furnished by state governments, an average of 7.56 m. ha. is affected annually by floods, of which 3.55 million ha. is cropped area. On an average, floods annually claim 1,595 lives and 94,772 heads of cattle and damage 1.2 million houses. The annual damage is about Rs. 1,347 crore.

8.1.23 The Rashtriya Barh Ayog has estimated the flood-prone area in the country at about 40 m. ha., of which 32 m. ha. can be given a reasonable degree of protection. The area protected prior to 1954 is assessed as 3 m. ha. Between 1954 and 2000, 33,630 km of new embankments and 37,904 km of drainage channels have been constructed. A total of 2,337 town protection works have been completed and 4,705 villages raised above flood level. All these works are estimated to have given reasonable protection to 15.8 m ha.

8.1.24 An expenditure of Rs. 4,856.68 crore has been incurred in the flood control sector till the Eighth Plan. The Working Group on Flood Management for the Ninth Plan assessed the likely benefits in Ninth Plan as 3.06 m ha., corresponding to an outlay of

Rs. 4,959 crore for the State Sector and Rs. 1,509 crore as additional Central assistance for identified flood management works. However, the actual outlay approved by the Planning Commission for the State sector was Rs. 2,212.12 crore and Rs. 716.13 crore for the Central sector and this outlay was expected to benefit 1.366 m. ha. The anticipated expenditure in the Ninth Plan is Rs. 2,629.23 crore and according to reports of State Governments, the area likely to be benefited is 1.14 m. ha.

8.1.25 The Working Group has recommended an outlay of Rs. 10,631.84 crore for the Tenth Plan, of which Rs. 7,624 crore is for the State sector and Rs. 3,007.91 crore is for the Central sector. This is expected to benefit 2.781 m. ha. The Group has recommended strengthening of the flood forecasting network of the Central Water Commission (CWC), flood plain management through zoning and people's participation in maintenance of embankments.

### Command Area Development

8.1.26 During the post-independence period, the country saw an unprecedented expansion of irrigation facilities and infrastructure, aimed at increasing agricultural production from irrigated land to meet the food needs of a growing population. However, in the 1970's it was noted that agricultural production was not commensurate with irrigation development and showed signs of stagnation. The Second Irrigation Commission (1972) reported a wide gap between the creation and utilisation of irrigation potential and this led to the initiation of the CADP.

8.1.27 The CADP envisaged integrated and coordinated development of irrigated areas along with on-farm development. The area of action of CADP was below outlets which were owned by farmers. The assumption was that the canal system above the outlet was satisfactorily operated, maintained and managed by the Irrigation Department.

8.1.28 The components of the CADP were:

- (i) Development of field channels and field drains.

- (ii) Land levelling and shaping.
- (iii) Reclamation of waterlogged area.
- (iv) Introduction of warabandi.
- (v) Realignment of field boundaries and consolidation of holdings wherever possible.
- (vi) Development of groundwater irrigation.
- (vii) Development and management of main and intermediate drains.
- (iii) Extension service support continues to be with the Agricultural Department of states.
- (iv) High water use crops like paddy, sugarcane had increased in head reach areas.
- (v) Conjunctive use did not pick up due to various constraints including cumbersome institutional financial support and unreliability of electricity supply.
- (vi) Maintenance and upkeep of the canal system above outlet was found lacking.
- (vii) Due to the neglect of intermediate and main drains, field drains were not effective in preventing waterlogging.

8.1.29 The CADP has, so far, covered 236 major and medium schemes and cluster of minor irrigation schemes with a total CCA of 23 m.ha. The overall achievement till 2000 was: -

Construction of field channels	-	15.72 m.ha.
Warabandi	-	0.57 m.ha.
Land levelling/ shaping	-	2.19 m.ha.
Field drain	-	0.68 m.ha.

Till 2000-01, a total expenditure of Rs. 7,097.48 crore has been incurred on the CADP, of which Rs. 2,304.23 crore has been released by the Central Government.

8.1.30 Evaluation studies carried out by the Ministry of Water Resources in 26 major and medium projects have shown that the CADP has had a positive impact by way of better utilisation of created potential, increase in irrigation intensity and water use efficiency, increase in agricultural production due to introduction of high efficiency crops and increase in use of fertilisers and better variety of seeds, improvement in farm income and reduction in water logging, soil salinity etc.

8.1.31 The evaluation study also threw up some shortcomings, which need to be corrected. Some of them are:

- (i) Progress of field channels was slow mainly due to inadequate funding by State Governments.
- (ii) Realignment of field boundaries and consolidation of holdings did not pick up in many states.

It was also increasingly realised that for the CADP to be a success, it was not only necessary to address these issues, but the system needs to be handed over to the Water Users Associations for maintenance. Thus, the concept of Participatory Irrigation Management (PIM) needs to be dovetailed into CADP.

8.1.32 The Working Group has suggested an outlay of Rs. 4,962.5 crore for the CADP in the Tenth Plan. The Ministry of Water Resources has allocated Rs. 1,401.8 crore in the Tenth Plan for CADP out of its total allocation of Rs. 3,600 crore. Scheme-wise Tenth Plan outlay is given in the Appendix to this volume.

### Private Sector Participation

8.1.33 Presently all the programmes in water resource development and management, especially in the major and medium sector, are entirely funded by the Government. Institutional finance is available for the minor irrigation sector. Recently, under the Rural Infrastructure Development Fund (RIDF), the National Bank for Agriculture and Rural Development (NABARD) has been extending assistance to major/medium projects as well. Despite massive investments and impressive achievements, a lot more investment is needed to fully harness the available potential. The unit cost of irrigation development is nearly Rs. 1 lakh per ha. of CCA. This is so high that even recovery of interest on capital from the service is difficult, unlike

many services which are able to pay for themselves with or without some incentives or subsidies. Due to decreasing investments in the irrigation sector, it may be difficult to complete even the on-going projects. Hence the desirability of mobilising financial resources from the private sector which will also ensure better irrigation efficiency and better service.

8.1.34 However, even in developed countries, there are only a few examples of successful private sector irrigation projects. One of the inhibiting factors is that the private investor has to deal with irrigators who are not used to treating irrigation as a commercial service. The long gestation period of projects and the fact that benefits are not transferable are other disincentives for the private sector. However, a beginning has to be made with pilot projects and by offering part of service for privatisation, especially in minor irrigation projects. The canal systems of the northern India used to generate surplus revenue during the British period as also in the initial years of Independence. A Group of Experts, therefore, needs to be set up to study the whole gamut of issues connected with the economics of irrigation water viz. water rates, cost of establishment, staff required for O&M purposes, requirement for O&M on Rs./ha basis etc.

## ISSUES IN FOCUS

### Demand for water

8.1.35 The demand for water, which was 634 BCM in 2000, is likely to increase to 813 BCM by 2010 and 1,093 BCM by 2025. Thus the entire water potential of 1,132 BCM utilisable by conventional means would have to be developed by 2025. This calls for the completion of 75 BCM of ongoing storage and developing a further 50 per cent of the potential storage of 132 BCM, ground water development in potential areas, improvement in water use efficiency and introduction of a rational pricing for water. Although irrigation will continue to be a major consumer of water (84 per cent as of now) demands from other sectors like industry, domestic, energy, ecology, recreation, navigation are likely to increase, putting additional pressure on the irrigation sector. Water audit should be insisted upon for all major large-scale water uses including irrigation projects, industries and civic bodies.

### Proliferation of projects

8.1.36 The spillover of major and medium projects into successive Plans is a major problem in this sector. Out of the balance 21.68 m.ha. potential to be created in the major and medium sector, completion of ongoing major projects with balance completion cost of Rs. 28,500 crore will itself add another 10 m.ha. The prioritisation of projects on the lines suggested by the National Commission for Integrated Water Resources Development and Management in 1999 should be adopted. Out of the 159 major projects spilling into Tenth Plan, nearly 65 per cent are projects dating back to the Sixth Plan or even earlier Plans.

