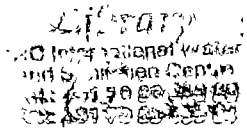

GOVERNMENT OF MAHARASHTRA

DRINKING WATER SUPPLY PROGRAMME

WHITE PAPER

RURAL DEVELOPMENT AND WATER CONSERVATION DEPARTMENT

AND

URBAN DEVELOPMENT DEPARTMENT

MANTRALAYA, MUMBAI 400 032

Dated the 26th July 1995

DRINKING WATER SUPPLY PROGRAMME

WHITE PAPER

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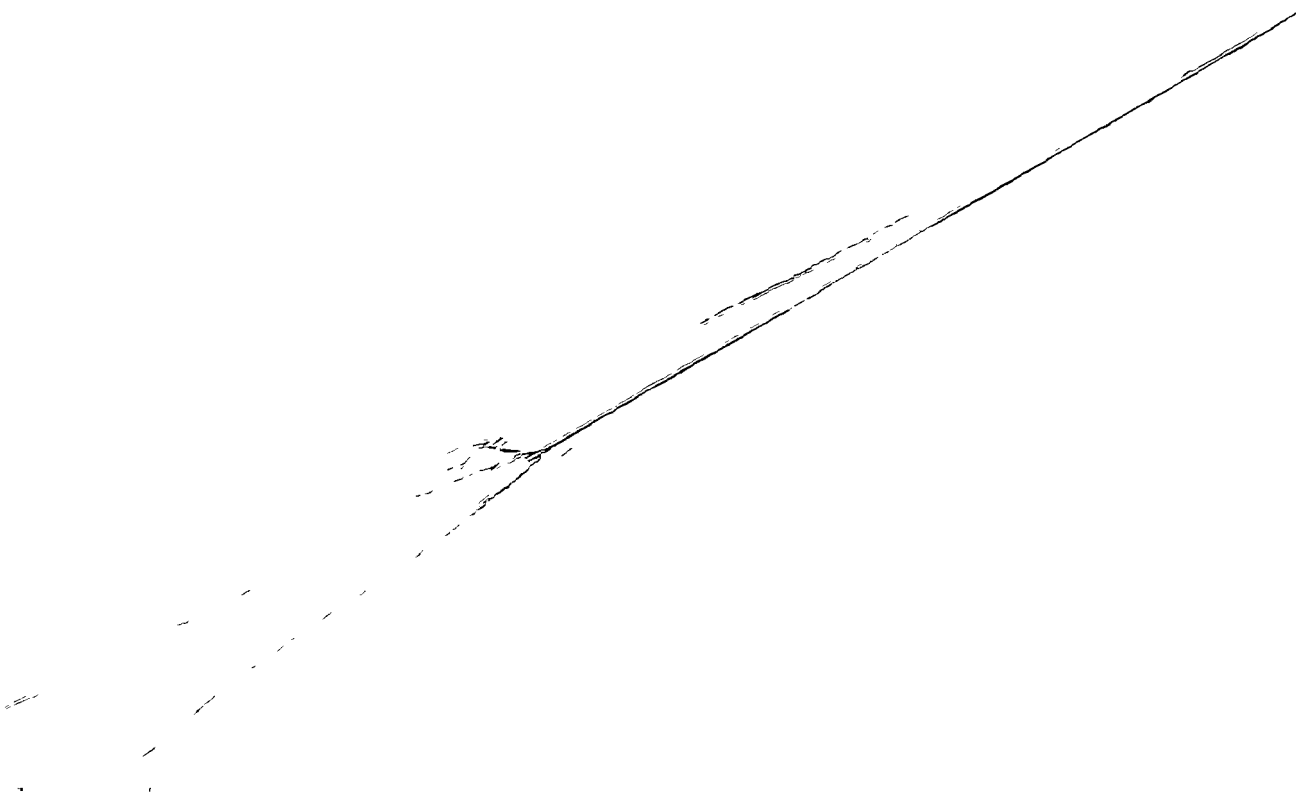

DRINKING WATER'S WHITE PAPER AT A GLANCE

1. Preface

1. Human as well as other life forms and all other sectors of development like agriculture, industry etc.depend on water. The water availability in the 21st century will be a scarce natural resource for development. Alongwith efforts for industrial development and economic growth, the provision of basic civic amenities like drinking water is also equally important and supplementary to development. However, despite huge investment made for tackling drinking water problem in urban and rural areas, the gravity of the situation still prevails.

2. It is necessary to adopt comprehensive and universally acceptable policy to tackle drinking water problem after in-depth study of all the aspects. Stern decisions will have to be taken in some cases. The success of the efforts depends upon the acceptance of such decisions. Hence this White Paper has been prepared after discussions at various levels, as declared by Honourable Chief Minister in the Budget Session of the Legislature for deciding the line of implementation of the programme. The White Paper is structured so as to facilitate decision making and achieve the aim behind it.

3. In order to know the opinions of peoples' representative, a conference of Members of Parliament, Members of Legislative Council and Assembly, Zilla Parishad Presidents, Mayors of Municipal Corporations and Presidents of Municipalities was organised on 5th June 1995 under the Chairmanship of the Chief Minister. Further, a seminar of the experts and social organisations in the field was organised on 30th June 1995 at Pune under the Chairmanship of the Deputy Chief Minister. While preparing this White Paper, the reports of various Central and State Committees on the subject, report of earlier Cabinet Sub-Committee, news paper articles and suggestions through other means have been duly considered.

4. A mere 0.5 per cent of the total water reserves on the planet in different forms is available for human and animal consumption. From this available water, the share of India is very small and unevenly distributed over different regions of the country. Further, the water availability in Maharashtra State is less than the national average due to topography and geo-physical structure.

5. During the Sixth Plan period, the rural drinking water programme was implemented in 15,883 out of 17,112 problem villages. Still the number of problem villages in the beginning of the Seventh Plan was 23,306. From these villages, 21,717 were tackled till 1991-92. However, the survey conducted in 1992-93 revealed 16,790 villages and 18,426 hamlets as problem villages. The intensity of the problem prevails even after spending Rs.2,000 crore since the Sixth Plan. Water shortage to some extent continues in all

10. The water supply schemes completed by spending large sums are not fully functioning for want of maintenance and timely and proper repairs. As a result, people do not get maximum benefits from the schemes.

11. The drinking water programme is very complicated and needs best management. Further, as the programme is implemented by different agencies at different levels, thelapses in coordination and monitoring have badly affected management.

12. Large funds are required for solving water problem in short period. The funds will have to be raised from all sources. Since the funds are limited, priorities will have to be fixed for the programme.

13. The Government is committed to make available drinking water from the groundwater sources and surface water sources and whenever necessary from privately owned sources. The rules in this regard will be strictly followed and according to the need, other measures will also be adopted.

2. Nature of Prevalant Programme, Agencies and status of Implementation.

14. Under the rural water supply programme, water supply is designed at the rate of 40 liters per capita per day for public standposts through least cost solutions such as dug-well, bore-well or piped water supply schemes. There is no provision in the existing programme for the supply of water for uses other than drinking. But schemes under Externally Aided Projects provide for 30 per cent private water connections, supplying water at the rate of 70 liters

urban areas where the schemes have been implemented except in 3 cities.

6. The drinking water problem is the disparity between the demand and supply of water. In order to solve the problem, effective management of the demand and supply will have tobe made. The demand of drinking water is continously increasing due to population growth, higher expectations of the people about standard of living and development process. Since 1951 census, the population of the state grew 2.8 times which is a matter of great concern and population control is an important aspect.

7. The recharging of groundwater in many regions of the State is poor due to geographical situation and ecological imbalance caused by large scale deforestation. Over exploitation of groundwater is leading to depletion of water table. Hence, watershed development programme will have to be taken up in large scale to improve ecology. Long term measures are essential to strengthen water sources and increase recharge of groundwater.

8. The availability of surface water is limited. Further, there is wide disparity in water availability among different regions, uses and sections. At some places the use is indiscriminate while at other places severe scarcity is felt. Hence it is absolutely essential to use water properly and economically in view of limited availability.

9. Polluted water has become a major issue in the drinking water problem. Water pollution is caused by various reasons in the development process and lack of attention towards water purification.

per capita per day. Besides, water at the rate of 6 liters per capita per day is reserved for livestock. The rate of water supply through public standposts is 40 liters per day. The schemes are designed on the basis of average supply of 55 liters per capita per day. In urban areas, depending upon the population of the city, supply is designed for 70 to 150 liters per capita per day. Besides, provision is made for institutional and professional needs, fire fighting purposes etc.

15. Rural water supply schemes are designed for a period of 15 years based on an annual population growth 1.08 per cent. According to the Central Government norms, a village having no public water supply within a radius of 1.6 kms are treated as problem village; while the state norm is availability of water within a radius of 0.5 km. Piped water supply schemes are undertaken in villages with more than 2000 population. The norms for bore-wells for villages is 1 borewell per 250 population and for habitats and hamlets 1 bore well per 80 persons. Norms of per capita cost for preparing plans and estimates have been revised in November 1992. For Schemes in Urban areas, the norm is actual shortfall in per capita availability. Accordingly, in respect of some cities emphasis is given on doing away with the backlog. While preparing the schemes population projections are made after taking into account rate of population growth in the past and working out averages. In Urban schemes per capita norms are not applicable.

16. In rural schemes, funds are available under Minimum Needs Programme of the state and Accelerated Rural Water Supply Programme of the Centre. Further, schemes are

taken up from external aids. Of late, assistance under Central Government accelerated programme is provided to cities having population below 20,000. However,major fundings is from State Government. Funds raised through people's contribution, Government grants and Loans. In the case of large projects, loan assistance is secured from World Bank, HUDCO and financial institution of Japan.

17. Up till now, 15856 piped water supply schemes, 63,901 wells and 1,18,000 successful bore wells have been undertaken in rural areas. At present almost all cities except three, are provided with piped water supply. Vengurla city scheme is nearly complete and Vasai Scheme is in progress while Malvan scheme has not yet commenced in spite of having been sanctioned.

18. The responsibility of maintaining water supply schemes in rural areas is entrusted to Panchayat Raj Institutions. These institutions are authorised to levy water cess subject to prescribed minimum and maximum rates and maintain, repair and manage the scheme, using the amount so levied.

In addition to this, maintenance and repairs fund has been instituted at district level. The state government contributes 5 per cent and central government 10 per cent of the budget provision for drinking water every year. Zilla Parishads have to contribute 20 per cent of their own income towards the fund. The responsibility for the maintenance of hand pumps, borewells, and electric pumps is entrusted to Zilla Parishad which are to meet the maintenance cost from taxes collected from Gram Panchayats at the prescribed rates.

19. In Urban areas, maintenance of water supply schemes is the responsibility of the Municipal Corporations/ Municipalities. Even then in some cities, Maharashtra Water Supply and Sewerage Board supply water in bulk/direct to consumers, while some other municipalities have entrusted maintenance of water supply schemes to the Board. Most of the corporation/municipal water supply schemes run in loss. Local bodies do not increase water rates to be charged to the consumers. Besides, instead of paying the dues to the Board or Zilla Parishad these institutions use the amounts so collected for other purposes and thus subsidies consumers indirectly.

20. Rural Water Supply programme is implemented at the district level through the Zilla Parishads, Ground Water Surveys and Development Agency and Maharashtra Water Supply and Sewerage Board. Zilla Parishads give administrative sanction to schemes costing upto Rs.10 lakhs and those above Rs.10 lakhs are sanctioned by the Government. Barring Greater Mumbai, planning and implementation of schemes of Corporations/municipalities is done by Maharashtra Water Supply Board. Of late Pune, Nashik and Kolhapur municipal Corporations are constructing their own schemes.

21. In order to monitor the programme at district level, district co-ordination committee has been set up under the Chairmanship of Guardian Minister of the respective district. The Committee consists of MP's MLA's, Presidents of Zilla Parishads, Chairman of some subject committees and presidents of Panchayat Samitis. The Chief Executive Officer of the Zilla Parishad is a Member-Secretary of the

Committee. A technical sub-committee has been formed to assist the co-ordination committee.

22. A survey of the problem villages/hamlets/habitats is undertaken at the beginning of every Five Year Plan period. Every Zilla Parishad has to prepare an "Action Plan" after considering all potential schemes of that district, and in accordance with the priority prescribed by the state Government. The "Action Plan" is implemented after obtaining approval from the District Co-ordinating and Monitoring Committee.

3. Norms & Criteria for Drinking Water Supply.

23. In rural areas water is supplied at public stand posts at the rate of 40 litre per capita per day. There is no provision for uses other than drinking purposes Externally Assisted Projects provide for 30 per cent private water connections on the basis of 70 liters per capita per day and for 6 liters per capita to livestocks. There is a demand in rural areas for private water connections, as well as for provision of water supply to livestocks, industry, fairs and pilgrimage and for tourism centres. Separate norms are being asked for villages at taluka places, large villages and rapidly urbanizing villages. In the rural areas people assemble together at different places like government and non-government offices, educational institutions, dispensaries, weekly bazaars, pilgrimage centres etc. and therefore there is need for fixing criteria for water supply making it strict and mandatory to the concerned institutions.

24. The following present norms of water supply in urban areas may be continued:

Population (1)		Norms per head per day (2)
		litres
Less then 20,000	...	70
Above 20 thousand but less than 60 thousands	...	100
Above 60 thousands, but less than 1 lakh	...	125
Above 1 lakh	...	150

At present, cities with population upto 20,000 are eligible for Centrally sponsored urban accelerated schemes. The Centre should be requested to relax this norm to cities with population upto 40,000.

25. Presently Urban water supply schemes are prepared in 2 phases of 15 years each, after taking into account population projections in the next 30 years. Increase in population is determined after taking into account its trend in the previous decades from 1951 to 1991. In the case of rural areas, however,the increase in population is assumed at an average annual rate of 1.08 per cent in the next 15 years. This has proved to be inadequate. It will, therefore, be proper to apply to rural schemes also the norms same as adopted for urban schemes, subject to availability of water.

26. Quantum of drinking water can only be increased as per its availability in respective areas. Besides, it is necessary to give priority to those areas not receiving sufficient water based on present norms. Rural Water Supply

schemes are entirely funded through Government grants, while a major portion of funds of urban water supply schemes is in the form of loans. It is therefore, necessary to keep this funding difference in mind while enhancing the rate of water supply in rural areas.