8.1.37 The Central Government will also take effective steps to complete old projects by targeting Accelerated Irrigation Benefit Programme (AIBP) funds to these projects and discouraging its use for comparatively newer projects. Projects where 90 per cent of the potential is already created should be declared completed unless there is a clear evidence that the project is really incomplete and for genuine reasons. The State Governments will be asked to plan phased development in large projects to avoid unproductive investments in dams or main canals alone and also make higher allocations for inter-state projects. The Planning Commission shall seriously consider a 'plan holiday' for new projects if the situation does not improve. The Planning Commission has already suggested that the Ministry of Water Resources carry out a State-wise review of on-going irrigation projects through a committee headed by the Secretary, with the Chairman, CWC, Adviser, Water Resources, in the Planning Commission and concerned secretaries of the State Government as members.

### Lag between potential created and utilised

8.1.38 The lag of about 9 m.ha between potential created and utilised is a matter of concern. The main reason for this is the non-construction of on-farm development (OFD) works below the outlet. Other reasons are: change in cropping pattern to more water-intensive crops, over-estimation of run off in hydrological planning leading to reservoirs not being filled, loss in live storage due to sedimentation, especially in minor irrigation tanks, low water use

efficiency due to disrepair of the system, lack of reliable statistics on creation and utilisation, etc. It is estimated that about 13 m.ha of irrigated area from projects completed before Independence and 8 m.ha. from schemes completed 25 years ago can be fully restored by modernisation of these projects. The proposed restructured CADP is aimed at addressing some of the issues. A committee headed by the CWC chairman, is already looking into the issue of differences in data on utilisation of irrigation potential as reported by the Ministry of Agriculture and the Ministry of Water Resources. The same committee, with the induction of other experts, will study and report, on a continuous basis, the progress in bridging the gap between created and utilised potential and suggest necessary corrective measures.

### Benchmarking

8.1.39 Benchmarking is a continuous process of measuring one's performance and practices against the best competitors and is a sequential exercise of learning from other's experience. It is the process of comparison with relevant and achievable internal standards as measured against the previous achieved goals or the future desirable targets (or external ones set by other similar organisations). This is done in order to identify the 'best practices' and the weak links in the system with the objective of improving performance. In the irrigation sector, benchmarking would mean more productive and efficient use of water i.e. 'more crop per drop'. There is, therefore, a pressing need for introducing the concept of benchmarking in the irrigation sector to assess and improve various indicators like efficiency, financial viability, environmental sustainability, productivity etc. The best existing models and success stories would be studied and adopted. Information on these will be collected in a set time frame and disseminated.

### Surface water pollution

8.1.40 Pollution of water bodies and rivers is most severe where human settlements have developed. The low flow in rivers have progressively decreased due to upstream withdrawals/impounding and ground water extraction along banks, denying the river the flushing dose required for ecological purposes. Urban water supplies which depend on flows in nearby rivers (like Delhi which depends on

the Yamuna), are most affected. It is estimated that 1,800 million litres of untreated domestic waste and another 300 million litres of industrial waste flow into the Yamuna daily. The actual count of coliform count is several times more than the permissible limit of 500 per 100 millilitre. The remedy lies in ensuring release of historic minimum flows from dams, treating urban sewage before letting it into river courses, setting up land-fills away from river banks, provision of sanitation facilities in slums on river banks etc. An appropriate strategy needs to be devised for integrated management of water and waste water.

8.1.41 As far as the Yamuna is concerned, there is urgent need to take up and complete the storages which are planned like Renuka dam, Agra barrage and Kanpur barrage, so that the stored flood waters can be released in lean months for river conservancy. A study titled 'Blueprint for Water Augmentation in Delhi' carried out by INTACH in March 1999 has recommended storing part of Delhi's monsoon season allocation of Yamuna waters in flood plains around Delhi especially by creating a ground water sanctuary. Water harvesting and recycling has also been recommended. The Central Ground Water Board (CGWB) has made a similar recommendation for the Gomti river near Lucknow, suggesting that the meandering loops be developed as flood plains to create a ground water sanctuary.

### Participatory Irrigation Management

8.1.42 People's participation in renovation and maintenance of field channels was the established practice during the British days. However, the bureaucracy encroached on this function since Independence. The central and state governments need to promote PIM more vigorously, as currently only 15.25 per cent of the net irrigated area is partially covered. There is merit in linking the CADP to PIM so that projects receiving assistance under the former have to promote PIM in at least a part of the command area. The sustainability and success of PIM depends on mutual accountability between the Water Users' Association and the Irrigation Department, attitudinal change in the bureaucracy, autonomy for the Water Users' Association, multifunctional nature of the Water Users'



Association and choice of appropriate model for PIM with appropriate legal and institutional framework. If farmers have to take over and manage the system, then the system must be rectified by the Irrigation Department to a minimum standard to carry the design discharge before it is handed over to the Water Users' Association. The success of PIM is also linked to the introduction of rotational water supply and water charges with rationalised establishment cost. Unlined field channels need to be manually constructed in a 'V' shape which is considered stable and efficient for carrying water. Based on the 30-year experience of operating CADP and the results of evaluation studies, the CADP is proposed to be restructured in the Tenth Plan with emphasis on structures like field channels and equitable distribution of water through warabandi and Water Users Associations and dropping of infeasible components. The restructured CADP will include corrections of system deficiencies, linkage of field drains with the main drainage system, increased involvement of beneficiaries by expanding the scope of Water

Users' Associations in construction and maintenance of OFD works through a mandatory 10 per cent contribution. Cost norms for CAD components are also proposed to be revised.

### Water Rates

8.1.43 Water is both an economic and social good. Canal water rates in most states are, however, very low and are generally based on the size of the holding, depending on crop and season. Water rates in many states have not been revised for many decades. A substantial part of the water charges recovered goes to meet the expenditure of the maintenance staff leaving very little for maintenance works. Increase in water tariff on volumetric basis will become acceptable, therefore, only when basic restructuring is done by reducing establishment cost, better technical management and establishing participatory systems. The central government has moved in this direction in linking AIBP allocations to economic reforms in the water sector. The state governments should take

#### Box 8.1.1 Administrative Cost Component In O&M

The Eleventh Finance Commission has recommended maintenance norms of Rs. 450 per ha. for major and medium projects and Rs. 225 per ha. for minor irrigation projects. Irrigation projects, which were financially viable before Independence have, since 1974-75, reported losses (negative net revenue i.e. gross receipts – working expenses). Several factors have contributed to this, like increase in construction and operation and maintenance (O&M) cost, low water charges and mounting salary bills of over-staffed establishment for O&M. Data for four states collected by the Planning Commission has revealed the low percentage of O&M allocation to works and poor realisation of O&M costs through user charges in 1998-1999.

State	Expenditure on O&M	Establishment cost as % of O&M expenditure	Revenue realised as % of O&M expenditure
Andhra Pradesh	Rs. 440/ha.	38.5	73.80
Assam	Rs. 406/ha.	99.1	0.07
Gujarat	Rs. 428/ha.	49.8	28.20
Haryana	Rs. 462/ha.	85.3	26.50

Data from other states is being collected.

advantage of the facility of better loan terms and move towards full recovery of O&M charges in a time frame of five years.

### Water Logging and Water Use Efficiency

8.1.44 The water use efficiency in most irrigation systems is low in the range of 30 per cent to 40 per cent against an ideal value of 60 per cent. Low water use efficiency leads to lower productivity, inequity in supplies to tail-enders and water logging and salinity. The reasons for this situation are not difficult to identify. Many of the irrigation systems

have become dilapidated due to silting of canal system, weed growth, and breakage of regulatory structures leading to over-use of water. The low water rates also encourage misuse of water. In many of the old delta systems like the Godavari, Cauvery and Mahanadi, irrigation is practised by field-to-field flooding. The issue of low water efficiency, water rates, O&M, dilapidation of system and PIM are all inter-related and need to be tackled as a package of measures to improve the water use efficiency. The package should include: modernisation, conjunctive use through shallow augmentation tubewells, provision of tamper-proof outlets, replacement of old canal road bridges, development of canal banks as roads for maintenance of canals and improving the rural transport system, promotion of water saving devices like sprinkler and drip irrigation systems through tax concessions and back-ended subsidy-cum-loan schemes. A Task Force on Water Use Efficiency would be set up to co-ordinate all these measures. There should be a systematic survey to assess the extent, nature and location of waterlogged and saline/alkaline lands in existing irrigation commands.

#### Box 8.1.2

##### Success Story In Water Use Efficiency

Beneficiary members of the Pimpalnare village in Maharashtra formed a cooperative society named Shriram Pani Waper Sahakari Sanstha Maryadit in 1995 to utilise the waters of the Pimpalnare Minor Irrigation Project which was completed in 1983. Due to shortfall of rain, the tank does not fill completely every year. Therefore, the beneficiaries always faced difficulties due to water shortage. To tide over the situation and for proper distribution of water, they decided that water from the tank be drawn directly by pipelines and supplied to the fields to prevent the wastage of water. Beneficiaries were not allowed to lay separate pipelines, but asked to form groups of not less than 10. Thus, 18 groups were formed and each group laid down separate joint PVC pipelines. All 18 groups installed electric pumps at the tank site. During the rainy season, water flowing in the nals in the area was pumped into the tank using these pipelines and pumps. The expenditure of about Rs. 100 lakh has been contributed by the members from their own funds, without any financial assistance from the Government or from any financial institution. There are 169 members of the society today. Against 143 ha. of gross area irrigated earlier from the project, an area of 400 ha. in the rabi season and 125 ha. in the summer season has been brought under irrigation by augmenting and saving water thus. The problem of drinking water has also been solved. For this effort, the Sanstha was awarded the 'Jain INCID-Krishi Sinchai Vikas Puraskar – 2002'.

8.1.45 Introduction of irrigation in any area inevitably results in disturbance of the ground water balance that existed prior to irrigation. Because of seepage from water conveyance systems and deep percolation losses from farms during irrigation, the rate of recharge to the ground water increases, resulting in the progressive rise of the water table which, if unchecked, leads to waterlogging in irrigated lands. Recharge to the ground water can be minimised by regulating improving water effect withdrawals from ground water to strike a balance with net recharge so that the rise of the ground water table is checked at an appropriate level. Conventional drainage methods are: horizontal drainage by sub-surface drains and vertical drainage by conjunctive use and pumping back into canal system or pumping from wells. These methods are quite expensive and present many operational and environmental problems.

8.1.46 Bio-drainage is an effective drainage measure particularly in dry, arid regions. It is less expensive, environment friendly and socially acceptable. Plantation of properly selected species of trees at suitable locations can meet the total

drainage requirements without any loss in agricultural produce.

### Ground water development

8.1.47 Over exploitation of ground water is leading to falling water levels in many areas especially, the hard rock areas. The CGWB has assessed that as on 1 April 1998, out of 5,711 blocks/mandals/taluks/watersheds, 310 are categorised as over-exploited (stage of groundwater exploitation has exceeded the annual replenishable resource). Another 160 are categorised as dark (stage of groundwater exploitation has exceeded

85 per cent of the annual replenishable resources). The state-wise position is as under (Table 8.1.1):

8.1.48 While there is over-exploitation in some parts of the country, under-exploitation of ground resources especially in the east and northeast is a matter of concern. Some of the reasons inhibiting ground water development in these parts are: -

- (i) Erratic and unreliable power supply.
- (ii) Fragmented holdings, the returns from which are not adequate to pay back loans

**Table 8.1.1**

S.No.	State	No. of districts	No. of blocks/ taluks/mandals/ watersheds	No. in over exploited category	No. in dark category
1.	Andhra Pradesh	22	1,104	12	14
2.	Arunachal Pradesh	3	-	-	-
3.	Assam	23	134	-	-
4.	Bihar	42	589	3	9
5.	Goa	3	12	0	0
6.	Gujarat	19	184	13	15
7.	Haryana	17	108	33	8
8.	Himachal Pradesh	12	69	0	0
9.	Jammu & Kashmir	14	123	0	0
10.	Karnataka	19	175	7	9
11.	Kerala	14	154	0	0
12.	Madhya Pradesh	45	459	2	1
13.	Maharashtra	29	231	2	6
14.	Manipur	6	26	0	0
15.	Meghalaya	5	29	0	0
16.	Mizoram	3	20	-	-
17.	Nagaland	7	21	0	0
18.	Orissa	30	314	4	4
19.	Punjab	17	138	72	11
20.	Rajasthan	32	236	74	20
21.	Sikkim	4	4	-	-
22.	Tamil Nadu	27	384	64	39
23.	Tripura	3	17	0	0
24.	Uttar Pradesh	58	819	19	21
25.	West Bengal	16	341	0	1
26.	U.T.s	-	20	5	2
	<b>Total</b>	<b>470</b>	<b>5,711</b>	<b>310</b>	<b>160</b>

from institutional finance for construction of ground water structures.

- (iii) Availability of cheaper canal water.
- (iv) Lack of adequate maintenance facilities.

8.1.49 The power supply position needs to be improved to make it more regular and reliable. Levying a minimum horsepower standing charge plus metered tariff is more desirable than extending power subsidies. Areas where the ground-water table is not very deep can have shallow tubewells

that can be run with diesel engines, promoted by a back-ended subsidy-cum-loan scheme. A better alternative will be to make these a common resource as per the Assam model (see Box).

8.1.50 The systematic approach to the management of ground water requires a sustainable legal framework. The Central Government has circulated a model ground water legislation among the states. A few states have enacted such a legislation. This is possible only with strong political will and public acceptance.

### **Box 8.1.3 Success Story In Ground Water Development**

The one lakh shallow tubewells programme initiated in Assam is a success story in ground water exploitation meriting replication in other areas with ground water potential. The total cost of the project was Rs. 230 crore, out of which one-third was contributed by the beneficiaries. The balance was made available to the State Government from the non-lapsable pool of Central resources and by the National Bank of Agriculture and Rural Development (NABARD). The shallow tubewells were installed in clusters of eight to ten through farmers bodies viz. Field Management Committees. Operation and maintenance of the tubewells is the responsibility of the Committee. The response of the beneficiaries to this programme was overwhelming.

The Department of Agriculture has also initiated a million tubewells programme for the eastern and northeastern states. The subsidy-cum-loan programme envisages 20 per cent contribution by the beneficiaries while the subsidy and loan components are 40 per cent each. The programme is being operated through NABARD.

8.1.51 The CGWB has been constituted into an Authority, which has started initiatives in notifying areas as protected areas from the point of view of over-exploitation of ground water. The CGWB has prepared a master plan for rainwater harvesting and

recharging of ground water. An area of 4.5 lakh sq. km has been identified in the master plan for recharge with 36 BCM of monsoon runoff at a cost of Rs. 24,500 crore. Groundwater recharge through rainwater harvesting has already been made

### **Box 8.1.4 Ground Water Legislation**

A model Bill to regulate and control development of ground water was circulated by the Central Ground Water Board to the State Governments in 1970 and again in 1992 for enactment. The model Bill was also circulated among the states in 1996 by the Ministry of Water Resources. However, the response from the State Governments has been most discouraging. Gujarat has enacted the legislation. Tamil Nadu has passed the Metropolitan Area Ground Water Regulation Act. Madhya Pradesh, Maharashtra and Andhra Pradesh have passed regulation for drinking water purposes. West Bengal and Karnataka have also passed a Bill for water resources conservation, protection and development but these are awaiting the assent of the President.

compulsory in many urban areas and this should be extended to all urban areas.

8.1.52 The National Commission for Integrated Water Resources Development, in its report, has stated that the story of watershed development undertaken so far is a mixed one of success and failure, initial success and later decline and initial failures and later revival. Compared to government programmes, projects undertaken by local communities, voluntary organisations and activists were more relevant to each location, had much greater people's involvement and were flexible and innovative. These projects have also been keen to evolve cost-effective techniques and use local traditional knowledge. A major reformulation of priorities and programmes and restructuring of institutions and operational means are vital for integrated local watershed development. The ultimate aim should be to make each rural area manage its own water needs through water harvesting. The Commission has emphasised the integration of rural area programmes into an umbrella programme and the inclusion of watershed development as an integral component. Funds available under poverty alleviation programmes should be tapped for watershed development.

8.1.53 The Committee on Twenty Five Years' Perspective Plan for the Development of Rainfed Areas set up by the Planning Commission has, in its report of June 1997, estimated that the entire treatable area of 75 m.ha. can be covered under the watershed programme with Government and people's initiative at a cost of Rs. 29,720 crore.