The state government gets substantial funds under Rural Water Supply programme from the centre,and these funds are increasing regularely. Hence, any change in norms will have to be done with the approval of the Central Government.

4. Industrial Water Needs.

27. Maharashtra is at the forefront of industrialization in the country and to maintain this position, an exhaustive survey will have to be done for determining the water need of industries for the next 30 years.

28. Following action can be taken to avoid pollution of water sources due to industrial development.

(i) Maharashtra Industrial Development Croporation (MIDC) will erect treatment plants in approved/ proposed zones for chemical industries.

(ii) MIDC will examine measure to be taken to treat effluents in existing chemical industries zones.

(iii) In the disposal of effluents due care will be taken to see that water sources outside the@@ i industrial area also are not polluted.

(iv) Sewerage process plants will be installed in large industrial areas.

5. Groundwater Availability, Water Conservation and Regulation on withdrawal.

29. The geological structure and leeward location of Maharashtra limits the availability of water in the state. The rainfall and recharge of ground water is generally stable. However, due to excessive exploitation of water, scarcity is experienced during the summer months. Groundwater is a public asset that needs to be utliised judiciously.

30. Water supply schemes should not be based on ground water sources in the case of villages with a population above 2000. Augmenting groundwater recharge for strengthening of water sources, water conservation programme will have to be undertaken. In order to protect drinking water sources,effective implementation of Maharashtra Ground Water (Control for the purpose of drinking water) Act 1993 is indispensable.

31. Considering that ground water is limited for perennial irrigation except in catchment areas of dams and some parts of Nagpur, Chandrapur, Bhandara and Gadchiroli districts, it is necessary to review the use of water for irrigation of rabi and kharif crops in general. It would be advisable to supply water year round only if micro irrigation systems like drip irrigation are used. Public awareness campaigns will have to be undertaken to popularize this system.

6. Surface Water Sources.

32. In Maharashtra, 123 billion Cubic Meter of water (75 per cent reliability) is available. Out of this, only 74 billion cubic meter water can be used due to various reasons,

and is not distributed in different regions in the proportion of population. The Irrigation department has so far constructed dams which can store about 24.83 billion cu.m. of water. This has created an irrigation potential of about 29 billion hectares. About Rs.7,200 cores have been invested on these so far.

33. Water for drinking will be made available from these irrigation projects on priority basis. It is possible to plan projects under construction accordingly. But in the case of completed projects wherein farmers are using water for irrigation, action will be taken for making drinking water available on preferential basis.

34. Since Minor Irrigation projects are planned for eight month storage, there will be large scale wastage of water due to evaporation, if drinking water scheme are based on them. It will therefore, be improper to plan drinking water schemes based on minor irrigation tanks.

35. Drinking water schemes based on rivers or canals, lead to wastage and pollution of water. It will, therefore, be useful if water is lifted from water reservoirs directly through pipes. Where such a course of action is not practicable, it will be necessary to construct storage tanks of sufficient capacity with a separate provision.

36. Districtwise and taluka-wise water plans need to be prepared, taking into consideration total availability of water and its use for different purposes in future. In the case of irrigation projects which are in planning stage, the canal irrigation system should be developed for water available, after accounting for drinking and industrial purpose.

37. There is also need for taking detailed measures for optimum use of dead storage in large and medium dams. Two ways to achieve this are to construct base of jackwell, for drinking water, below the bottom level for releasing water for irrigation. So as to use the dead storage during exingencies. Secondly while planning of big dams, provision should be made for sluice gates in the river so that water from the dead storage can be used in times of need.

38. With a view to maximizing efficient use of available water, funds should be increased for supervision and repairs of dams of large and medium projects and their distribution system.

39. In respect of irrigation projects where more than 10 per cent water will be used for purposes other than irrigation, the institutions using water for such purpose should share the cost of the dam proportionately.

40. About 15 per cent water from the irrigation projects is used at present for non-irrigation purposes. The balance 85 per cent is used for irrigation only. It means that water availability will increase if the water is used more efficiently. This could be achieved by concentrating attention in a big way on drip-irrigation and sprinkler irrigation, even making the systems compulsory.

7. Economy in water utilisation and Water Audit.

41. Considering limited availability of water in the State and increasing requirement for different sectors of development, there is need for effective planning of water allocation and water use. Care needs to be taken that the

economic use of water will not be an impediment to development. As a long term policy, the water requirement should be met, as far as possible, from ground and surface water available in the concerned watersheds so that water supply schemes will be within the reach and affordability of the people. Besides, agricultural development programme will have to focus on crop planning for increasing productivity through minimal use of water.

42. There is need to formulate a general strategy for water conservation on the lines of conservation of energy. The strategy may include following items:

(a) To implement the concept of water conservation on the lines of energy conservation;

(b) To prepare reports about usage of water@@ i industry wise and institution-wise;

(c) To mention the progress of implementation of water economy measures by all institutions in their annual reports;

(d) To plan effective research and development (R&D) on all matters of economical use of water.

8. Drinking water sources and Measures for Pollution Control

43. It is the responsibility of the state government to supply pure and safe water to the people by controlling pollution of water sources. In order to prevent pollution many measures have been suggested. The State will have to formulate a policy after considering pros and cons of these measures so that drinking water sources will be protected

and substantial progress will be made in future in controlling water pollution.

44. In order to keep water sources protected, it is the need of the hour to regulate industries situated near rivers and drinking water sources; encourage minimum water use and modern and proper techniques of effluent control; cleaning some portions of rivers; proper disposal of effluent and other harmful solid wastes; create social awareness among industrial units, local institutions, government departments and agencies, and more importantly among the people; avoid wastage of the previous resource by recycling waste water; and people's participation in decision making for integrated water conservation programme.

45. Lack of clean surrounding is one of the main causes of wide-spread pollution in rural areas. Only 5 to 6 percent of the households have their own toilets. Community toilets and drainages is also a neglected area. Health education is also ignored and hence there is public demand for sanitation programmes. Like externally aided projects, it is necessary to implement integrated projects covering drinking water, environmental sanitation and health education. Clean environment and pollution control should be a part of new water supply schemes. No difficulty is envisaged in effecting this policy in rural areas as the cost of environmental sanitation is minimal in comparison to the total cost.

46. Programme for private toilets and public latrines for women deserves to be given impetus. Besides, there is need to integrate this programme with bio-gas projects.

47. Water testing laboratories need to be strengthened to enable sample testing frequently and receive immediate results so as to take corrective measures. Presently, there is no system for water filteration in the small water supply schemes. It is necessary to develop an economic yet effective technology for purifying drinking water.

9. Maintenance, Repairs and sustainability of Schemes.

48. In rural areas, nearly 27 per cent of the projects need repairs of various nature. They are therefore not fully utilised. The major reasons for such situations are: defective design and construction to some extent, non-availability of adequate water, no take over of the schemes by local bodies, improper maintenance of the schemes taken over, poor financial condition of the local bodies, non-recovery of water tax from local people, and indifference and negligence at local level.

49. Since April 1985, the provision of 5 to 10 per cent popular contribution for rural water supply schmes has been deleted. As the schemes are based now on 100 percent grants, sufficient attention is not paid at local level in some places. It is therefore necessary to consider the need for some minimum level of people's contribution for maintenance and repairs. In order to avoid delays the amount can be made available to local bodies in the form of loans.

50. The main difficulty in respect of maintenance and repairs is inadequacies in the administrative machinery. Large piped water supply schemes are constructed by Maharashtra Water Supply and Sewerage Board and

borewells are drilled by Ground Water Survey and development Agency (GSDA). After completion these schemes are transferred to local bodies. However local bodies complain of basic defects in design and construction. On the other hand, there are complaints that local bodies do not maintain and repair these schemes. Since the fact remains unknown; such conflicts are to be kept in mind while suggesting alternative administrative set up for water supply.

51. Zilla Parishads as well as Village Panchayats pass resolution to take over and maintain water supply schemes to obtain administrative sanction. However, they later start making difficult demands to the Government. Therefore there should be a permanant policy for implementalation of schemes.It can be made obligatory that alongwith the resolution for administration sanction the local bodies should clearly indicate the source and extent of funds and the machinery for maintenance. Also,it can be made obligatory to Zilla Parishads and village panchayats to pass a resolution for fixing and levying water tax.Also new projects should not be sanctioned unless maintenance and repairs of earlier projects has been done.

52. District coordinating and monitoriing committee in every district should ensure that while preparing master plans for water supply and annual plan proposals, a detailed work plan for implementation of the schemes is prepared as a part of the programme Further, both the work plans and schemes should be sanctioned together.

53. All Municipalities/Municipal Corporations should make a provision in their budget for amount payable to the Water Supply Board and for maintenance of water supply schemes. District Collectors should not approve municipal budgets which do not have such provision. Further, inspite of such provision if the amount is not paid, such irregularity should be treated as inefficiency and Govt.should take action against the Municipality.

54. The Maharashtra Water Supply and Sewerage Board has to receive Rs.68 crores as dues against the expenditure on schemes executed but not taken over by panchayati Raj Institutions and schemes maintained by the Board. Further, the Board has to receive an amount of about Rs.180 crore as dues mounting on account of repayment of loans, water charges Bills and maintenance and repairs expenses from Municipalities and Municipal Corporations in the State. This has badly affected the working of the Board and urgent remedial action is needed.

55. All Panchayat Raj Institutions as also Municipalities should draw a time-plan to clear the overdues of the board and the repayment should be made compulsory. After the over dues are repaid interest on overdues can be considered for a waiver. However, as an interim arrangement to regularise the working certain amount should be given to the Board as interest free loan.

56. Minimum and maximum rates for water charges for piped water supply were prescribed in 1982. The levy to be recovered by Zilla Parishads from Village Panchayats for maintenance and repairs of tubewells was also

prescribed 15 years back. These rates, therefore, need upward revision.

57. As a long term policy, it will be proper if repairs of borewells etc.is done through social organisations and women's groups. Meanwhile taluka level maintenance teams created in 1978 will have to be strengthened to some extent and the Government will have to consider sharing the expenses on strengthening for some period.

58. Every municipality should levy realistic cess based on actual operational costs so as to run the water projects at least on a no profit/no loss basis. Further, it must be made obligatory for municipalities to recover minimum water charges.

59. In due course, maintenance of completed water projects should be carried out on contract basis wothout increasing existing staff, by the Municipal corporations / municipalties and wherever possible by Zilla Parishads.

60. Over the years, the maintenance and repair works need to be made sustainable through contributions from local population. However, for a fixed period, the Government can consider financial assistance to rural water supply schemes within the following parameters:

(a) The assistance will be in proportion to the funds recovered locally.

(b) The assistance should be reduced over a period according to certain time schedule so that the project becomes self sustaining.

(c) This assistance should be linked to the economic conditions & available infrastructure of different regions.

(d) Electricity charges need to be based on Horse Power basis and this concession should be reduced by stages. Fifty percentage subsidy is being given to the Gram Panchayats on the electricity bills of their own schemes. This should be extended to Zilla Parishads also for their regional projects.

61. Municipalities are demanding that urban areas also get the concession like rural water supply schemes to pay electricity bills on the basis of H.P.

62. In cities, the number of public water connections should be reduced and emphasis should be given on increasing private domestic connections so as to enhance the income of municipalities in the form of water tax. In rural areas also increasing the number of private domestic water connections will help to increase the income of the Gram Panchayats.

63. The term maintenance and repairs should be define elaborately and a policy should be declared in this regard. This should specially include provision for preventive maintenance.

64. Stopping of water leakage in distribution system will increase availability of water to that extent. Efforts should be made to stop visible water leakage. Wherever necessary leakages need to be detected with use of instruments, and measures taken to stop leakages, if necessary, trained staff should be appointed.

65. The performance on water purification and maintenance and repairs by local Institutious should be evaluated annually and appropriate incentives disincentives instituted.

10. Planning and Implementation of the Programme.

66. Planning, implementation and maintenance/repairs of drinking water programme is a very vast field having natural, administrative and social complications. Hence the planning and implementation of the programmes needs skillful management Therefore all related Institutious viz., Maharashtra Water supply and Sewerage Board, Ground Water Survey and Development Agency, etc.should be totally modernised and computerised.

67. The action plan for implementation of programme should be made an integral part of the water supply programme. The funds required, necessary action, staff and machinery should be incorporated in the action plan. Further, the programme/scheme together with action plan should be approved.

The scope of this programme will have to be limited to the extent of availability of funds and administrative machinery. Otherwise, it will lead to time and cost overruns and poor quality.

68. To have proper coordination on the action plan, a system like memorandum of understanding (MoU) can be started between the Government and the agencies implementing the programme. The memorandum should high-light government's expectations from the agency

availability of funds, incentives for performance and penalties for shorfalls.

69. The assured water source, particularly ground water source, is a matter of importance in a scheme. The source should last for the proposed life of the scheme. To achieve this, action is esential after special study.

70. While designing the scheme the assumptions should be practicable. Impracticable assumptions should not be included in order to fit scheme somehow within accepted expenditure norms. Design should therefore take into account wastage in water, capacity of the water tank, pumping hours etc.

71. Over the years certain problems crop up in the scheme e.g.insufficient source, breakage of pipe lines, defects in pumping or distribution system. As the existing water supply programme does not have provision for rehabilitation or for special repairs of the projects and as local bodies are unable to incur this expenditure, the projects are rendered useless for want of marginal funds.

72. While planning scheme various provisions are made for quality assurance measures e.g.ensuring availability of water resources, fixing priority of various jobs, selection of proper contractors, preventing divisions of scheme for construction, fixing responsibility on the contractors in case of detection of defects, not allowing water supply till the project is complete etc. these measures need to be strictly followed.

73. Inspection by third party as in the case of externally aided projects is possible. For this purpose, services of

various engineering colleges and allied institutions can be availed.

74. Generally, there are complaints about delay in preparing new schemes, supplementing or revising earlier schemes, giving administrative sanction and implementation. It is therefore necessary to draw a time bound programme and review the progress (at state, regional and district level). Computerisation and modernisation will save time in the work being done and so far done.

75. For successful implementation of the drinking water supply programme, sufficient trained staff is essential at state/regional, District and other levels. Obviously, the organisation will have to be strengthened at minimum cost by modernisation and procedural improvement.

76. An institution may be established to utilise the knowledge of various non governmental organisations, colleges, voluntary organisations and experts in this sector. This institution can make recommandations on deciding technical norms, improving the quality of the works and for bringing down expenditure. Similarly, compilation of available information & dissemination of the same can be arranged through existing institutions.

77. Some social organisations have done excellent work in drinking water and water conservation programmes. These institutions should be encouraged for maximum participation in the programme. The work done by these organisation can be used as pilot projects or model projects.

11. Funding of water supply programme.

78. According to the districtwise plans prepared for the drinking water supply programme the requirement of funds is about Rs.4,000 crores for rural areas and Rs.2,700 crores for urban areas (excluding Greater Mumbai). The Government is committed to provide drinking water to all and the funds will have to be raised from all sources,i.e. State Government, Central Govt., external agencies, private agencies etc.

79. More and more funds are being received from the Central Government still, large increase in funds in the Nineth Five Year Plan is necessary. Central Government should allocate more funds for urban areas also like rural areas. State government needs to give top priority to drinking water programmes and stress for higher allocation in the National Development Council by creating right atmosphere at national level. State government will have to make at least a matching contribution for this and this might mean a considerable increase in its outlay for this sector, perhaps at the cost of some other sectors. A consensus in this regards will facilitate making available funds.

80. In the year 1995-96 about Rs.250/-crores will be allotted to the local development funds of M.Ps. and M.L.As. There is a provision of allocating 20 percent of the states local development fund for drinking water. At some places, even more funds are provided. It will be helpful if 50 to 75 percent of the funds are made available for drinking water. The M.Ps. can also be requested to allocate substantial funds for drinking water programme from their regional development funds.

81. The World Bank has expressed its interest in this programme. Efforts will have to be made to secure more funds from other external agencies. All such agencies however insist that the project should be made self sustaining, by levying water tax on the local population and some part of the project cost should be met through people's contribution.

82. Feasibility of privatisation of drinking water programmes can also be assessed as in the areas like power, transport, ports etc. Further, levying of a special cess for this purpose can also be considered. As provision of drinking water is considered as noble and divine, funds can be mobilized from donors on a large scale.

83. Every year the government spends money on several temporary scarcity measures in rural as well as urban areas. As funds have to be made available every year, it will be useful if certain provision is made in the normal budget for such measures. Further, temporary measures should be planned in such a way that as far as possible the assets created will be of permanent nature.

84. The provision for 10 percent contribution by municipalities and municipal corporations for urban water supply schemes should be scrapped and loan assistance should be increased to that extent. This will facilitate implementation of schemes without delay.

85. Suitable non-plan provisions need to be made in the budget of Urban Development Department for repayment of loans to M.W.S.S.B. on behalf of municipalities and towards expenses on maintenance and repairs.

12. Administrative set-up for water supply programme.

86. Various agencies are working in rural and urban areas in the field of drinking water supply, for example, Maharashtra Water Supply and Sewerage Board, Zilla Parishads and Groundwater Surveys and Development Agency in designing and implementation and Municipalities/ Zilla Parishads/Gram Panchayats in maintenance. At state level also several departments are involved in the programme. Existing administrative set up could not fulfill peoples' expectations in the implementation of the programmes. People's representatives at all levels have pointed out deficiencies in the organisation.

87. Lack of coordination & monitoring appears in the programme due to the involvement of several agencies at various levels. Further, there are disparities in powers and responsibilities. Since the agencies for implementation and for maintenance & repairs are different, the respensibility for defects in the scheme cannot be fixed. The departments at state and regional levels should be reorganised to promote better coordination.

88. At the state level a new separate water supply department is necessary for handling the programme comprehensively for both urban and rural areas. Such separate department will observe the aspects from different angles and give impetus to the programme.

89. Even if such a new department at the state level is formed, actual implementation involves coordination with Irrigation department, Revenue and Forests department,

Industry and Power department, Rural Development department, Urban Development department and Maharashtra Water Pollution control Board. In order to ensure coordination and monitoring it will be desirable to form a Water Resources Authority under the Chairmanship of the Chief Minister.

90. Commensurate with the state level structure, organisational framework can be restructured at regional level and their working jurisdiction, authority and responsibilities can be fixed.

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PREFACE

"Bhima, Varada, Krishna, Koyana,
Bhadra, Godavari.
All fill water with a sense of unity
Let Yamuna water given to ponies of Bhima
Hails to my Maharashtra."

Maharashtra, known for pilgrimage nature and eulogised by ballad singers and poets, has ironically to face persistant draughts and water shortages. Hewever, with cooperation from all, it is possible to win over the situation.

1.2 From king Satwahan to Jijamata, Dadoji Kondeo, chatrapati Shivaji and Ahilyabai Holkar, all strived to provide drinking water to the people by digging wells & ponds and constructing river approaches and dams. Interestingly, the water of ponds on various forts is useful even today. The wells in the forts at Rajmachi, Raigad, Janjira, Sindhudurg, Shivneri and Holkar palace at chandwad reflect the confidence, will, determination and social awareness of the rulers of the past.

1.3 Water is an important constituent of the earth and given by nature as a right. The life origins from water

and it is indispensible for life. Human and other life will not survive without water. Industry and development is not possible without water. Hence water is called as "Jeevan". The water problem is the problem of existence of the society. Availability of water in the 21st contury will be an important aspect in the development process. We all are on the threshold of the 21st century. The pace of development of industry, technology, science, agriculture, etc in Maharashtra is impressive. On the face of fast progress and development, the drinking water problem is a contradictory picture.

1.4 Water is a limited natural resource. Unfortunately, the natural distribution of the available water is largely uneven and there is a scarcity of water at many places on the earth. In many places, waste water and substances from chemical processes of the industry flow to water rendering pollution to water and harmful to health. Hence adequate potable water can not be assured every where. Therefore measures for quantitatine and qualitative water conversation will have to be undertaken by changing our attitude. The reasons for severe water problem include unprecendented population growth, poverty and ignorance, old and outdated cultivation methods,indiscriminate tree felling and fast growth of industry. Very serious water scarecity will arise if suitable steps are not taken in time.

1.5 The total water reserve in different forms in the world is nearly 14,54,329 million TCM (Thousand Cubic

Metres). The classification of the total water reserves is as under :—

	Water Form (1)		Million TCM (2)
1.	Sea water	...	1370000
2.	Ground water	...	60000
3.	Ice	...	24000
4.	Lakes	...	230
5.	Vapour	...	014
6.	Surface water	...	083
7.	Streams & Rivers	...	001.2
	Total	...	1454328.2

The above classification shows that 97.5 percent water is in the from of sea water while 2 percent accounts for ice in the polar regions. Only 0.5 percent of the water is available in lakes & ponds as surface water and groundwater and only this water is useful to meet human needs. It means only 29000 million TCM water in the world is useful.

1.6 As regards India, about 4000 milion TCM water is available from normal rainfall. From this large portion is converted into ice, some percolates in the ground while some converted into vapour and all these water forms are of no use. Hence only 690 million TCM water is available for human needs. With maximum efforts only 420 million TCM groundwater can be used. Considering surface water and ground water together, total 1110 million TCM water can be utilised (Reoprt of Irrigation Commission,1972).

Present and future water requirements of the country ar as follows:—

(Qty in Milion TCM)

Sr No (1)	Need (2)	1990 (3)	percent (4)	2000 (5)	percent (6)	2075 (7)	percent (8)
1	Household	25	4.5	33	4.4	52	5.0
2	Irrigation	460	83.3	630	84.0	770	73.3
3	Power generation	19	3.5	27	3.6	71	6.8
4	Industrial use	15	2.7	30	4.0	120	11.4
5	Other	33	6.0	30	4.0	37	3.5
	Total Surface	362	65.6	500	66.7	700	66.7
	Total Below Surface	190	34.4	250	33.3	350	33.3
	Grand Total	552	100.0	750	100.0	1050	100.0

(Source -Central Water Commission, Water Conservaion Report

1.7 The total geographical area of India is 329 million hectares. The cultivable area is 186 million hectares and the present area under cultivation is 142 million hectares. In the 5th National Water Conference the river-valley wise availability of water is shown as 1900 million TCM. From this water available, planning of 1100 million TCM surface water is possible for different purposes. The population of the country will be 100 crore in the year 2000 and 135 crore in the year 2025. Considering the above water reserve for drinking only, the water availability in the country is 1100 cubic meter per capita.

1.8 As regards Maharashtra, out of 123 million TCM surface water available in the state, 74 million TCM can be tapped for other purposes. According to the 1991 census, the population of Maharashtra state is 7 crore 89 lakh. It shows the water availability of 940 cubic meter per capita. The valleywise details are as under.

Sr No	Name of the Valley	Population (crore)	Available Water Million TCM	Usable Water Million TCM	Water available per capita CM
(1)	(2)	(3)	(4)	(5)	(6)
1	Godavari	2.88	38		1069
2	Krishna	1.87	27		877
3	Tapti	1.14	7	74	525
4	Narmada	0.01			...
5	West ward	1.99	51		1038
	Total	7.89	123	74	984

1.9 The measures taken from time to time for drinking water in rural areas and the present position are as follows.

The details of implementation of the programme in rural areas from Sixth Five Year plan period till the end of the year 1994-95 are given below.

Period/ Year (1)	Total Villages (2)	Problem Villages (3)	Villages tackled (4)	Villages remained (5)	Expenditure (Rs in crore) (6)
6th Plan	35778 *(349 excluded)	17112	15883	880	372.59
7th Plan	40760	23306	18257	5049	674.11
1990-91			1842		145.02
1991-92			1618		159.96
8th Plan					
1992-93	43020	16790	1339		173.96
1993-94			1373		151.72
1994-95		**	4239		170.00

*349 are excluded due to either submergance under Irrigation Projects or inclusion in the Municipal areas.

**Villages and hamlets According to the central Government directions, the progress of the work is given for villages and hamlets.

1.10 During the Eighth Five Year Plan period all villages/ hamlets in the state were surveyed under Rajiv Gandhi Drinking Water mission for the first time survey of the hamlets was carried out (1991-92). The results of the survey are as follows.

(a) Total number of villages in the state	43020
(b) Total number of villages/hamlets ... without public water source	2768/8390
(c) Number of villages/hamlets with. polluted water source	696/108
(d) Number of villages with inadequate water supply	9362/8253
(e) Number of villages/hamlets with seasonal water supply	3964/1675
Total number of problem villages/ ... hamlets	16790/18426

1.11 In the state 244 local institutions including municipal corporations are functioning and out of these only 3 cities do not have piped water supply schemes. Out of 3 cities, scheme at Vengurla is nearing completion while at Vasai it is in progress. Although scheme for Malwan was sanctioned 4 years ago, the work is not yet started. A revised scheme of lesser coverage for Malvan is submitted to the Government which is under consideration.

For those municipalities formed recently, enhanced piped water schemes will have to be taken up. Further, even per capita water availability in many cities is according to the norms, enhanced schemes for extended areas will have to be under taken with pipes, increasing pressure and allied work.

1.12 From 1980-81 to March 1995 an expenditure of Rs. 2000 Crore is incurred in the state on drinking water scheme in rural areas. Sofar 15856 piped schemes, 118429 successful borewells and 63901 dug wells have been completed. Piped water supply schemes for 12 municipal corporations and 232 municipalities have been prepared. In spite of making so many efforts, the sufferings of the people, particularly women folk, are not lessened, on the contrary increased.

1.13 The vicious circle of undertaking new schemes on a big scale and when they become problem-ridden taking up augmented or new schemes continues. This year also 16 cities, more than 11,000 villages and 6000 hamlets are scarcity affected. About Rs.100 crores expenditure in the current year is expected on making temporary arrangements. Although these measures are unavoidable the expenditure incurred is futile for a longterm solution of the problem. Hence,in order to solve yearly water shortage problem once for all, strong demands are being made to find a permanent solution of this problem at all levels.

1.14 Owing to geographic & geo-structure conditions, irregular rains and limited water availability compared to population, the intensity of water scarcity is much more in Maharashtra than in other States. The situation gets further aggravated if rains are delayed or sporadic. Under the circumstances, it is really a challenge for the administration to arrange for water supply throughout the year in a State spread over 3.08 lakhs sq.km. having 12 municipal corporations and 232 municipalities and 43000 villages and more than that hamlets located far off. Hence people have a common doubt that the problem could be solved at any

time. The problem of water scarcity will have to be solved with the same zeal, confidence and determination as the food problem was faced by the country and the state and the green revolution made a success.

1.15 It is necessary to determine the nature and extent of the problem after an in-depth study and analysis, take policy decisions and implement effectively related programme with all energy. The success of the programme depends on coordination of all organisations & sections, combined efforts of all the officers workers and office bearers of the institutions from state to village levels and active participation of local people. At times unpalatable decisions will have to be taken and the success of efforts depends on the universal acceptance of these decisions. Hence, deciding a commonly acceptable policy is an ultimate step important is solving the problem. Although solving the drinking water problem is akin to lifting the great bow of Lord Shiva. The Government has given top priority in tackling parmenantly this serious and complicated problem. The Hon.ble Chief Minister, in the last budget session, had announced that a White Paper would be presented to the people for a clear idea of various aspects so as to arrive after extensive discussions and consensus at informed judgements and universally acceptable policies and directions for implementation. This White Paper has been prepared in pursuance of that announcement.

1.16 A water conference was convened on June 5, 1995 in connection with the White Paper, under the Chairmanship of Hon"ble Chief Minister. All the M.Ps. from the State, MLAs, Mayors and Presidents of Zilla Parishads and Municipal presidents and important Government officials

had participated in this conference. Thereafter, on June 30, 1995 a symposium of selected experts, and representatives of voluntary organisations was arranged at Pune under the Chairmanship of Hon'ble Deputy Chief Minister. This white paper has taken into account the opinions and suggestions expressed in both the conferences, earlier cabinate sub-committee, commissions and committes at national and state levels and various newspapers.

1.17 In the Conference, the Chief Minister analysed various aspects of the problem of drinking water, importance given by state Government, and the role of the Government priority accorded. He also placed before the representatives important points on which Government expected suggestions from them. The conference discussed in detail all these points and the government received invaluable suggestions. At the symposium held in Pune, Hon'ble Dy. Chief Minister explained government's stand on the White Paper. Representatives attending the symposium emphasised on the means of water conservation taking into account ecology, increasing groundwater availability, and the judicious economic use of water . Many suggestions were also made on the mechanism and obtaining cooparation of valuntary organisations and people.