### Ground water pollution

8.1.54 Ground water has played a crucial role in irrigation and is also the main source of drinking water in rural and urban areas. It is estimated that 80 per cent of domestic needs in rural areas and 50 per cent in urban areas is met by ground water. Contamination of ground water sources due to over-exploitation and industrialisation is a matter of concern. It is difficult to restore ground water quality once the aquifer is contaminated. Ground water contamination occurs due to human intervention (seepage of sewer lines, disposal of chemical effluents in natural water courses, salinity ingress

in coastal areas due to over exploitation) and also naturally (viz. arsenic, fluoride, iron). In parts of West Bengal, over-exploitation has led to arsenic contamination. To promote human health, there is urgent need to prevent contamination of ground water and also promote and develop cost-effective techniques for purifying contaminated ground water for use in rural areas like solar stills. Dilution of harmful chemicals can, to a large extent, be achieved by recharge.

### DRINKING WATER SUPPLY AND SANITATION

8.1.55 The National Agenda for Governance aims to ensure provision of potable water supply to every village in the next five years. The National Water Policy, 2002 has accorded topmost water allocation priority to drinking water. The norms adopted for rural water and urban water supply are:

- |                               |  |
|-------------------------------|--|
| Rural water supply            | <ul style="list-style-type: none"> <li>- 40 litres per capita per day (lpcd) or one handpump for 250 persons within a walking distance of 1.6 km or elevation difference of 100 m in hills.</li> <li>- 30 lpcd additional for cattle in Desert Development Programme (DDP) areas.</li> </ul>   |
| Urban water supply (Domestic) | <ul style="list-style-type: none"> <li>- 40 lpcd where only spot sources are available.</li> <li>- 70 lpcd where piped water supply is available but no sewerage system</li> <li>- 125 lpcd where piped water supply and sewerage system are both available. 150 lpcd for metro cities.</li> <li>- Additional water for other demands like industrial, commercial, institutional, fire fighting, gardening etc.</li> </ul> |

8.1.56 Substantial progress has been made on the rural water supply front mainly due to the Accelerated Rural Water Supply Programme

(ARWSP), launched in 1972-73. Out of 14.22 lakh habitations, 12.56 lakh habitations have been fully covered, 1.48 lakh partially covered and 0.18 lakh not covered. Similarly urban water supply coverage is almost 100 per cent. However, State Governments have not paid adequate attention to urban and rural sanitation as the coverage is only 60 per cent and 35 per cent respectively.

8.1.57 Reforms in the drinking water sector were introduced on a pilot project basis in 65 districts under ARWSP. The project aims to include the people in the development process by engaging the beneficiaries in both the management and upkeep of the project. The beneficiaries are also expected to contribute 10 per cent of the project cost. The experience gained during the implementation of these pilot projects would be effectively utilised while expanding the reform package to other districts.

8.1.58 Sewage treatment plants should be made compulsory for all cities and industrial areas and this should be implemented in a time-bound manner. The water supply systems in urban areas need to be redesigned to supply treated water for drinking purposes only, while untreated and ground water should be used for other purpose like bathing, washing, gardening. A differential tariff structures should accordingly be worked out keeping in view the cost of treatment of water.

## Flood Management

8.1.59 According to the Working Group on Flood Control Programme for the Tenth Plan, the flood damage reported for the first three years of the Ninth Plan was Rs. 10,784 crore and the corresponding disaster relief provided as central share was also high at Rs. 3,992 crore. The Plan expenditure of Rs. 1,207 crore during this period thus seems inadequate. The increasing value of flood damage reflects the increasing economic activity in flood plains. There seems to be a hesitation on the part of state governments to enact flood plain zoning legislation. While legislation is desirable, other immediate steps such as differential insurance rules, additional surcharge by way of property tax on structures in risk areas etc. can also be taken to discourage unbridled economic growth, especially

construction of houses and other structures, in flood plains. The long-term and permanent solution, however, lies in the construction of storage, raising of villages, modification in cropping pattern (sowing crops which can tolerate water-logging) and setting up of a nation-wide network of communication, forecasting and forewarning systems.

8.1.60 In the past, flood proofing measures adopted in the country (mainly in Uttar Pradesh) consisted of raising a few villages above pre-determined flood levels and connecting them to nearby roads or highlands. In West Bengal and Assam, land fills were attempted in villages to keep houses above flood levels. In North Bihar, flood proofing measures were implemented by the construction of raised platforms with amenities where flood-affected people could be temporarily shifted. The Working Group on Flood Control for the Tenth Plan has recommended setting up of a new Integrated Flood Management Commission to review the follow-up action taken on the recommendations made by the Rashtriya Barh Ayog in 1980. This Commission could also study the long-term permanent solution and assess the number of villages in each state that can be raised. Other measures that merit detailed examination by the proposed Commission are: changes in crop pattern and timing of crops in flood affected areas and providing shallow tubewells for irrigation in such areas by capping them in flood months and reopening in other months.

## R & D Efforts

8.1.61 For optimal utilisation of the water resources and to ensure sustainable development, the highest standards of scientific activity have to be taken up in the sector. With this objective, research and development (R&D) efforts have to be speeded up through sponsored research as well as through invited research proposals. Institutionalised arrangements are necessary to compile and update the data on availability and utilisation of surface and ground water for various purposes and by sources in basins and sub-basins, on a continuing basis. Further, personnel involved in the sector have to be adequately trained to improve their knowledge and skills. It is also

essential to organise post-evaluation studies for major and medium irrigation projects to serve as a vital input to improve designs in order to make them more cost effective and functional. Similarly, evaluation of flood control works has to be undertaken to take necessary corrective actions.

### Use of Remote Sensing

8.1.62 Organisations under the Ministry of Water Resources like the CWC, Central Water and Power Research Station (CWPRS) and the National Institute of Hydrology (NIH) have developed in-house capability to interpret satellite imageries in some of the facets of water resources planning like reservoir sedimentation and river behaviour. The capability needs to be expanded to cover other areas in water resources planning like land use, irrigated area assessment, water logging and salinity, crop condition, river morphology studies using long-term data to assist states in planning of flood protection works etc.

### Single Administrative Ministry for Water

8.1.63 Presently water as a subject that is being dealt with in different ministries (Table 8.1.2).

8.1.64 While at the policy formulation level, the National Water Resources Council representing all the concerned ministries was set up in 1983 under the Prime Minister, the Planning Commission is of

the view that the subject of water and all its uses should be dealt with at the Centre by only one ministry — the Ministry of Water Resources.

8.1.65 To begin with, it is desirable that a National Water Resources Programme Coordination Committee under the chairmanship of Member (Agriculture and Water Resources), Planning Commission is set up to ensure that everyone's interests and concerns are taken into account when framing and implementing all programmes having a bearing on the use, development, conservation, augmentation, productivity and protection of water resources. Secretaries of the concerned ministries as well as the chairmen of CWC, CGWB and chairman and managing director of the National Hydroelectric Power Corporation (NHPC) would be members and the Secretary, Water Resources, would be the Member Secretary. The role of each Ministry in the use and management of water should be clearly identified by the Committee.

### Institutional and Legal Framework

8.1.66 At present, the Government has virtually no legal control over surface water resources and regulation of ground water use is done through restrictions on the flow of institutional credit from banks, mainly in the form of seeking various clearances before sanctioning loans. What is needed to effectively manage the country's water resources is an appropriate legal framework that clearly specifies

**Table 8.1.2**

S.No.	Ministry/Department	Subject dealt with
i.	Water Resources	Irrigation, command area development, flood control, ground water.
ii.	Rural Development	Rural drinking water supply and rural sanitation, watershed programmes.
iii.	Urban Development	Urban drinking water and urban sanitation.
iv.	Environment	Pollution control
v.	Power	Hydropower
vi.	Shipping	Inland navigation
vii.	Planning Commission	Allocation of Plan funds for various sectors and investment clearance.

the rights and responsibilities of various stakeholders. This issue merits serious consideration in the Tenth Plan, when a beginning could be made by evolving an appropriate forum for discussion on the scope and coverage of such a legal framework keeping in view practices in other countries.

## THE PATH AHEAD

8.1.67 The country's achievements in the areas of irrigation, command area development and flood management in the last five decades have been considerable, but there are many challenges that need to be faced in the new millennium. These are: the challenge of feeding a growing population, the challenge of poverty and malnutrition and the challenge of meeting the targets of economic growth in a sustainable manner so that the development process does not harm the environment.