1.18 As declared by the Chief Minister on 5th June 1995 in the water conference, the representative discussed modalities of District level plans in the course of the conference. In such a manner, broad district level plans have been prepared which will help to decide the extent method and direction of the work. Detailed plans will be prepare covering policy decisions after discussions on the white

paper. The plans will be finalised after scrutiny and approval of the district co-ordination and monitoring committee.

1.19 As the white paper on the problem being a maiden attempt, not only in the state but in the country, it is but natural that a variety of doubts should arise. There are different aspects and opinions in regard to drinking water problem. The White Paper is arranged in such a way that the basic objective is achieved. It includes some alternatives, suggestions and recommendations relating to opinions on the measures to be taken up and to enable the Government to take decisions. The details of administrative and technical aspects have been included Hence, without giving emphasis on statistic, the white paper analyses various problems and discusses suggestions on related measures. The white paper should be seen through this angle. After detailed discussions and exchange of views on the white paper proper decisions will be taken at the government level. Since drinking water is an integral part of the total water problem, the entire water problem is discussed in all angles. However, keeping inview the scope of the White Paper limited to drinking water problem, other related matters such as water for agriculture, industry, irrigation,canals and dams etc. have been dealt with only to the extent related to drinking water.

1.20 Ultimately, the solution to water problem depends upon effective management like demand and supply management of any other essential commodity. Drinking water problem is generally the result of a gap between demand and supply, or requirement and availability. There is a continuous increase in demand for water due to rise in population coupled with increased expectations of the people

about standard of living and development process. Expectations are also increasing due to change in the attitude about access to and timings of water supply. Moreover, the expectations are becoming stronger on enhanced water supply in the proximity or even in the house at suitable timings for all purposes. As demands of different sections are met, their expectations still increase.

1.21 To some extent, increase in demand is fair and welcome. Increase in water use is a sign of higher level of living standard due to development process. The demand of water is expected to increase as industries and development process increase. However, along with other aspects of development population growth is a major cause of increased demand for water.

1.22 In 1951, the population of the state was 3.20 crores where as in 1996 it will be about 8.86 crores. In other words, during the past 45 years state's population increased 2.8 times. In 1981-91 decennial growth in population was 25.36 percent. It follows therefore that drinking water needs to be made available to 25 percent increase in the population every 10 years. The rate of increase in State population in 1981-91 decade is more than the national rate of 23.50 percent. Therefore, population control becomes an important aspect of water problem and effective action will have to be taken on this front.

1.23 Water availability in general is limited. Further, there is wide disparity in water availability between various regions, various purpose and various sections. Hence the problem of drinking water has therefore become more and

more acute. The limited availability of water stresses the importance of its judicious distribution. In some regions crops fail for want of water and water for drinking becomes scarce while in other regions abundant water is consumed in industry, cultivation and household purposes which creates a doubt whether the state has water scarcity or abundance. If this tendency continues it may create a fear about availability of water for future generations. Hence unlimited watersupply for all purposes will be never possible.

1.24 The major hurdle in the supply of drinking water is its availability. More emphasis was given hitherto on bore wells and schemes based on ground water sources in rural areas with a view to complete water supply schemes in a short time with minimum expenditure. However, excessive drawal of ground water led to drying of Government bore wells and dug wells in some areas, and therefore new schemes had to be undertaken and new tube wells drilled.

1.25 Availability of ground water in general is limited due to many causes. In some parts of the state rainfall is scanty and irregular. Due to geographical conditions, replenishment of ground water is minimal in many regions. The situation is aggrevated by large scale felling of trees. The ecological balance is also disturbed. Water conservation and afforestation has therefore significant importance.

1.26 The Government is committed to making drinking water available from ground water and surface sources and if need be from private sources. With this object in view, rules and regulations will be strictly implemented and other measures will also be implemented as per needs.

1.27 Since earlier drinking water scheme in rural areas were based on ground water, due attention was not given to its purification. In the course of time industries also developed on a large scale as a part of development. But adequate attention was not given to industrial pollution and water contamination. As a result, water pollution has become a major issue in water supply. In same areas, contaminated water has become a crisis.

1.28 Lack of proper running of water supply schemes after completion is a matter of serious concern and important reason of water problem. Some deficiencies in the completed schemes, problem of funds of local institutions, negligence on the part of the local institutions and people and tendency to depend on government for everything are major reasons of the problem.

1.29 Like other important programmes, drinking water programme is also a complex one and needs proper planning and implementation because the deficiencies and short commings lead to increasing problems. Though it is true that funds alone donot solve the problem, it will have to be agreed that adequate financial provision is essential. Everytime, funds compared with needs are inadequate and even though expenditure is large, the need is more, besides the problem has become more acute as more schemes are taken up with insufficient funds in hand. Limited availability of funds with local institutions for the purpose of maintenance, repairs and water purification add to the seriousness of the problem.

1.30 Drinking water schemes are implemented by different agencies at different levels. Shortcomings in the

matter of coordination and monitoring has adversely affected their management.

1.31 From the above discussion the following aspects will have to be considered in the context of drinking water.

(1) Total availability of water and its use.

(2) Norms and criteria of drinking water.

(3) Water needs and criteria for industrialisation.

(4) Availability of Groundwater and water lifting problems in relation to water conservation.

(5) Availability of surface water, its distribution and use.

(6) Economical use of water and its balance sheet.

(7) Water pollution control and remedial measures.

(8) Supply of drinking water , maintenance repairs and water cess.

(9) Proper planning of programme and its implementation.

(10) Administrative machinery for integrated policy, planning and implementation.

1.32 In general, the policy decisions on the drinking water problem and their implementation should be consistent with the administrative policies and objectives. In view of this, at least the following items are important :—

(1) Schemes of minimum cost will have to be designed for the benefit of funds available with Government to maximum areas;

(2) The planning and implemention of the programme will have to be done with the objective to utilize the available funds with utmost economy, realistic norms and efficiency;

(3) Different criteria have been fixed from time to time for different areas, sections and uses. It is necessary to rationalize all these criteria after a total review;

(4) It is also necessary to ensure while observing economy of expenditure that the economy will not affect the utility of the scheme and the scheme will remain fully operational during the projected life;

(5) While solving the drinking water problem a long term planning of the management will have to be done. Though the measures have to be taken up in a short period for solving this problem, care should be taken to make the design a part of the long-term measure so that the problem will not arise again in future;

(6) Since this is a longterm programme, it will have to be fit in a proper frame to make the policy, nature and systems extensive.

(7) Action will have to be taken to give pace in decision making at all levels for the success of the policy and the programme in general and

(8) Efforts will have to be made for maximum participation of the programme.

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2. NATURE OF PREVALENT PROGRAMMES, AGENCIES AND STATUS OF IMPLEMENTATION

Nature of Programme

2.1 The Rural Watter Supply Programme is a plan programme included in the Minimum Needs Programmes (MNP). The Government has accepted, under this programme, the responsibility of supplying pure drinking water through stand posts to rural population at the rate of 40 liters per day per capita. The water problem of village/hamlets is tackled by a scheme of minimum cost from dug wells, bore-wells and pipe scheme. The present drinking water supply programme to the rural population is limited to supply of water through public stand post.

Items Not Covered In Water Supply Programme

2.2 Water supply required for the following needs is not considered in the present programme.

(1) No provision of water supply for cattle is made. However, provision of 6 litres per animal per day is made in the externally aided projects;

(2) Only permanant population is considered for the programme. The adhoc additions in the population due

to temporary migrations for pilgrimage, tourism, etc are not considered;

(3) Small industdries, hotels, shops, brick kilns,etc are coming up. in the villages and their number is continuously increasing. The water requirement of these small industries is not considered;

(4) Water requirement for large scale construction work going on around cities is also met from the existing water sources. This requirement is not considered in planning of drinking water;

(5) In big villages/towns markets are organised every week or every month and large number of people and cattle come together. No provision for their drinking water need is made in the programme;

(6) Sufficient arrangement is not made for water suppply to many institution functioning in villages like educational institutions, hostels, Village Panchayat offices, charitable hospitals, etc.

Private Water Connections

2.3 No provision is made in the current programme for providing private water connections to the house. However in same cases village panchayats have take decision at their level and provided water connections to the houses. Provision is made to supply 40 liters of water per head by public taps and 70 litres per day by private taps in the schemes funded by the World Bank and British Government. The schemes have provision to give water connections to 30 percent houses. Assuming 6 litre drinking water for animals,

pipewater schemes are planned for providing 55 litres per capita per day.

Population Criteria

2.4 While formulating rural water supply schemes, the growth of pupulation is taken at 1.08 percent for all villages for the next 15 years. Similarly, criteria for per capita water requirement are applied uniformly for all, ie a village of small population as well as a big town.

Distance Criteria

2.5A ccording to the criteria of central Government, the villages without any drinking water source within the distance of 1.6 km or 15 meters below surface or at a height upto 100 meters are problem villages. However, the State Government has accepted the criteria of 0.5 km distance of water source for identifying problem village.

Criteria for Programme Execution

2.6 (1) The Pipe Water Supply Schemes are taken up for villages with population above 2000 and a water post is provided for every 250 persons. However, provision is made to install water posts for backward people without any population criterion

(2) Under bore-well programme, one bore well is provided for every 250 persons in the village and one bore well for every 80 persons in hamlets.

Per Capita Expenditure Criteria

2.7 The Government has revised per capita expenditure norm for preparing plan & estimates of pipe water schemes in November 1992 which are as follows:—

(1) Pipe water schemes in designated hilly areas.	Rupees 300
(2) Pipe water scheme in plains—	
(a) More than 30 meters static lift	Rupees1100
(b) Upto 30 meters static life	Rupees850

If the expenditure of pipe water schemes exceeds the above norms, sanction is given with approval of planning and Finance Department after considering urgency and circumstances.

Availability of Funds

2.8 Funds for the programme are available from state Government under minimum Needs Programme, from Central Government under Accelerated water supply programme and from external agencies. The provision of funds is made according to the proposals of District Planning and Development council for all schemes except externally aided projects. There is also provision to spend 20 percent of Local Development funds on the water supply programme.

2.9 The Rural Watersupply Programme is being implemented in the state as per national policy since the Sixth Five Year Plan period. The expenditure on rural water supply schemes is incurred as 100 percent grants from the state. Till 1985, the programme had provision of 5 to 10 percent people's contribution. However, considering the

delay in implementation, this provision was done away in 1985.

Central Assistance Under Accelerated Rural Water Programme

2.10 The financial assistance is given every year by the Central Government under Accelerated water supply scheme to speed up the rural water supply programme taken up by the state Government.The state Government has to follow the policies and criteria of the central Government for obtaining the assistance. The details of central assistance received from seventh plan period are given in Annexure -I. According to the present criteria the norm for water supply is 40 litres per capita per day. The centre has also fixed the expenditure per capita. norms. Besides, priorities are also fixed while granting schemes. As per orders of 30th may 1995 of the central Government, the funds are to be utilized during the year with giving priority to the village where no arrangement of public drinking water supply is made. The state Government has to make provision of matching contribution.

Externally Aided Projects

2.11 The funds provided by the state Government under minimum needs programme and central Government under Accelerated Water supply schemes are not adequate to tackle drinking water problems in the state. The state Government has therefore made efforts to take up watersupply schemes from external aid. Under the external aid programme, a project of Rs.497 crore aided by World Bank and another project of Rs.67 crore aided by the British Government are

being implemented. Further, negotiations are in progress with the German Government on water supply projects. All externally aided projects include drinking water environment cleanliness and health education as part of the project. A provision is made for external aid in the state plan schemes which is reimbursed by the agencies.

Priorities Fixed for Taking up schemes

2.12 The priorities for taking up water supply schemes are prescribed as follows under Government Resolution No.RWS-1093/CR-448/39-A dated the 17th september 1994 of the Rural Development and Water Conservation Department :—

(a) The villages/hamlets surveyed as problem villages/ hamlets and still not covered,

(b) The villages/hamlets found in the aforesaid surveys as without public water source.

(c) The villages/hamlets receiving polluted water,

(d) The villages/hamlets with water supply of less than 10litres per day per capita,

(e) The villages/hamlets with water supply of 11 to 20 litres per day per capita, and

(f) The villages/hamlets with water supply above 21 litresbut less than 40 litres per day per capita.

Assets created under the programme

2.13 The details of the assets created district wise under the programme upto 1994-95 are given in Annexure -II. Total assets created so far are as under :

	Number
1. Pipe water schemes	
(a) State sector	7936
(b) Local sector	7920
Total	15856
2. Dug wells	63901
3. Successful bore-wells	118429

Arrangements For Maintenance & Repairs

2.14 The responsibility of maintenance, repairs and management of the schemes is given to local institutions and provisions have been made in the Maharashtra Zilla Parishad and Panchayat Samiti Act,1960 and Bombay Village Panchayat Act,1958. Pipe watersupply scheme for a village is handed over to the village panchayat and that for 2 or more villages to the Zilla Parishad. The State Government has fixed minimum and maximum rates of water tax for maintainance and repairs of the pipe watersupply schemes. The local institutions have to levy water tax on local population. The water rates prescribed by the Government in 1982 are given in Annexure-III. The water tax has to be collected regularly and spent on salary of employees, spare parts, payment of electricity bills and TCL powder for water purification.

Funds & Grants for Maintenance & Repairs

2.15 Inspite of the provisions mentioned in para. 2.14 above, the Local Institutions find it difficult to run the schemes. The State Government has, therefore, established in 1986 "Maintanance and Repairs Fund" at the district level. For this fund, an account of 5 percent of the state allocation for water supply is contributed by the state

Government. Further, an amount of 10 percent of the funds received from the Central Government under the accelerated rural water supply programme is also given to the fund. The concerned Zilla Parishads also have to credit minimum 20 percent of their income. From this pool of funds, the local Institutions can meet the expenditure on maintenance and repairs. The details of grants sanctioned by the state Government for maintainance and repairs are given in Annexure -IV. Besides concession is given to charge the bill at the rates fixed on the horse power basis to the water supply schemes with electric connections from low tension lines. Also, 50 per cent grants is given to the concerned Village Panchayat on the electric bill of the Water Supply Scheme.

Maintenance and Repairs of Bore wells

2.16 The Government has created in 1978 three tier machinary for maintanance and repairs of the bore wells. The hand pumps/electric pumps in the district are repaired through this machinary. To have adequate funds for maintanance and repairs of hand pumps/electric pumps the Government has prescribed following annual subscription rates for collection by Zilla Parishad from village panchayats :—

(a) Bore wells with hand pumps—	
(1) For the first bore well.	Rs. 300
(2) For the second bore well	Rs. 250
(3) For the third bore well	Rs. 200
(4) For the fourth and more for each bore well	Rs. 150 Rs. 150
(b) For each bore well with electric pump	Rs. 1000

Agencies Functioning

2.17 Three agencies are functioning in the state under the programme. The nature of the agencies is briefly as follows :—

(a) Groundwater Survey and Development Agency.— The Groundwater Survey and Development Agency (GSDA) was estabilished in 1972. The headquarters of the GSDA is located at Pune. It is headed by the Director. The posts of Additional Director, Joint Director etc. have been created in the Directerate besides the Director. The Agency has three tier structure with a Divisional office functioning under the Deputy Director in each of 6 Revenue Divisions. The offices of the senior Geologists have been established in all districts. Besides, a post of Geophysist is also created in each division. For conducting groundwater surveys and issuing certificates relating to location of the source 5 to 6 officers in the category of Geologist are working in the district. Government rigs and private rigs are working according to needs in every district for implementation of tube-well programme. For handling the programme and maintenance and repairs of the rigs the post of Senior Drilling Engineer has been created with 2 to 3 Assistant Drilling Engineers working under him. Further there is a post of the Deputy Engineer in each Zilla Parishad for boring and blasting programme. The Deputy Engineer has to carry out maintenance and repairs of hand pumps and electric pumps under three tier system.

(b) Maharashtra Water Supply and Sewerage Board :— The Board has been established by the Act of 1976, execution of the pipe watersupply schemes in the urban

and rural areas has been given to the Board. The member-secretary of the Board is its administrative head. The Board has office of the Chief Engineer (Rural) for rural water supply programme, office of superintending Engineer at Divisional level and office of Executive Engineer (Rural) at district level and the works of Rural Watersupply Scheme are carried out through these offices.

(c) Zilla Parishad :—Every Zilla Parishad has constituted water conservation and water supply programme committee as a subject committee. The drinking water programme is implemented through this committee and the works and Health committees. There is no separate organisation at Zilla Parishad level for rural water supply programme. The programme is executed through the staff of the Executive Engineer (Minor Irrigation) of the Zilla Parishad.

Powers Delegated to Agencies

2.18 The dug well programme under water supply programme is implemented through Zilla Parishads. Bore wells are taken by the Ground water survey and Development Agency. As regards pipe water supply schemes, the schemes with cost upto Rupees 10 lakhs are implemented through Zilla Parishads while those with cost above Rupees 10 lakhs are implemented through the Maharashtra water supply and sewerage Board. The powers to accord administrative sanction to the schemes with cost upto Rupees 5 lakhs are delegated to Zilla Parishads. Also the powers to give administrative sanction to the schemes with cost between Rupees 5 lakhs and Rupees 10 lakhs with the prior approval

of the Divisional Commissioner are delegated to the Zilla Parishads. The administrative sanction of pipe water supply schemes costing above Rupees 10 lakhs is given by the Government.

Coordination and Monitoring of Programme

2.19 A District Coordination and Monitoring Committee has been formed in every district for coordination and monitoring of the work of the Zilla Parishad, Ground Water Survey and Development Agency and Maharashtra Water Supply and Sewerage Board and for considering water supply schemes of optimum costs in view of local circumstances. The Minister-in-charge of the district is the Chairman of the Committee and the other Ministers/ Ministers for State elected from the district are co-chairmen. The President of the concerned Zilla Parishad is Vice-Chairman of the Committee. The other members are Members of Parliament and Members of Legislature from the district, the chair persons of Zilla Parishads subject committees for works, Agriculture and Health; the chair persons of the Panchayat Samitis and the District Collector. The Chief Executive Officer of the Zilla Parishad is the Member Secretary. The functions of the committee are execution of Water Supply Schemes taken up by various agencies, co-ordination and monitoring of the progress, fixing the priorities of the villages and preparation of action plan according to the criteria presented by the Government.

Technical Sub-committee

2.20 A technical sub-committee is established under the chairmanship of the Chief Executive Officer of the Zilla

Parishad with the senior Geologist, Excutive Engineer (Minor Irrigation) of the Zilla Parishad and Executive Engineer of Environmental Engineering as members. The project officers of the Tribal Development Projects in very sensitive and backward areas of the tribal sub-plan are nominated as members. The functions of the committee are to examine the schemes with minimum cost for tackling the drinking water problem of the villages/hamlets identified for the programme and thrash out the proposals received.

The strategy for working

2.21 The villages/hamlets are surveyed before every Five Year plan period. The problem villages found in view of drinking water are classified. A schemewise annual action plan is prepared in the light of the priorities fixed by the Government and availability of funds for the district and the action plan is executed.

Funds Sanctions

2.22 In order to complete the schemes within the proposed time-limit and avoid delays for want of funds, the administrative sanctioning is connected with the availability of the funds. For the schemes being implemented by the Maharashtra watersupply and sewerage Board orders are issued that while sanctioning new schemes in any year the total estimated cost of the new schemes and the amount required to complete the on-going schemes together should not exceed three time the provision made for the purpose in the district. However, for the local sector schemes implemented by the Zilla Parishad, the amount should not be more than twice.

(B) URBAN WATER SUPPLY

Nature of Programme

2.23 The urban watersupply programme is a programme under plan schemes. However, like Rural Water Supply Programme special priority as Minimum Needs Programme is not given to it. The programme has objective to provide drinking water to all cities according to the norms. According to the Municipal Act, the Municipalities are responsible to supply pure and bacteria free water to the people in their jurisdictions. However the Government assists the municipalities in the form of grants. The municipalities have responsibility to raise rest of the funds. The Government also helps in obtaining loans.

2.24 The norm of watersupply is taken as the basis and provision is made for seepages along supply lines. Therefore, the people can get more water now than they received earlier.

2.25 The water needs of the urban population are more and of different nature. The central Public Health and Environment Engineering Organisation has fixed criteria of watersupply in the form of guiding instructions. In fact, the Central Government has published a "Watersupply Mannual" after considering thoroughly all aspects of watersupply. The mannual is updated from time to time and schemes are formulated accordingly. The norms of minimum requirement are indicated in the guiding instructions.

2.26 While preparing schemes for the cities, not only the domestic requirement is considered, but provision is also made for non-domestic requirements, institutional requirement and fire-fighting needs. Generally, large scale

industrial requirement of water is also not considered. In exceptional cases, water is sold to the Maharashtra Industrial Development Corporation or the corporation offers to share some portion of the expenditure of the scheme. Separate provision is made in the scheme for temporary increase in the population at tourist places and pilgrim centres.

2.27 Presently, the cities are being extended by large scale urbanisation outside municipal limits. The Rural watersupply scheme existing at such places can not meet the increased need of water. It is possible that the Zilla Parishad gives less priority to such area in view of its inclusion in the municipal area in the future. In view of this and the decision taken for Satara, such area is included in the watersupply scheme of the city if the Municipality is prepared to pay the peoples's contribution for the increased expenditure and the Rural Development Department agrees to share the expenditure of the scheme.

2.28 Construction activity is going on in large scale in the cities and the builders are expected to obtain water for the activity from other sources. As the problem intensified, the Kalyan Municipality has taken a policy decision that water will not be allowed for construction work from the city water supply scheme.

2.29 The urban water supply schemes are generally prepared to meet the need of next 30 years after the completion. The headworks, pipe lines and distribution system are planned for a period 30 years while the rest of the components for 15 year needs. If available water

is not adequate, different consideration is given as an exception.

2.30 The population growth is estimated according to circumstances at the time and place and by separate consideration at some places. However, the population growth is estimated by arithmatic and geometric methods and the average is worked out. In case of the projects taken up with the loan assistance from the foreign financial institutious like World Bank, necessary changes are made in the norms of population growth and watersupply.

2.31 While preparing design for the distribution system, minimum 5 meter pressure at the public tap and 7 meter pressure at ground floor is a criterion and for every floor above ground the pressure is 5 meter, the total being 22 meter maximum. However, when all the floors have common taps and the taps of the ground floor are opened, the other floors can not get water. Recently, it is being thought that water should be made available at ground floor only. Further, considering the city population and the possible period for water distribution, the norm for maximum watersupply is fixed while preparing design of the distribution system. However, the experience shows that the actual rate of water consumption is more and the distribution system becomes inadequate.

Central Government sponsored Accelerated Urban Water Supply Scheme

2.32 Financial assistance is provided by the Central Government to the cities with population upto 20000 under accelerated watersupply programme. The Central Government

provides 50 percent grants under the programme on certain conditions. The remaining expenditure has to be incurred by the state Government. For this expenditure, separate provision of Rs. 1.00 crore has been made in the budget of 1995-96 for the first time.

2.33 The funds available are very inadequate compared to the requirements for watersupply and sewerage schemes in urban areas and especially for augumented and extended watersupply schemes. However, efforts are being made to tap all the possible sources to raise the funds. With the financial assistance from the World Bank, the Maharashtra water supply and sewerage project of the cost Rs.162 crore was taken up in 1979. The proposal for obtaining financial assistance for the second stage is under consideration. The funds are also obtained from the Housing and Urban Development Corporation (HUDCO). Further, loan is being made available from the financial institution O.E.C.F. of Japan through HUDCO relating to the Solapur Municipal corporation. The state Government makes separate provision for such projects in the budget in the form of grants.

Backlog and Non-backlog Schemes

2.34 A committee under the chairmanship of Dr. V. M. Dandekar was appointed in connection with making up the backlog in the development of various regions in the state. The committee has pointed out backlog in the watersupply schemes of some cities. The schemes of those cities are taken up under a special programme and the Government also makes separate provision with priority.

2.35 For the cities not included in the backlog list the schemes are to be taken as non-backlog schemes. Naturally, these schemes do not get priority and the total funds available for the watersupply schemes is inadequate in view of the requirements. Even if funds are made available, the actual funds in the hands of the Board are very short because there are large number of dues to be received by the Board from local institutions for various reasons. This affects the progress of non-backlog schemes.

2.36 Taking into account the criteria fixed for identifying backlog, first priority has to be given to the schemes of the cities where the watersupply is not according to the norms or where priority has to be given due to reasons like pollution. The following table shows the watersupply norms according to the population and number of cities not receiving water according to the norms.

Sr No.	Population of Cities	Total No of Cities	Norms of Water Supply	No. of Cities norms having as per norms	No of Cities having Water Supply less than norms
(1)	(2)	(3)	(4)	(5)	(6)
1	Upto 20000 ...	25	070	17	08
2	More than 20000 but less than 60000 ...	98	100	23	75
3	More than 60000 but less than 100000 ...	48	125	06	42
4	Above 100000	72	150	08	64
	Total	243		54	189

Implementation of Water Supply Schemes in Urban Areas

2.37 Since formation of Maharashtra State till the end of the financial year 1984-85 total 297 original and revised/ enhanced watersupply schemes have been completed while the number of schemes completed in the Seventh Five Year Plan period is 93. So the total number of schemes completed is 390 by the end of the seventh plan which provide pipe water supply to all municipalities in the state except municipalties of Vengurla, Malvan and Vasai. Presently, water is supplied by standpost to Vengurla city while the scheme of Vasai is in progress. Although administrative approval is given to the scheme of Malvan city a new scheme with less coverage is under consideration for affordable maintenance expenses.

2.38 Currently schemes costing Rs.505 crore are in progress and expenditure of Rs.281 crore has still to be incurred. Similarly expenditure of Rs.161 crore out Rs.527 crore has been incurred on the non-backlog schemes and still Rs.366 crore to be spent. If the funds are made available in future as were provided for 1994-95, the period required to complete backlog schemes and non-backlog schemes would be 4 years and 7 to 8 years respectively. Besides, backlog and Non-backlog together 120 schemes have still to be taken up. For all the schemes like Maharashtra Watersupply and Sewerage project Stage II, Vasai-Virar project, New Mumbai project based on Morve dam the total amount of Rs.2700 crore is required and Rs.830 crore of this amount will have to be obtained as grants.

2.39 The watersupply of the Greater Mumbai which was daily 32 million litre in the year 1860 gradually increased

to 2100 million litre in 1980-81 and now it is 2538 million litre per day. During the period 1980-81 to 1994-95, Rs.455 crore have been spent for the watersupply to Mumbai. Shortly on completion of Mumbai-III project, there will be addition and the daily watersupply will reach to 2893 million litre. The Chitale committee appointed to study in-depth the problem of watersupply of Mumbai and suggest measures has estimated the water requirement of 5400 million litres per day in the year 2021. The committee has opinioned that the requirement can be met by 3453 million litre of water which will be available on construction of dams at Kalu and Shai in the Ulhas river valley and central Vaitarna, Gargai and Pinjal in the Vaitarna valley, besides the water received at present from Tansa and Vaitarna dams. According to the priorties recommeded by the committee for construction of dams on considering the water rates to be charged, the water requirement in the 2021 can be met without construction of Pinjal dam. Hence the committee has opinioned that the Pinjal dam can be constructed later.

Arrangement For Maintenance And Repairs Of The Schemes

2.40 Even though the local institutions have responsibility to supply water in their areas and carry on daily maintenance, some of the municipalities have refused to take over schemes ofter completion. The maintenance of these schemes is entrusted to the Board on full deposits principle. In such a way, the Board has 52 centres at present and supplies water direct to the consumers from 20 centres while in bulk from 32 centres to the corporations / municipalities. In addition, the maintenance of the water supply centres

owned by 20 municipalities is done by the Board on full deposit principle.

2.41 Some years back there used to be many difficulties in tranferring urban watersupply schemes. The situation was noted in the cabinet meeting held on 16th April 1990 and decision that whenever differences occured between the Board and Concerned Municipality in transferring a joint committee of Government officers, Board officers and representatives of the Municipality should survey and take further action.