8.1.68 It is a matter of concern that from the First Plan onwards, the funding for the irrigation sector with respect to the total state Plan size, has steadily declined from 23.25 per cent in the First Plan to 15 per cent in the Eighth Plan. This is particularly disappointing as the incremental capital output ratio (ICOR) for agriculture, where irrigation is an important input, is around 2:1. Moreover, it is well recognised that irrigation is the best bet for poverty alleviation in rural areas with several spin-off effects by way of secondary and tertiary benefits. There is, therefore, a strong case for progressively stepping up investments in the sector from the Tenth Plan onwards.

8.1.69 In the minor irrigation sector, the balance potential to be created is only 21 m. ha. and, at the rate of Rs. 30,000 per ha cost of development, an investment of Rs. 63,000 crore is required to create

all the balance potential of 21 m.ha in this sector. Since the gestation period of minor schemes is low, as compared to major/medium schemes, one strategy in the Tenth and subsequent Plans should be to give priority to minor irrigation and make the required investment through Plan and institutional resources to develop the full balance potential.

8.1.70 The revised National Water Policy adopted in April 2002 has focused on the areas needing attention in the water sector and has given a roadmap for further development of this sector to make it viable and self-sustaining. State Governments should prepare State Water Policies in a time-bound manner and also take steps to operationalise the policy.

8.1.71 The philosophy of development of the water sector needs a sea-change to move away from government owned and operated systems to participation of beneficiaries in construction, operation and maintenance. Some state governments have already made changes in existing Irrigation Acts or introduced new Acts to facilitate and motivate such participation. Others should follow suit with the central government acting as a catalyst. State governments also need to be persuaded to enact other suggested legislation for ground water regulation, dam safety and flood plain zoning. The central government should also take the initiative for drawing up guidelines and initiating policy changes for private sector participation in the irrigation sector.

8.1.72 It is deemed appropriate that the Tenth Plan is declared as a Water Plan for focused attention on the integrated development of water resources in the country.



## Financial and Physical details of ongoing Major projects of X Plan (2002-07)

(Rs. in Crore/Potential in Th. Ha.)

Sl. No.	Project Name	Started in Plan	Estimated cost Original	Latest	Likely Expenditure upto end of IX Plan	Spill over Cost	Likely achievement of Potential upto end of IX Plan	Districts Benefitted	Likely Year of Completion
<b>ANDHRA PRADESH</b>									
1	Jurala(Priyadarshini)	VI	76.40	512.00	492.25	19.75	36.17	MahaboobNagar	2006-07
2	Nagarjuna Sagar	II	91.12	1000.00	1056.40	-56.40	839.58	Khammam, Prakasham, Nellore, Guntur, Krishna, Nalgonda	2006-07
3	Pulivendula Branch Canal	IV	2.98	90.73	50.25	40.48	14.74	Cuddapah, Kurnool	2006-07
4	Singur	V	29.75	180.00	169.62	10.38	0.00	Medak	2006-07
5	Somasila	V	17.28	467.00	397.00	70.00	14.74	Nellore	2006-07
6	Sriram Sagar Stage-I	III	40.10	2550.00	1967.30	582.70	342.20	Nizamabad, Warrangal, Karim Nagar	2006-07
7	Srisailam Left Br. Canal	VI		1186.00	487.28	698.72	0.00	Nalgonda	Beyond X Plan
8	Srisailam Right Branch Canal	VI	220.22	1600.00	1252.32	347.68	40.22	Kurnool	2006-07
9	Telugu Ganga	VI		2149.00	1477.36	671.64	29.52	Kurnool, Cuddapah, Nellore	2006-07
10	Vamsadhara Stage-I	IV	8.78	109.00	104.49	4.51	58.26	Srikakulam	2003-04
11	Vamsadhara Stage-II (Niradi Barrage)	VI		749.83	26.39	723.44	0.00	Srikakulam	2006-07
12	Yeleru Reservoir (water supply scheme)	VI	107.35	335.34	344.04	-8.70	Water Supply Scheme	E.Godavari	2006-07
13	Chagalanadu	IX		85.00	42.65	42.35	0.00	E.Godavari	2006-07
14	Galaru Nagari Ph.II	IX		392.10	29.86	362.24	75.80	Cuddapah, Nellore, Chittur	2006-07
<b>ASSAM</b>									
15	Bordikerai	V	3.560	32.500	43.610	-11.11	30.752	Sonitpur	2003-04
16	Champamati	VI	15.320	80.000	59.820	20.18	4.180	Kokrajhar	2006-07
17	Dhansiri	V	15.830	224.800	171.990	52.81	34.650	Darrang	2006-07
18	Intd. Kollong	V	4.570	80.550	67.510	13.04	29.078	Nagaon	2003-04
<b>BIHAR</b>									
19	Bagmati	V	5.78	154.73	36.74	117.99	0.00	Sitamari	2009-10
20	Barnar	VII	8.03	230.43	46.10	184.33	0.00	Munger	2009-10
21	Bateshwarsthan Pump Ph.I	V	13.88	175.85	29.65	146.20	0.00	Bhagalpur	2009-10
22	Durgawati	V	26.30	266.97	218.96	48.01	23.69	Rohtas	2009-10
23	Eastern Kosi Canal Ph.II	VII		156.32	95.48	60.84	0.00	Purlia, Sahansa, Kathihar	2006-07
24	Gandak Ph.II	VII		578.27	97.02	481.25	7.50	Siwan, Vaishali, E&W Champaran	2009-10
25	Western Kosi Canal	III	13.49	693.88	696.03	-2.15	51.10	Madhumani, Darbhanga	2004-05
26	Upper Kiul Project (under residual payment)	V	8.07	109.93	113.78	-3.85	27.67	Munger	2002-03

Annexure 8.1.1 Contd.

(Rs. in Crore/Potential in Th. Ha.)

Sl. No.	Project Name	Started in Plan	Estimated cost Original	Latest	Likely Expenditure upto end of IX Plan	Spill over Cost	Likely achievement of Potential upto end of IX Plan	Districts Benefitted	Likely Year of Completion
<b>JHARKHAND</b>						0.00			
27	Ajoy Barrage	V	115.24	206.89	209.63	-2.74	0.00	Deoghar	2002-03
28	Auranga	V	125.40	699.36	24.29	675.07	0.00	Palamu	2008-09
29	Konar	V		373.00	105.03	267.97	0.00	Hazaribagh	2008-09
30	North Koel	V	439.00	814.74	512.92	301.82	66.00	Palamu, Aurangabad	2008-09
31	Punasi	VII		219.05	85.72	133.33	0.00	Santhal Pargana	2008-09
32	Subernarekha	V	1428.00	2376.15	1078.18	1297.97	0.00	Singhbhum	2008-09
33	Tilaiya	V		301.79	78.22	223.57	0.00	Nawada, Hazaribagh	2008-09
<b>GOA</b>						0.00			
34	Salauli	IV	9.61	153.00	157.00	-4.00	14.330	South Goa	2004
	- Tillari (IS)	V	217.22	510.73	350.73	160.00	2.170	North Goa	2005
<b>GUJARAT</b>						0.00			
35	Sardar Sarovar(IS)	VI	6406.04	13180.00	12264.00	916.00	235.72	12 districts	Beyond X Plan
36	Zankari	VI	18.70	90.00	4.99	85.01	0.00	Surat	Beyond X Plan
37	Sidumber	IX		30.53	0.21	30.32	0.00	Valsad	Beyond X Plan
<b>HARYANA</b>						0.00			
38	Gurgaon Canal	III	2.88	65.00	26.52	38.48	34.74	Gurgaon, Faridabad	Beyond X plan
39	J.L.N. Lift Irrigation	V	40.00	245.75	159.08	86.67	189.74	Rohtak, Bhiwani & Mahendragarh	2006-07
40	Loharu Lift	IV	4.13	79.63	39.00	40.63	43.70	Bhiwani, Ambala	2006-07
41	S.Y.L. Project(Punjab Portion)	V	59.70	601.00	454.62	146.38	432.88	Whole State	Beyond X plan
42	Rewari Lift St.II	III	0.62	39.60		39.60	32.01	Guragaon, Rewari, Jhajjar	
<b>HIMACHAL PRADESH</b>						0.00			
43	Shahnahar Irrigation Project	VIII	143.32	150.78	83.23	67.55	0.50	Kangra	2003-04
<b>KARNATAKA</b>						0.00			
44	Bennithore	V	73.25	153.00	203.75	-50.75	10.18	Gulbarga	2003-04
	- Dudhganga(IS)	VI		110.00	13.20	96.80	0.00	Belgaum	2006-07
45	Harangi	III		310.00	338.47	-28.47	48.37	Kodagu, Hassan, Mysore	2006-07
46	Hemavathi	AP 66-69		2484.73	1665.61	819.12	198.19	Hassan, Mandya, Tumkur	2006-07
47	Hippargi Barrage	V	418.77	524.21	57.20	467.01	0.00	Bijapur, Belgaum	2006-07
48	Kabini(NP)	II		1207.00		1207.00		Mysore, Ch. Nagar	
49	Karanja	V	98.00	284.92	301.13	-16.21	18.98	Bidar	2006-07
50	Malaprabha	III	19.91	603.56	640.40	-36.84	172.76	Belgaum, Dharwad, Bijapur	2006-07
51	Tungabhadra HLC(IS)	II	2.57	62.93	54.15	8.78	74.47	Bellang, Raichur	2006-07
52	Upper Krishna St.I	V	58.20	3785.46	8354.04	-4568.58	318.70	Bijapur, Raichur	2006-07