2.42 As stated above, any financial assistance is not given by the Government for maintenance and repairs. However, if financial assistance/concession is given by the Government in some form considering financial position of local institutions and expenses involved in running water supply schemes, the water rates will be affordable to the common man in some proportion.

Agency For Implementation Of Schemes

2.43 Except Greater Mumbai, the planning and execution of water supply schemes is done by the Maharashtra Watersupply and Sewerage Board at all places in the state. The planning and execution of watersupply schemes in Mumbai metropolis is done by the Mumbai Municipal Corporation. Some more Municipal Corporations like Pune and Nashik have also recently started undertaking their own works in some proportion. However, the Government executes the schemes of other Municipalities and Corporations through the Board.

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3. NORMS AND CRITERIA FOR DRINKING WATER

(A) Rural Water Supply

3.1 While planning drinking water supply schemes in Rural areas, the population growth rate is assumed at 1.08 percent. However, the population census statistics shows 2.3 percent growth per year in the state. Hence the scheme designed on the basis of 1.08 percent growth become shortly inadequate. The growth of population is observed more in big villages due to migration. For urban areas growth is worked out based on average of population statistics of five decades of 1951-1991 according to the present method of increamental and geometrical increase. The same method should be adopted for rural areas also so that the population projections will be realistic, the schemes will function for the proposed period and supplementary schemes will not be needed for high population growth.

3.2 The population growth is estimated for the next 15 years while designing rural water supply schemes under the programme. However urban watersupply schemes is designed for 30 years in 2 stages of 15 year's each. Further, some time elapses between designing and reaching the benefit resulting in the use of the schemes

for 10 to 15 year only. Thereafter a supplementary schemes has to be prepared as a separate scheme. Hence the cost increases and other difficulties crop up like available water is reserved for other purposes or land difficulties or lack of suitable connections between the sub items of old and new schemes. Hence it will be proper to create new schemes in rural areas also for 30 years in two stages of 15 years each as in urban areas wherever sufficient water sources are available. If adequate water is not available, the growth of population should be estimated for 15 years only. However, while designing a scheme, it should be remembered that a supplementary scheme will have to be created when water source is available. The present system should be continued in urban area.

To Increase Per Capita Norm And Make Provision For connections

3.3 There is a large demand from the people for private connections. From private connections, the village panchayats receive assured income of special water tax. This facilitates maintenance and repairs of the scheme. The schemes in the externally aided projects are designed to provide 55 litres of water per capita per day and 70 litres per capita per day through private connections and includes provision for 30 percent private connections. However, the thinking of external agencies is that the proportion of the private connections should not be fixed but decided on demands after actual survey. Since private connections are given in urban areas, they cannot be refused in rural areas for a long time. The income from private connections will improve the

maintenance and repairs and help the depriciation aspect and further make the scheme self-sustaining. To asses the demand of private connections and funds required to make the scheme sustainable, the water charges for a year and expenses on giving connections should be recovered in advance. This will enable to estimate funds available and ensure maintenance and repairs.

Provision Of Drinking Water For Animals

3.4 There is a demand of water at all levels for the animals as it is for people. Earlier, this demand use to meet from village tanks. But now the village tanks are not sufficiently useful for want of maintenance and repairs. Even if provision of water for animals can be made under externally aided projects, some assistance to local institution will have to be considered for the repairs of village and other tanks which are not in use for want of maintenance and repairs and silting and also for drainages.

Water Provision at Pilgrimages and Tourist Places for Increasing Population

3.5 No provision of water is made, according to the prevalent policy, for temporary increase in the population at pilgrimage and tourist places. Hereafter, provision will have to be made for such population. This will increase the cost of the scheme and related expenses on maintenance and repairs. The increse in the population is much more than the permanent population at some places. In such cases the question of maintenance and repairs and the expenses involved will have to be tackled by the participation of village panchayats and tourist / religious institutions.

Revision of criteria

3.6 The living standard of rural population is raising day by day. Obviously, the people are demanding increased water supply. There is also demand for change in the population criteria for taking up schemes. The present criteria are based on 1981 population which should be changed to 1991 census or the schemes should be implemented taking into account 1991 population. The criteria for approving bore wells should be decided after taking into account the actual water supply through bore wells. Further, there is a demand for enhanced water supply to taluka headquarters and villages where urbanisation is taking place without application of criteria uniformly.

Amenities for water supply

3.7 It is necessary to provide amenities for water supply to following institutions in rural areas like piped water schemes, bore wells or other suitable sources :—

(1) All educational institutes,

(2) Public offices,

(3) Hospitals, and

(4) Anganwadi buildings.

Provision of water for floating population.

3.8 (a) Although the pilgrimage is for few days, the congregation becomes unprecendented. A definate programme has to be prepared for water supply at such places in view of the health of the people collecting together in large numbers. The pilgrimage is on fixed days and water is

supplied by tankers. Still, it is necessary to provide permanant facility like storage tank.

(b) A permanant provision of water will have to be made for weekly markets.

(c) Facility of drinking water is necessary for the villagers coming to Taluka / District headquarters in connection with Employment Guarantee Scheme or public work in other departments.

Provision of Water for Construction Activity

3.9 Concerned contractor themeselves arrange water at the site of construction. The arrangement is made from the existing sources. This creates pressure on the water reserve as the demand is not considered while assessing the needs.

Water at Place of Work

3.10 The cisterns for drinking water supply under the programme are decided on accounting for the population in the village habitation and in highly inaccessible hamlets. Many people go out of the village for work where facility of water is not available. Many people drink impure water of the existing wells, springs, rivers, etc. resulting in water borne diseases like jaundice. The people working outside village habitation belong to the same village or come from other villages. There is no arrangements of drinking water for them at all places.

Arrangements for drinking water in hilly and inaccessible areas

3.11 The drinking water problem in rural areas is tackled by different alternatives in the rural water supply

progrmme. However, in highly inaccessible and tribal areas the water supply problem cannot be solved by trying prescribed alternatives because the water table in the hilly areas is very deep and water source is not easily available. Hence changes in the current criteria are necessary for such areas. The water problem will have to be tackled according to local situations at various places. Without confining the problem in a specific frame, freedom can be given for implemention of water supply schemes within the existing criteria of expenditure for water supply.

Arrangement for drinking water at public places/ Institutions

3.12 Criteria are not fixed for water supply being made at public places/institutions. For example, arrangement for water supply is made by local institutions at pilgrimages, religious and other places; contractors at construction sites; and Agricultural produce market committees at market and other related places. The arrangements are adequate at some places while lacking sufficiently at other places. The main reason for such disparity is that no criteria are fixed for water supply at those places or not even insisted upon. Similarly, conditions are not imposed on the institutions, starting school, for arrangement of drinking water to the students, guardians and teachers.

Criteria for schemes under Accelerated water supply programme

3.13 While making changes in the criteria for drinking water in rural areas, the accelerated water supply programme of the central Government will have to be

considered. The state Government will have to make suitable provision from its funds for the programme. The state Government has to follow the central Governments guidelines on the programme. The central Government has policy to provide 40 litres of water per capita per day. For making any changes under the programme, the state Government will have to obtain prior permission of the central Government.

Per capita Norm depends on water availability

3.14 The norms of water supply will depend upon the availability of water in the area. Even if decision is taken to enhance water supply per capita, the schemes will have to be prepared after reviewing water availability. It will not be proper to design a scheme with enhanced norms without availability of adequate water. The arrangements for more drinking water will depend upon availability of water in the area. Where available drinking water is inadequate, it will have to be increased by undertaking groundwater recharging and water conservation works and when it is increased, enhanced supply of water can be considered.

Arrangements of funds for Enhanced water supply

3.15 There is a continuous demand from rural areas for enhanced supply of drinking water. It is true that the norms of water supply in urban areas are higher than those in rural areas. However, it should be remembered while enhancing water supply in rural areas that the criteria for provision of funds are different for urban and rural water supply programmes. For rural drinking water programmes 100 percent grants are given by the Government. However,for

urban areas the provision is made for loan and grants. In rural areas also, instead of giving 100 percent grants, some portion should be treated as loan while enhancing the norms of water supply.

Schemes for Long Term needs

3.16 It is suggested in para 3.2 the drinking water supply schemes should be taken for the needs of next 30 years in 2 stages of 15 years each. However such stages have to be made where water is available. In general, when a scheme is designed supplementary scheme will be needed after some time and the expenditure in future will increase. If a scheme is designed and completed for water to the increased population in future, the cost of the scheme and expenses on maintenance and repairs will increase. Hence all schemes can be planned considering long term needs and implemented in stages according to the needs.

(B) Urban Water Supply Programme

3.17 The Maharashtra State has 12 Municipal Corporations and 232 Municipalities. According to 1991 population census, the urban population of the state is 38.73 percent of the total 7.89 crore population. The urbanisation in the state is fast in last few decades. New industries coming up with large scale investment makes urbanisation essential. It is expected that 50 percent of the total population of the state will be urban in near future. Under the circumstances, the basic amenities like watersupply, roads, electricity, telephones, etc. will have to be created fast for the urban population. It is absolutely necessary to provide such amenities where do not exist and increase and improve where exist but are inadequate.

Water supply is the important amenity. According to the municipal Act, local institutions have responsibility to make adequate and safe water supply to the people in their respective areas. The provision of safe water also reduces epidemics in the city. Since water supply is an essential service the expenditure on water supply schemes is complimentary to health service. Hence utmost priority should be given to water supply.

Existing Norms of Water Supply

3.18 The present norms per capita per day for urban water supply are as under :—

Sr. No. (1)	Population range (2)	Water supply per capita per day in litre (3)
1	Less than 20 thousand	070
2	20 thousand to 60 thousand	100
3	60 thousand to 1 lakh	125
4	More than 1 lakh	150

The above norms are based on the minimum among the criteria prescribed by the central Government and should continue further.

Urban Schemes Under Accelerated Programme

3:19 The Central Government sponsored accelerated programme is presently applicable to the cities having population upto 20000. The Central Government should be requested to make the programme applicable to cities with population upto 40000 as urbanisation in the state has taken / is taking place in large scale.

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4. INDUSTRIAL WATER NEEDS

INDUSTRIAL DEVELOPMENT IN MAHARASHTRA.

4.1 Maharashtra is a leading state in the country in industrialization. The following type of industries have a share in the industrial development of the state.

		(As on 31-3-1995)
1	Village/Khadi	2,23,287
2	Small scale	1,36,856
3	Medium & large scale	2,541
4	Cooperative Sector (With share capital above Rs.10 Million)	159

The Maharashtra Industrial Development Corporation (MIDC) has been established in 1962 for developing industrial estates in the state. The corporation has proposed to estabilish 269 large, small and mini growth centres in the state and uptil now 134 centres have started functioning. These 134 growth centres cover 32994 hectares of land aquired, out of which 12918 hactores of the land has been distributed to various industries. Besides, many industries are situated on private lands and in 122 cooperative and private industrial estates.

The data avilable on small and village industries pertain to registered industries. In addition, some industries are functioning in unrecognised areas.

Water requirement of Maharashtra Industrial Corporation's Estates

4.2 Small and large industries need water in a big scale. Such industries are mostly set up in the industrial estates of the corpotation as they get assured water supply. Precise information about water supply in the MIDC estates is available with the corporation. For water supply to industrial estates, the corporation utilizes its own reserviors, dams of Irrigation Department and sources of Maharashtra Water Supply and Sewerage Board as follows :—

Type (1)	Number (2)	Consumption per day (3)
(a) Own Reserviors	05	0.55 MCM (550 ML)
(b) Water Supply Schemes (Irrigation Department)	49	0.75 MCM (750 ML)
(c) Distribution per day by Maharashtra Water Supply & Sewerage Board.	06	0.005 MCM (5 ML)
Total		1.305 MCM

(Note : MCM -Million Cubic Meters; ML -Million Litres)

The MIDC has prepared a plan of acquiring land and developing into industrial estates till the year 2015. The number of large, medium, small and chemical industries likely to come up in the proposed estates has been estimated.

The water requirement is also estimated on the basis of the plan. For estimation of water requirement, the following criteria have been followed.

1. For chemical zones, 50 to 100 cubic meter per hectare area per day.
2. For big industries area, 30 to 40 cubic meter per hectare area per day.
3. For medium industries area, 20 to 30 cubic meter per hectare area per day.
4. For industrial areas in backward regions, 15 to 20 cubic meter per hectare area per day.
5. For small industrial estates of 15 to 20 hectares area, bore wells will be considered as of such estates will be assumed as 100 to 200 cubic meter per day.

According to above criteria, the water requirement upto year 2015 is expected as under :—

Year (1)	Need expected (Million Cubic Meters per day) (2)
1995	1.305
2000	1.9
2005	2.65
2010	3.3
2015	4.0

Requirement of water for industries outside MIDC areas

Precise data are not available on the consumption of water by the small, medium & large industries located outside industrial estates of the MIDC. Most of these industries meet

their water requirement through Local Self Governments, Village Panchayats, Minicipalities or Municipal Corporations. Some medium and large industries, mainly industries like cement based (spun pipe, mosaic tiles) which require large water quantities create their own water source like tube-well. Since different industries obtain water from different sources, the precise information on water consumption is not available. The Industries Department will conduct a comprehensive study on this aspect.

Future demand for Maharashtra's Industrial Development.

4.4 The pace of industrial development in Maharashtra is expected at the rate of 10 percent in the next 20 years. The water need will also increase in the same propertion. However, the demand of water of MIDC is estimated on the basis of the land it is likely to acquire.

Investment of Rs.1 lakh 9 thousand crore is expected in medium and large industries in the state. Out of it, an amount of Rs.15 thousand crore has already been invested and projects having total investment of Rs.65 thousand crore are in progress. When all these industries are established their water demand will be 1.65 million cubic meter per day. The present number of medium and large industrics in the state is 2541 with the investment of the order of Rs.54 thousand crore. This investment is the sum total of the investment made in each year. The quantity of water consumed by these industries is not known at present.

Wherever chemical industries have come up in Maharashtra, the problem of disposal of effluent arose. The

Government is aware that the surrounding life is affected due to effluent of chemical industries. The Government is planning to acquire treatment plants for common use to treat the effluent.

Policy for utilization of water for industrial purposes

(1) (a) (I) In the zones approved/proposed for chemical industries, water treatment plants will be acquired by MIDC for common use.