Sl. No.	Project Name	Started in Plan	Estimated cost Original	Latest	Likely Expenditure upto end of IX Plan	Spill over Cost	Likely achievement of Potential upto end of IX Plan	Districts Benefitted	Likely Year of Completion
53	Upper Tunga	VIII		877.75	177.72	700.03	0.00	Shimoga, Dharwad Chitradurga	2006-07
54	Varahi	VII		122.50	30.30	92.20	0.00	Dakshina Kannada	2006-07
55	Yagachi	VIII		239.70	139.64	100.06	3.00	Hassan	2006-07
56	Markandeya	IX		223.00	110.13	112.87	0.00	Belgaum	2006-07
57	Bhima Lift	IX		187.58	16.30	171.28	0.00	Gulbarga	2006-07
58	Singatlur	IX		595.00	49.60	545.40	0.00	Bellary	2006-07
<b>KERALA</b>						0.00			
59	Idamalayar	VI	17.85	107.00	112.00	-5.00	0.00	Ernakulam	2006-07
60	Kallada	III	13.28	457.50	706.00	-248.50	53.61	Alapuzha, Kollam	2006-07
61	Kuriarkutty (Karappara)	VIII		100.00	15.00	85.00	0.00	Palakkad	XI
62	Muvattupuzha	V	48.08	388.00	332.00	56.00	0.00	Idukki, Ernakulam, Kottayam	2006-07
<b>MADHYA PRADESH</b>									
63	Bansagar (IS) Unit-I	V	91.31	936.00	461.22	474.78	0.00	Rewa, Satna, Sidhi, Shahdol	2006
	Bansagar (IS) Unit-II	V	344.66	345.00	186.63	158.37	5.00	do	XI Plan
64	Bargi Div.	VIII	1101.23	1554.50	24.88	1529.62	0.87	Jabalpur, Satna, Rewa	2014
65	Bariarpur LBC	V	18.40	143.00	71.29	71.71	-	Chhatrapur	XI Plan
66	Mahan	VI	39.00	155.10	51.83	103.27	0.00	Sidhi	Beyond IX plan
67	Indira Sagar	VI	752.16	1574.00	610.78	963.22	0.00	Khandwa, Khargaon	2014
68	Jobat	VI	30.75	67.23	37.92	29.31	0.00	Dhar	2005
69	Kolar	IV	139.14	185.00	178.68	6.32	35.00	Sehore	2004
70	Mahi	VI	61.52	192.85	74.93	117.92	0.00	Dhar, Jhabua	XI Plan
71	Man	VI	44.10	96.13	106.61	-10.48	0.00	Dhar	2003
72	Omkareshwar (NVDA)	VIII	350.00	755.00	15.36	739.64	0.00	Khandwa, Khargaon, Dhar	2012
73	Pench Diversion	VIII	91.60	184.04	9.50	174.54	0.00	Chhindwara	IX Plan
-	Rajghat (IS) Unit-I	V	61.61	133.50	143.33	-9.83	0.00	Guna, Shivpuri, Datia, Tikamgarh Gwalior, Bhind	2003
	Rajghat (IS) Unit-II	V	309.21	523.41	436.74	86.67	18.80	do	2005
74	Rani Avanti Bai Sagar (Bargi)	V	566.34	759.00	560.08	198.92	25.68	Jabalpur, Narsimhapur	2005
75	Sindh Ph.I	IV	4.95	46.42	59.43	-13.01	40.20	Gwalior, Shivpuri	2004
76	Sindh Ph.II	VI	510.94	607.67	188.15	419.52	8.70	Shivpuri, Gwalior, Datia	XI Plan
77	Upper Wainganga	V	50.60	193.97	239.74	-45.77	81.00	Seoni, Balaghat	2007
78	Urmil (IS)	V	6.41	22.01	26.70	-4.69	3.80	Chhatrapur	2005
-	Bawanthadi Unit-I	VI		82.80	60.33	22.47	0.00	Balaghat, Bhandara	2007
	Bawanthadi Unit-II	VI		149.19	45.17	104.02	0.00	Do	XI Plan
<b>CHHATTISGARH</b>						0.00			
79	Mahanadi Reservoir	IV		1223.45	494.42	729.03	135.40	Raipur, Durg	2007
80	Jonk Diversion	IV	4.13	49.99	40.39	9.60	10.10	Raipur	2003

Annexure 8.1.1 Contd.

(Rs. in Crore/Potential in Th. Ha.)

Sl. No.	Project Name	Started in Plan	Estimated cost Original	Latest	Likely Expenditure upto end of IX Plan	Spill over Cost	Likely achievement of Potential upto end of IX Plan	Districts Benefitted	Likely Year of Completion
81	Hasdeo Bango	78-80	115.30	858.31	709.72	148.59	186.90	Bilaspur, Raigarh	2005
<b>MAHARASHTRA</b>						0.00			
82	Arunavati	VI	66.48	148.71	194.26	-45.55	23.97	Yavatmal	2004
83	Bawanthadi (IS)	78-80	161.58	124.17	108.62	15.55	0.00	Bhandara	2008
84	Bhatsa	V	164.11	322.49	246.42	76.07	8.93	Thane	2007
85	Bhima	III	42.58	919.00	858.60	60.40	214.53	Sholapur	2007
86	Chaskaman	V	22.48	347.14	289.25	57.89	21.21	Pune	2005
87	Dudhganga (IS)	V		540.00	372.12	167.88	22.39	Kolhapur	2007
88	Gosikhurd	VI	461.11	2091.00	1134.11	956.89	15.01	Nagpur, Chandrapur, Bhandara	2012
89	Human	VI		370.04	37.48	332.56	0.00	Chandrapur	2009
90	Jayakwadi St. I & II.	V	127.36	796.87	779.32	17.55	236.93	Aurangabad, Beed, Parbhani, Nanded, Jalna, Ahmednagar	2004
91	Kadwa	VI	27.00	48.46	64.47	-16.01	7.82	Nasik	2004
92	Khadakwasla	II	11.62	345.04	322.21	22.83	62.15	Pune	2005
93	Koyna Krishna L.I.S.	VI	259.10	1083.00	921.49	161.51	4.52	Sangli	2009
94	Krishna	III	27.66	370.00	388.97	-18.97	89.95	Satara, Sangli	2007
95	Kuadi	66-69	17.90	919.00	1052.45	-133.45	94.88	Pune, Solapur, Ahmednagar	2007
96	Lendi (IS)	VI		204.50	55.50	149.00	0.00	Nanded	2010
97	Lower Dudhna	VIII	52.21	347.83	130.62	217.21	0.00	Parbhani, Jalna	2010
98	Lower Penganga (IS)	VIII		207.14	156.66	50.48	0.00	Yavatmal, Chandrapur	2012
99	Lower Tirna (Flow)	VI	37.65	129.67	230.57	-100.90	26.60	Osmanabad, Latur	2007
	Lower Tirna (Lift)	VI		53.71		53.71			
100	Lower Wardha	VI		540.14	278.41	261.73	0.00	Wardha	2009
101	Lower Wunna	VI	87.55	261.33	274.08	-12.75	21.48	Nagpur, Wardha	2004
102	Nandur Madhmeshwar (A)	V		105.30	371.99	-266.69	0.00	Do	2009
	Nandur Madhmeshwar (N)	V	72.66	146.40		146.40		Aurangabad, Nasik, Ahmednagar	
103	Nira Deoghar	VIII		576.60	418.26	158.34	1.99	Satara	2008
104	Punad	VI	29.92	81.97	93.80	-11.83	0.00	Nasik	2005
105	Surya	78-80	19.35	175.14	228.20	-53.06	22.55	Thane	2007
106	Talamba	VI		238.85	78.06	160.79	0.00	Sindhudurg	2011
107	Tillari (IS)	78-80	217.22	424.06	484.16	-60.10	1.33	Sindhudurg	2008
108	Tultuli	VI		169.40	46.84	122.56	0.00	Gadchiroli	2010
109	Upper Godavari	66-69	14.20	133.23	116.94	16.29	66.17	Nasik, Ahmednagar, Aurangabad	2007
110	Upper Penganga	V	84.48	861.99	548.44	313.55	73.97	Yavatmal Parbhani, Nanded	2007
111	Upper Pravara	V	15.87	287.14	120.03	167.11	4.83	Ahmednagar	2007
112	Upper Tapi	IV	12.09	115.57	170.11	-54.54	37.37	Jalgaon	2006