(II) Common treatment plants or alternate arrangements will be considered for treatment of effluent from existing chemical industries.

(b) While disposing off effluent care will be taken so that the existing water sources out side industrial areas are not affected.

(2) A comprehensive survey will be conducted in the state for assement of water utilization in the industries and requirement for next 30 years.

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5. GROUNDWATER AVAILABILITY, WATER CONSERVATION AND REGULATION ON WITHDRAWAL

Groundwater for Drinking Purpose

5.1. Groundwater resources play an important role as a drinking water source for Rural and Urban areas. Dug wells have been included on large scale in the planning for drinking water. In the urban areas of the State almost 1,00,000 borewells, and in Rural areas 1,18,000 borewells and 64,000 open wells are used for drinking water supply. In addition to this, open dug wells form the source for pipe water supply schemes of 10,000 villages and 3,500 hamlets.

Groundwater Availability

5.2. During the past 10 to 12 years, the groundwater sources are becoming inadequate. There is a general feeling that the groundwater table in the State is getting depleted. Before going into the detailed discussions about this, it is necessary to take a review of the availability of groundwater in the State.

(a) Out of the total 3.07 lakh sq.km. area of the State, nearly 82 percent of the area is occupied by Deccan

Trap basaltic rocks. Because of the inherent properties of these rocks, the capacity to store and transmit the groundwater is limited. Besides, due to the physiography and rainfall pattern, there are limitations on the availability of groundwater.

(b) The total available groundwater in the State is 2.54 million hectare metre. The Groundwater Surveys and Development Agency has identified 1503 Watersheds. In different districts of the state. Out of these 1503 watersheds, 34 watersheds fall in the category of 'Over-exploited Watersheds'. The important point is that all these watersheds fall mainly in the drought prone area (DPAP). Some over-exploited watersheds are located in some talukas of Amravati and Nagpur districts outside DPAP areas. In these areas the density of irrigation wells is more than 8 wells/sq.km. These are the areas where irrigated crops like Sugarcane, Banana, Orange are taken.

(c) In view of low rainfall and agro-climate, the Drought prone area of the State is very sensitive. In this area, the rainfall is low and erratic. Besides, the rate of evaporation in this area is more than the precipitation during nearly 11 months of the year. This adversely affects the moisture contents in soil and recharge to groundwater.

(d) Another important problem that needs to be mentioned regarding the availability of groundwater is that, even in the high rainfall area of Konkan and Western Ghats, the availability of groundwater is much less. The main reason for this is the steep slopes of the

terrain, rock types and distruction of adequate green cover.Because of these reasons, the average rainfall recharge to groundwater is generally 1 to 5 per cent, as compared to the average of 15 percent in the other parts of the State.

Groundwater Levels

5.3. In the D.P.A.P. areas of the State, the rainfall is normal in some years while scanty in other years. Due to this, it will have to be accepted that the availability of groundwater through the recharge will vary from year to year. Since no planning is made for the exploitation of groundwater based onthe average availability of water for a period of 4 to 5 years, various problems crop up, resulting in missunderstanding. Except for some of the over-developed watersheds in D.P.A.P. areas, and in Nagpur and Amravati districts, groundwater availability and the water levels in the State are generally stable. In short, the availability of groundwater resources through rain cycle and the occurrence of peculiar physiographic configuration of the State should be taken into consideration while planning for the utilisation of groundwater. Considering that the groundwater is primarily a public property and its availability being limited, adopting suitable cropping pattern, giving priority to drinking water and protection of drinking water sources should be the main theme of planning.The limited recharge of groundwater every year and its use for crops beyond the availability, results in adverse effect on the drinking water source in summer.The main reason for drying up of some of the borewells is the increased use of borewells for irrigation purposes and considerable withdrawal.

Effective Utilisation of Groundwater Resources:

5.4. The aspects to be included in the planning are cropping pattern with low water requirement, drip irrigation system for efficient use of water, protection and strengthening of drinking water sources and implementation of water conservation programme for increasing the rate of recharge in the areas with steeper slopes and high rainfall. In short, the State will have to decide a Code of utilisation of water, not only for groundwater but for all water resources. The fact can not be denied that the time has come to accept and implement such water culture.

Measures for Regulating the Withdrawal of Groundwater

5.5. Considering the limited scope of groundwater resources for irrigation of perennial crops, irrigation of only Kharif and Rabi crops by ground water would be proper. Where the micro system like drip irrigation system is adopted, the irrigation of perennial crops by groundwater may be permitted hereafter. Further, publicity media like propaganda, canvassing and awareness campaigns will have to be used for popularising of this system amongst the cultivators and making acceptable.

Protection of Drinking Water Sources

5.6. Maharashtra Ground Water (Regulation for Drinking Water purposes) Act 1993 has come into force in the state. Rules under this Act have been framed and published in the official Gazette. This includes mainly the following aspects:

(1) No individual can sink any well within a distance of 500 metres from public Drinking Water Source. Only under special circumstances and on consideration of the opinion of a Technical officer, the compentent authority may grant permission for sinking of such well..

(2) The Collector may take into consideration the progress of monsoon and the amount of rainfall by 30th September or during the rainy season and if he has reason to believe that water scarcity may arise in parts of the district, he may declare such areas as water scarcity areas and regulate or prohibit the withdrawal of groundwater within 1 km. of the drinking water source (Section-4).

(3) The competent authority may, on the advice of Technical Officer, declare a watershed as over-exploited watershed. It will be necessary to obtain permission of the competent authority for sinking new wells in such over-exploited watersheds.

(4) If, any existing well is adversely affecting any public drinking water source in the over-exploited watersheds declared by the Collector, then the Collector has power to stop the withdrawal from such well for a period of 6 months from 1st February to 31st July (Section-8).

The above Act and its rules have come into existence. Their effective execution will certainly help to protect the drinking water source. This will largely save expenditure on Tankers and Bullock Carts for supplying drinking water.

Planning of water Conservation Programme and Augmentation of Groundwate

(1) The water conservation programme is implemented with multiple objectives of increasing the productivity of rain fed cultivation in the State, arresting the soil erosion, recharging of groundwater, strengthening of the drinking water source and thereby improving the availability of water. Experts as well as experienced Non-Govermental Organisations in the field have opined that planning for irrigation and drinking water can be done by an integrated approach under this programme at village level towards water sources. As mentioned earlier in the preface if priority is to be given while planning least cost drinking water schemes for effective utilization of water resources at village level, the water conservation programme will have to be implemented as an integral and complementary programme of this policy.

(2) It is also necessary to make clear the limitations of the water conservation programme. The water conservation programme will not be successful in solving the drinking water problem unless attention is paid to the low water requirement cropping pattern and the regulation on the groundwater withdrawal. It is necessary to mention that suitable cropping pattern and proper management of groundwater has helped in solving the drinking water problem in the successful watersheds as well as projects implemented by the Non-Governmental Organisations in the state. Considering the experience

of Groundwater Surveys and Development Agency so far, a conclusion can be drawn that generally planning of water supply scheme for villages with population above 2000 should not be based on the groundwater as a source.

(3) In case of inadequacy of the source of existing pipe water supply schemes, the concept of strengthening of the source by unconventional measures of water conservation may be taken up as a part of the water conservation programme. From the experience of the experimental work done during past two years, such water conservation works are certainly found to be helpful for augmentation of drinking water source. These works include bore blasting, fracture-sealcementation, borewell injection, hydrofracturing, jacket well and such other measures which can be adopted by taking into consideration local conditions

(4) In those villages with smaller population and situated on hills or high hill slopes, the method of recharge trench with handpump can be adopted. In this method, taking into consideration the requirement of drinking water, a trench of suitable capacity is excavated. Recharging is effected by filling the trench with sand and boulders and handpump is installed on the down stream of the trench. The method is found very useful at high places and steep slopes wherever it is not possible to drill borewell and a drinking water scheme is very expensive. Besides, at such places, recharge and rejuvenation of old and new sources can be

effected by implementing the concept of Afforestation, Forest ponds, Forest bunds, and Continuous Contour Trenches.

(5) The Department feels that the concept of village tank, wherever geographically feasible, will be very useful in the water conservation programme. This will help in solving the problem of water for cattle and making available water for other domestic use and will reduce pressure on drinking water source.

(6) Peoples' participation is extremely essential in the implementation of the above concept. Otherwise possibility can not be ruled out that the sources and assets created going waste due to negligence in their management.

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6. SURFACE WATER RESOURCES

Population and Availability of water

6.1 As per 1991 census, the population of Maharashtra is 7.89 crores. However, the water is disproportionately distributed amongst the population of the State. Total 123 million Thousand cubic meter (TCM) or 4349 million thousand cubic feet (TCF) of water with 75 percent reliability is available in Maharashtra.

Study of the various river basins in Maharashtra reveals that 49.5 percent of the geographical area of the State comes under Godavari basin which yields 38 million TCM, i.e., 31 percent of the total water available in the State. The Krishna basin yields 27 million TCM or 22 percent of total available water and covers 22.6 percent of the area of the State. Tapi basin covers 16.7 percent of the geographical area which yields 7 million TCM meter, i.e., only 6 percent of total water available. In contrast the westword flowing rivers occupy only 10.7 percent of the geographical area of the State but the basins of these west flowing rivers yield 57 million TCM water, i.e. a huge 41 percent share of the State. Besides, a tiny 5 percent of the area is covered by Narmada basin, the water availability of which is negligibly small. Thus, the availability of water is disproportionate to the geographical

area and hence naturally disproportionate to the population also.

6.2 Though the total water available in the state is 123 million TCM, it can use only 74 million TCM due to inter-state agreements. The Maharashtra state can utilize 31 million TCM of the 38 million TCM water from Krishna basin, 6 out of 7 million TCM from Tapi basin and due to specific topography of Konkan, only 21 out of 51 million TCM from westward flowing rivers. Thus, the state has a policy to utilize from the available 74 million TCM water 56 million TCM water for irrigation purposes and remaining 18 million TCM for drinking, industrial, fishery and other such non irrigation purposes. Out of the total 18 million TCM water projected for non-irrigation use a large chunk of 14 million TCM is proposed for Konkan region alone especially for industrial purposes. Remaining 4 million TCM water earmarked for non irrigation purpose will be used in rest of Maharashtra excluding Konkan region for drinking and industry.

6.3 As per 1991 census,the population of Godavari basin is 2.88 crores, Krishna basin 1.87 crores, Tapi basin 1.14 crores, the basins of West flowing rivers 1.99 crore and Narmada basin 0.01 crore. Because of all such factors, the basin wise per capita availability of water for irrigation non-irrigation purposes together is different as follows.

The basin wise per capita water availability is 1069 cu.mt. in Godavari basin, 877 Cu.Mt. in Krishna basin, 525 Cu.Mt. in Tapi basin and 1038 Cu. Mt. in basins of westward flowing rivers.

Creation of Reservoirs and Irrigation Potential and Investment

6.4 Uptill now a total of 46 major, 188 medium and 1933 state sector minor irrigation projects have been completed in Maharashtra. The total storage capacity of all these 2167 reservoirs is 24830 Cu.Mt.(24.83 million TCM)This represents 39 percent of total net water available to the State.

[The above figures do not include storage capacity of local sector tanks of irrigation potential below 100 hacters each]

Regionwise details of storage facilities created are given in the following table.

Name of Region (1)	Water storage created(in million TCM) (2)
Pune	9.40 (including 2.7 Million TCM of Koyna reservoir)
Aurangabad	5.40
Nasik	4.20
Amravati	1.50
Nagpur	3.10
Konkan	1.23
Total	24.83 T.M.cu.m.

Irrigation Potential

6.5 With this available storage capacity, irrigation potential created by major projects is 15.16 lakhs ha, by medium projects is 6.70 lakhs ha. and by State sector minor irrigation projects 7.10 lakhs ha. Thus, uptill now total irrigation potential of28.16 lakhs ha. is created.

Investment

6.6 According to the report submitted by Barve Commission in 1962, the total irrigation potential after completion of all the above mentioned major, medium and minor irrigation projects, would be 52.61 lakhs ha. which would require an investment of Rs. 1130 crores at 1960 prices.

The actual investment on irrigation projects up to March 1994 was Rs. 7,200 crore which is Rs.921 Crore at 1960 prices. It means that the investment suggested by the Barve Commission is still not made. At March 1994 price level, still investment of Rs. 8,800 crore is required for construction of proposed irrigation projects.

Water availability in Irrigation Projects and its use

6.7 Studies of water storage and actual use during last 6 to 7 years in the irrigation projects will reveal that nearly 15 percent of the water from the irrigation projects was utilised for non irrigation purposes, i.e., drinking or industry.

During the year 1993-94 nearly 2503 Million Cu Mt. water was used for drinking and industrial purposes benefitting 2.64 crore population, 372 industrial units and 8 fishery research centres.

Present policy on use of water from Irrigation Projects

6.8 In view of the irrigation facilities in the up stream areas of reservoirs of irrigation projects, 6 percent and 14 percent of the command area is reserved for lift irrigation and drip irrigation respectively. The Government has a

policy to sanction 10 percent of area to be sanetioned under canal for flow irrigation and another 10 percent for lift irrigation where canal irrigation is not possible.

Problems of surface water and distribution policy

6.9 In a course of the time a major stress will be on irrigtion projects for drinking, industrial and agriculture purposes. In general such demand is low compared to storage capacity of major irrigation projects. However, the demand for non-irrigation purpose many times comes after completion of the project. So some expenditure incurred on irrigation projects turns infructuous and problems crop up in supply of water to cultivators for irrigation. As far as medium projects are concerned there is large demand of water for non irrigation purposes compared to the projects capacities.

6.10 The major policy in this respect is the planning of all available water by preparing taluka and district water plans on the basis of talukawise and districtwise demands of next 25 years for purposes like agriculture, irrigation and water supply schemes. The irrigation projects should be designed considering the anticipated demand. In the case of projects under construction, the requirement of non-irrigation use should be taken into consideration and accordingly the design of the project should suitably be modified. In such a way, the priorities of the project can be decided by taking into account demand for drinking water. At present, the priorities of water conservation programme are fixed in accordance with shortage of drinking water. Similarly, for irrigation projects also priorities will have to be reviewed. Further if water demand for other purposes

exceeds 10 percent of the capacity of the irrigation project, the proportionate expenditure will have to be borne by the concerned departments. In some places projects will have to be constructed as non irrigation projects only.