SI. No.	Project Name	Started in Plan	Estimated cost Original	Latest	Likely Expenditure upto end of IX Plan	Spill over Cost	Likely achievement of Potential upto end of IX Plan	Districts Benefitted	Likely Year of Completion
113	Upper Wardha	V	39.88	661.86	618.03	43.83	73.33	Amaravati, Wardha	2007
114	Vishnupuri	78-80	78.93	193.22	184.10	9.12	18.54	Nanded	2007
115	Waghur	V	12.28	109.40	145.17	-35.77	0.00	Jalgaon	2007
116	Wan	VI	46.85	158.35	211.70	-53.35	18.17	Akola, Buldhana	2004
117	Warna	IV	31.08	892.00	429.55	462.45	18.81	Kohlapur, Sangli	2010
118	Bembla	VIII		353.35	206.00	147.35	5.82	Yavatmal	2008
119	Bhama Askheda	VIII		393.29	287.74	105.55	0.75	Pune	2008
120	Urmodi	VI		478.18	360.82	117.36	2.00	Satara	2009
121	Gunjawani	VIII		286.78	145.33	141.45	0.00	Pune	2008
122	Janai Shirsal	VIII		144.24	99.03	45.21	5.00	Pune	2008
123	Khadakpurna	VIII		336.34	126.20	210.14	11.58	Budhana	2008
124	Sina Kolegaon	VIII		228.00	142.09	85.91	2.00	Solapur	2008
125	Sina Madha LIS	VIII		197.70	93.50	104.20	1.50	Solapur	2008
126	Temghar	IX		267.64	234.52	33.12	1.00	Pune	2005
<b>MANIPUR</b>									
127	Khuga	VI	15.00	150.29	152.21	-1.92	8.00	Chura Chanderpur, Bihnpur	2002-03
128	Thoubal	AP 78-80	47.25	390.00	235.97	154.03	4.00	Imphal,Ukrul, Senapati, Thoubal	2004-05
<b>ORISSA</b>						0.00			
129	Potteru	IV	14.81	148.07	150.27	-2.20	102.62	Malkangiri	2003-04
130	Rengali	IV	233.64	2316.77	847.23	1469.54	3.25	Dhankanal	
131	Subernarekha (IS)	VII	790.52	1232.45	542.32	690.13	9.32	Balasure+ Mayurbhanj	Beyond X plan
132	Upper Indravati	AP 78-80	42.74	796.19	672.60	123.59	78.11	Kalahandi+Nowrangpur	2006-07
133	Kanupur Irrigation	VIII		330.89	22.22	308.67	0.00	Keonjhar, Sundargarh	Beyond X plan
134	Lower Indira	IX	211.70	211.70	34.22	177.48	0.00	Kalahandi, Bolangir	2006-07
136	Bagh Barrage	IX	49.19	49.19	27.00	22.19	0.00	Phulbani	2006-07
137	Deo	VI		135.91	64.69	71.22	0.00	Mayurbhanj	2006-07
138	Manjore	VIII		89.34	33.85	55.49	3.00	Dhankanal	2006-07
<b>RAJASTHAN</b>									
139	Bisalpur Irrigation	VII	173.03	228.30	201.66	26.64	49.50	Tonk, S.Madhopur	X Plan
-	Gurgaon Canal(IS)	III	2.88	35.40	28.10	7.30	22.78	Bharatpur	X Plan
140	I.G.N.P Stage-II	V	89.12	2267.44	1957.16	310.28	794.00	Sriganganagar, Bikaner, Churu, Barmer, Jodhpur, Jaisalmer	X Plan
141	Mahi Bajaj Sagar(IS)	IV	31.36	1016.98	499.84	517.14	94.01	Banswara, Dungarpur	X Plan
-	Narmada (SSP) (IS)	VI	467.53	548.00	178.88	369.12	0.00	Jalore, Barmer	Beyond X plan
142	Sidhmukh Nohar(EA)	AP 90-92	143.59	308.77	296.58	12.19	33.74	Hanumangarh, Churu	X Plan

Annexure 8.1.1 Contd.

(Rs. in Crore/Potential in Th. Ha.)

SI. No.	Project Name	Started in Plan	Estimated cost Original	Latest	Likely Expenditure upto end of IX Plan	Spill over Cost	Likely achievement of Potential upto end of IX Plan	Districts Benefitted	Likely Year of Completion
143	WRCP (Rajasthan)	IX		2000.00	0.66	1999.34	0.00	Whole State	Beyond X plan
<b>TAMIL NADU</b>									
144	WRCP (Tamil Nadu)	IX		1062.00	996.00	66.00	Stab.	Whole State	2002-02
<b>UTTAR PRADESH</b>									
145	Chambal Lift	78-79		69.83	97.76	-27.93	59.00	Etawah, Agra	2002-03
146	Eastern Ganga	V	48.46	579.00	347.97	231.03	51.36	Bijnor	2006-07
147	Jarauli P.C.	90-92	47.92	48.22	35.09	13.13	0.00	Fatehpur	2003-04
148	Kanhar Irrigation	V		240.00	64.02	175.98	0.00	Mirzapur	2006-07
-	Bansagar Dam (UP Share) IS	V		287.85	240.34	47.51	0.00		2006-07
	Bansagar Canal (UP)	1990-92		691.35	203.23	488.12	0.00	Allahabad, Mirzapur	2006-07
	Bansagar Dam (MP Share)	V		70.50	22.16	48.34	0.00		2006-07
149	Madhya Ganga	V	66.01	543.96	672.62	-128.66	172.58	Bullandshahar, Agra, Aligarh, Mathura, Etah, Mainpuri	2002-03
150	Providing Kharif Channels in Hindon Krishi Doab	78-80	15.53	34.56	96.65	-62.09	11.40	Meerut, Muzaffarnagar	2002-03
151	Rajghat Dam	V	123.22	133.08	133.09	-0.01	-	Lalitpur, Jalaun, Jhansi, Hamirpur.	2003-04
	Rajghat Canal(UP)	V	126.43	179.24	287.23	-107.99	97.57	do	2003-04
152	Saryu nahar	V	78.68	1256.00	1173.12	82.88	443.70	Bahraich, Gonda, Basti, Gorakhpur.	2006-07
153	Tehri Dam (Irrigation share)	78-80	197.92	711.14	748.29	-37.15	0.00	17 districts	X plan
<b>UTTARANCHAL</b>									
						0.00			
154	Jamrani Dam	V	61.25	280.00	26.32	253.68	21.00	Nainital, Rampur, Bareilly	X Plan Beyond
155	Kishau Dam	IX		864.00	8.10	855.90	0.00	Dehradun, Tehri	Beyond X Plan
156	Lakhwar Vyasi	V	140.97	576.00	217.49	358.51	0.00	Sharanpur, Muzaffarnagar, Meerut, Ghaziabad.	2006-07
<b>WEST BENGAL</b>									
						0.00			
157	Barrage Irrigation DVC	I		60.00	82.33	-22.33	407.96	Bankura, Hooghly Howrah	N.A.
158	Kangsabati	II	25.26	205.41	307.84	-102.43	398.20	Bankura, Hooghly, Midnapur	2001-02
159	Teesta Barrage St.I Ph.I	V	69.72	1177.00	979.13	197.87	153.19	Jalpaiguri, Malda, Dinapur	2008-09
-	Subernarekha	VIII	215.61	654.00	32.88	621.12	0.00	Midnapur	2009-10
<b>Total</b>			21149.61	98369.84	28391.49	28425.23	8396.72		

- Inter State Project (IS)

N.A. - Not Available

\* Provisional Figures

## Development of Irrigation Potential (cumulative) through Plan periods

Plan	Major/Medium Irrgn.		Minor Irrigation		Total Irrigation		Gross Irrigated Area as per Land Utl. Statistics
	Pot.	Utl.	Pot.	Utl.	Pot.	Utl.	
1	2	3	4	5	6	7	8
Pre-Plan	9.70	9.70	12.90	12.90	22.60	22.60	22.56
First (1951-56)	12.20	10.98	14.06	14.0	26.26	25.04	25.64
Second (1956-61)-GW	14.33	13.05	14.75 *(8.28)	14.75 (8.28)	29.08	27.80	27.98
Third (1961-66)	16.57	15.17	17.00	17.00	33.57	32.17	30.90
Annual (1966-69)	18.10	16.75	19.00 (12.50)	19.00 (12.50)	37.10	35.75	35.48
Fourth (1969-74)	20.70	18.69	23.50 (16.44)	23.50 (16.44)	44.20	42.19	40.28
Fifth (1974-78)	24.72	21.16	27.30 (19.80)	27.30 (19.80)	52.02	48.46	46.08
Annual (1978-80)	26.61	22.64	30.00 (22.00)	30.00 (22.00)	56.61	52.64	49.21
Sixth (1980-85)	27.70	23.57	37.52 (27.82)	35.25 (26.24)	65.22	58.82	54.53
Seventh (1985-90)	29.92	25.47	46.61 (35.62)	43.12 (33.15)	76.53	68.59	61.85
Annual (1990-92)	30.74	26.32	50.35 (38.89)	46.54 (36.25)	81.09	72.86	65.68
Eighth (1992-97) IX Plan (1997-02)	32.96	28.44	53.30	48.80	86.26	77.24	70.64
Anticipated	37.08	31.03	56.90	49.05	93.98	80.80	

\* Component of ground water.

**Source** : Ministry of Water Resources and Reports of Working Groups and Tenth Five Year Plan proposals of various states.

Annexure 8.1.3

(Th. Ha.)

## Statewise Position of Potential Creation

Sl. No.	Name of States & UTs	Ultimate Irrgn. Pot. For Major & Medium	Potential created till end of IX Plan	Potential utilised till end of IX Plan	Ultimate Irrgn. Pot. For Minor	Potential created till end of IX Plan	Potential utilised till end of IX Plan
1	2	3	4	5	6	7	8
1	Andhra Pradesh	5000.00	3303.22	3051.59	6260.00	3019.46	2781.22
2	Arunachal Pradesh	0.00	0.00	0.00	168.00	99.52	77.40
3	Assam	970.00	243.92	174.37	1900.00	603.62	494.11
4	Bihar	5223.50	2680.00	1714.83	5663.50	4716.44	3759.46
5	Jarkhand	1276.50	354.47	230.45	1183.50	588.87	471.09
6	Goa	62.00	21.17	15.33	54.00	19.14	20.00
7	Gujarat	3000.00	1430.37	1300.83	3103.00	1998.92	1876.14
8	Haryana	3000.00	2099.49	1849.97	1512.00	1630.95	1578.12
9	Himachal Pradesh	50.00	13.35	7.51	303.00	161.00	138.30
10	Jammu & Kashmir	250.00	179.69	168.75	1108.00	382.45	366.77
11	Karnataka	2500.00	2121.12	1844.82	3474.00	1585.40	1541.74
12	Kerala	1000.00	609.49	558.87	1679.00	640.02	603.76
13	Madhya Pradesh	4853.07	1386.90	875.63	11361.00	2256.13	2149.48
14	Chattisgarh	1146.93	922.50	760.74	571.00	487.70	322.86
15	Maharashtra	4100.00	3239.00	2147.24	4852.00	2942.60	2557.72
16	Manipur	135.00	156.00	111.00	469.00	75.49	62.34
17	Meghalaya	20.00	30.00	16.87	148.00	50.97	47.31
18	Mizoram	0.00	—	—	70.00	16.69	14.08
19	Nagaland	10.00	0.00	0.00	75.00	76.56	65.63
20	Orissa	3600.00	1826.56	1794.17	5203.00	1474.12	1337.55
21	Punjab	3000.00	2542.48	2485.99	2967.00	3427.56	3367.82
22	Rajasthan	2750.00	2482.15	2313.87	2378.00	2447.10	2361.80
23	Sikkim	20.00	—	—	50.00	29.67	23.61
24	Tamil Nadu	1500.00	1549.31	1549.29	4032.00	2123.38	2119.52
25	Tripura	100.00	4.90	4.50	181.00	109.65	96.09
26	Uttar Pradesh	12154.00	7910.09	6334.00	17481.00	21599.40	17279.62
27	Uttranchal	346.00	280.30	185.41	518.00	500.98	400.80
28	West Bengal	2300.00	1683.29	1527.12	4618.00	3792.52	3098.12
	UTs	98.00	6.51	3.94	46.00	43.71	35.41
	Total	58465.00	37076.28	31027.09	81428.00	56902.70	49047.01



**Magnitude & Composition of Investment Through Plan Periods in Irrigation and Flood Control Sectors**

Plan	Major Medium.	Minor Public	Irrigation Institutional. finance	Total	C.A.D.	Flood Control	Total
First (1951-56)	376.24	65.62	Neg.	65.62	-	13.21	455.07
Second (1956-61)	380	142.23	19.35	161.58	-	48.06	589.64
Third (1961-66)	576	327.73	115.37	443.10	-	82.09	1101.19
Annual (1966-69)	429.81	326.19	234.74	560.93	-	41.96	1032.70
Fourth (1969-74)	1242.30	512.28	661.06	1173.34	-	162.04	2577.68
Fifth (1974-78)	2516.18	630.83	778.76	1409.58	-	298.61	4224.38
Annual (1978-80)	2078.58	501.50	480.40	981.90	362.96*	329.96	3753.40
Sixth (1980-85)	7368.83	1979.26	1437.56	3416.82	743.05	786.85	12315.55
Seventh (1985-90)	11107.29	3118.35	3060.95	6179.30	1447.50	941.58	19675.67
Annual (1990-92)	5459.15	1680.48	1349.59	3030.07	619.45	460.64	9569.31
Eighth (1992-97)	21071.87	6408.36	5331.00	11739.36	2145.92	1691.68	36648.83
IX Plan (1997-2002)	48259.08	8615.07	2659.00	11274.07	1519.17	2629.23	63681.55
Anticipated							
<b>Total</b>	<b>100865.33</b>	<b>24307.9</b>	<b>16127.78</b>	<b>40435.67</b>	<b>6838.05</b>	<b>7485.91</b>	<b>155624.97</b>

**Source :** Reports of the Working Groups of Tenth Five Year Plan.and Tenth Plan Documents of State Govts

Annexure 8.1.5

(Rs. in Crore/Potential in Th. Ha.)

**Plan-wise proliferation of schemes**

	Major projects		Medium Projects	
	Taken up	Completed	Taken up	Completed
I Plan (1951-56)	44	5	165	34
II Plan(1956-61)	33	20	102	85
III Plan(1961-66)	32	11	44	61
A.Ps(1966-69)	11	5	27	43
IV Plan(1969-74)	33	15	74	62
V Plan(1974-78)	68	6	303	70
A.P. (1978-80)	11	2	55	18
VI Plan(1980-85)	31	30	89	138
VII Plan(1985-90)	11	14	36	137
A.P. (1990-92)	2	7	-	12
VIII Plan (1992-97)	19	9	72	48
*IX Plan (1997-2002)	13	25	37	45
<b>Total</b>	<b>308</b>	<b>149</b>	<b>1004</b>	<b>753</b>