6.11 Medium and minor projects are generally designed for eight monthly crops only. In times of water scarcity water from storage dams is reserved for drinking purpose. Such reservations is generally made in Rabi Season i.e. in October-November. Even though the actual demand of water for drinking is small, five times or more of the required water has to be kept aside to meet the losses due to evaporations which are much more in October to May period. Due to such reservation of water for drinking from storage of irrigation projects, the irrigation programme for Rabi Season is badly affected.

6.12 Several times, the planning of the Water Supply Board is such as to let the water in the river from the irrigation tank, store as much quantity as needed for 2 to 3 days at few kilometres from the dam and lift it for drinking. In such planning there are losses of water not only by evaporation but also due to seepages and unauthorised lifting of water from the course of river. Further, large waste material is added in the river from the hamlets and hutments on the banks. All these factors cause a total loss of five to ten times of the actual demand for drinking water. Therefore, more water has to be reserved in storage tanks than the actual need of water. In spite of these efforts, people get impure water. Sometimes water supply Board requests for water supply from canals, distributories and sub-distributories. In such cases also five times or more water

has to be reserved in the dam for the losses of water in the canals, unauthorised use and evaporation in dams.

6.13 Under the above arrangements, construction of storage tanks is important and most essential as the canal water supply cannot start or stop instantaneously like electric supply. Twenty four hours continuous flow of water in the canal is required to reach the water upto tail-end of the canal. This makes thefts and losses inevitable. If a canal is allowed to flow for all 12 months to meet the perennial need of a village for drinking water, there will be huge wastage of water.

6.14 If water is reserved in medium and minor irrigation projects for drinking purpose and planning for Rabi season is not done (or very inadequately done), the water table in the entire command area will go deep. Subsequently water levels in the wells under command will also go very deep. The groundwater also will not be recharged. From the wells in the command areas at many places, cultivators take perennial crops like banana, sugarcane and the vegetables in hot season. The production will be adversely affected if water level in the wells depletes. The sugar factories will also face ripples. Similarly the villages in the command area will face shortage of drinking water. Hence, serious thought will have be given for reservation of water in medium and minor irrigation projects for drinking.

6.15 To overcome the situation for better future all water supply schemes will have to be connected by pipe line to the main source (water reservoir) in stages. This will result in substantial saving of water so also clean and pure water to

people. Later, in rural area also the supply of water through pipe line from the source is a need of the hour.

6.16 The dead storage is very high in some major projects. For example Jayakwadi and Ujjani major projects have 2.6 million TCM of water as dead storage. According to Barve Irrigation Commission's report, the present requirement of drinking water of Maharashtra State is about 3 Million TCM. That means 86 percent of the total drinking water requirement of Maharashtra is available as the dead storage of the Jayakwadi and Ujjani projects.The amount of siltation of the reservoirs is not considered in arriving the conclusion. For such reservoirs water supply schemes should be designed so that water can be drawn in summer season of 4 months from the dead storage of the reservoirs. Similar consideration can be given to all major irrigation projects in Maharashtra or it is necessary to study the feasibility.

6.17 Recycling of the water is the need of the time. The water used in industry should be used for agriculture after appropriate treatment. Some industries need not necessarily require potable water. For many processes non-potable water can be used. To meet the need of such water, the industrial units should be compeled to use ground water or other sources instead of taking water from dams/canals. The city sewarage can be used for cultivation after minor treatment. From the sewarage of Pune city about 700 hectares are irrigated. It is necessary to have similar system elsewhere.

6.18 Instead of constructing bridges on the rivers, the construction of bridge-cum-weir will be useful for irrigation as well as drinking water supply. Such structure will feciliate

the absoption of water into surrounding soil and help to increase water level in wells. It is observed that such type of construction helped in increasing water availability, where shortage of water was felt or water was available with much efforts. For these works, criteria will have to be fixed and funds made available to Public Works Department. Construction of bridge cum weirs in Amravati Division has resolved water problem in surrounding villages in a big scale.

6.19 Village tanks and other tanks had importance in the context of drinking water in olden days. Due to construction of the Malgujari tanks in Chandrapur, Gadchiroli and Bhandara districts the problem of drinking water has been solved to some extent. But day by day the tanks have been neglected. These tanks are used for watering and bathing animals. Similarly, the tanks are used by the villagers for other purposes like washing clothes. The main difficulty of construction of the tanks is, that the criteria for irrigation projects are followed for approval of the estimates and ultimately they do not fit into the norms. These difficulties can be overcome by applying criteria for drinking water if these tanks are mainly used as drinking water supply schemes instead of irrigation schemes. Many tanks are silted and the work for silt removing or repairs are not timely carried out.

6.20 The big problem of irrigation tanks and Kolhapur Type weirs is the lack of timely repairs. Hence projects constructed in large proportion remain useless. Paucity of funds is the main problem. The repairs and maintenance work is generally expected to be undertaken from non plan funds. Compared to the extent of the project, the non-plan

funds have limits. Very inadequate funds are received for inspection and repairs of the major, medium and major irrigation projects and their big distribution systems. The distribution system collapses in the course of the time and demands are made for revival from time to time. It is necessary to increase funds to run the distribution system properly.

6.21 The groundwater table is depleting in some areas. Urban Water Supply Schemes in particularly are generally based on rivers, canals and dams as sources of water. Due to construction of dams rivers also do not have perennial flow.The rains are also becoming erratic and irregular. Hence water supply schemes have to depend mainly on water storage in dams as assured source and if no certainly is given for drinking water from nearby dam, the distant dam has to be considered as a source. This results in increase in capital cost and expenditure on maintanance and repairs of water supply schemes.

6.22 In case of the irrigation projects where reservation for drinking water is approved during the construction stage or earlier, the priorities for the construction will be as follows:—

(1) Construction work of the irrigation projects in which the Maharastra Water Supply Board has a share of 33 per cent of the project cost or more should be under taken immediately by the Irrigation Department and necessary funds and machinery should be arranged to complete the work quickly.

(2) The Irrigation Department will give priority to construction of the irrigation projects fast in which the

Maharastra Water Supply Board will share the cost above 10 per cent but below 33 per cent. However, priority to such projects will be given after considering provision of additional funds., etc for the specific projects necessary due to regionwise irrigation backlog and inter state agreements.

(3) For the irrigation projects in which share capital is not contributed by the Maharastra Water Supply Board, the Irrigation Department will apply its usual norms and arrange funds.

6.23 In periods of water scarcity utmost priority is given for drinking water. The District Collectors reserve water from the irrigation projects by issuing orders from time to time. There is a committee at district level headed by the district Collector. The water charges for the reserved water will be compulsary. The Urban Development Department and the Rural Development Department should make provision for payment of water charges.

Although it is said that priority will be given for drinking water, a clear Government order binding on all is again necessary. In fact the requirement of drinking water is very small compared to agriculture and industry's requirement. Therefore, utmost priorities should be given for drinking water by reduction in irrigated area whenever necessary. In the period of scarcity, the water in the dams will be reserved for drinking with priority.

6.24 The river sluices should be constructed to the dams in the irrigation projects under construction or in future projects.

6.25 From the irrigation projects 15 percent of the water is used till today for non-irrigation purposes while rest of the 85 per cent is used for irrigation only. If the efficiency of irrigation is increased as much as possible, the total burden of the Government for water storage will be minimized. The availability of water will also increase largely. More attention will have to be given to drip irrigation and sprinklers. It is also necessary to assess the possibility of making drip irrigation compulsary for crops like sugarcane requiring maximum water.

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7. ECONOMY IN WATER UTILIZATION AND WATER AUDIT

Economy in water utilization.

7.1 The two inevitable certainties regarding water are its limited availability and continuous increase in demand for various development purposes, e.g., irrigation, industry, and various civil amenities. Hence, alongwith increasing water supply, full economy in water utilization will have also to be considered. Demand management will have to be given equal importance, if not more. The demand and supply management in a nutshell is to make efforts for maximum utilization of water available in the nature with maximum economy. The balancing of demand and supply of water will have to be done by accounting for future demand and supply than the present so that the present needs are not met at the cost of future.

Precautions to Avoid Water Economy Damaging to Development

7.2 Economy of water utilisation should not be damaging to the general development policy of the state. On the contrary, it should act as a catalyst in all types of development. The optimum use of the irrigation water

has to be made with a view to increase agricultural production and welfare of the cultivators in the state simultaneously giving pace to the state policy for agricultural development.

Planning of the schemes

7.3 The problem of drinking water has to be solved in a long-term manner at minimum cost. Schemes for the purpose should be within the means of the people and suitable to the local conditions. Efforts should be made, to the extent possible, to meet the water needs of a village from ground and surface water available in the local watershed area. A scientific approach is necessary to examine the possiblities. If such approach is not feasible in the present circumstances, steps should be initiated in this direction for framing a long-term policy to meet future needs. The long experience proves that the real issue lies in managing available water resources during the difficult period of 3-4 months of the summer. Whether it is possible to ensure water supply in this difficult period by planning surface and ground water is a real challange.

Importance of Economic Utilization of Water

7.4 Past experience shows that the water needs of even scarcity affected villages can be met from the groundwater reserves created by recharging through conservation of rain water in the mini-water sheds in village surroundings. The needs will include drinking water irrigation and other requirements from the scientific angle also it may be seen that the need of drinking water can be met in the drought prone areas of Maharashtra also by scientific and economic

use of surface water and groundwater. Need for carrying water from another basin should not arise.

Economy in water use for irrigation

7.5 Lot of discussion took place in connection with economic use of water for irrigation. The important conclusions of the discussions are crop planning for limited use of water by stems like drip irrigation and in general lessen water requirements of cultivation. There is almost unanimity that water utilization for irrigation will reduce if water is supplied from irrigation projects in measured quantities. Obviously, while thinking of crop planning, the demand of the crop and its returns to the cultivators will have to be considered so that their incomes will be rising continuously. For this purpose, research and basic changes in the agricultural development programme will have to be done and awareness that water is a scarce commodity need will have to be created. A policy in this effect will have to be formulated.

Measures to save water

7.6 Not only cultivators but all should remember that water is a national asset, it should be utilized economically and saved. For example, it is improper while advising cultivators, to make unlimited and unfair water use by industry and use of pure water for parks and gardens and similar purposes. Water conserving is the most neglected part in water utilization.

Importance of water conservation programme.

7.7 Under the water conservation programme, schemes like Watershed Development Programme have been taken

up for in sites conservation of rain water. However, enough attention is not given for conserving water. Important items like minimum use of water for various industries, continuous recycling of water, cultivation with minimum irrigation, etc. should be considered in context of conserving water. Use of filtered water in cities for public works is complained.

Need of water-audit

7.8 In the past there was similar situation about energy. But since then much awareness has been created in the field of evergy and the concept of energy audit has gained importance and got much success. The time is now ripe for water audit in alll areas like energy audit. The Bureau of Industrial Cost and Prices of Central Government had prepared a report in 1993 on use of water and its conservation in steel industry. Similar survey reports are needed for water use in all other industries. If necessary, legal provision also will have to be made for the water-audit. A reference to achievements made by all industrial organisation in conserving water will have to be made essential in their annual reports.

Reserch and Development programme for valuation

7.9 In-depth assessment of the expenditure required for water supply to different sections and the recoveries is needed. For this, an effective Water Conservation Research and Development Programme will have to be taken up. The research will have to be done on water utilization at all levels. It should include aspects from house cleaning with minimum water to maximum income from crops with least

waterings in drought prone areas or stress on the programmes for minimum water use in industries.

Education to people on water utilization.

7.10 The country "Israel" is the telling example in the field of proper water utilization. The knowledge of the work done in Israel will certainly yield benefits. The work done in Israel on water conservation ultimately depends upon best technology, discipline and determination. Hence a big programme for educating people by concentrating on those aspects will have to be taken up.

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8. DRINKING WATER SOURCES AND MEASURES FOR POLLUTION CONTROL

Importance of Pollution Control.

8.1 The water, which is a precious natural resource and is depleting fast, is polluted by traditional organic wastes, wastes generated from industrial processes, chemical agents or fertilizers and pesticides used in cultivation and silt from the degraded catchments of reserviors. While the domestic waste water constitutes almost 75 percent of the total waste water, the industrial liquid wastes, although less in volume, contribute over half of the total pollution load and large and medium industries are the major contributors. Therefore, there is a possibility of pollution of drinking water of the water supply schemes on the rivers and river stretches and outbreak of water borne diseases. It is very important to provide uncontaminated water to the public from health point of view.

Legal Provision

8.2 Maharashtra was the first State to enact a legislation in 1969, to protect and preserve the water sources. The State Water Pollution Control Board was set up by Maharashtra

first in the country in 1970. Thereafter, central legislation on prevention and control of water pollution was enacted in 1974. It is mandatory as per the provisions of this Central Act to protect the water quality and its wholesomeness for various uses, organise statewide programme to prevent pollution of water, monitoring water sources.These aspects are being handled by the State Pollution Control Board. The entire state has been declared as "Water Pollution Prevention Area" which covers all the river basins in the State. Under this act, it is obligatory on part of industries and the local Institutions to obtain consents from the Pollution Control Board and so far consents have been given to 49906 industries.

Powers of the State Government

8.3 Maharashtra Pollution Control Board (MPCB) regularly monitors the effluent generated by the industries for its quality. The water quality of important rivers in the State is also being monitored by the board under two projects sanctioned by Central Pollution Control Board. Under the second project Godavari, Bheema, Vainganga and two stretches of Krishna river are being regularly monitored by MPCB and the collected data are regularly supplied to Central Pollution Control Board. The MPCB is empowered under Water (Prevention and Control of Pollution) Act, 1974 to take action against the industries and local bodies who do not comply with the conditions of consent, initiate legal proceedings, take actions like disconnection of power, water supply and other facilities required by the industries and closure or regulation of the operations. MPCB has so far issued directions under Section 33A of Water Act to 57

industries out of which directions to 12 industries were confirmed. MPCB has also initiated legal action against 334 industries. The State Govt. is also empowered to take actions under section 5 of Environment (Protection) Act, 1986 and so far actions against 5 industries have been taken in exercise of these powers.

Water Cess

8.4 The funds of the Maharastra Pollution Control Board are arranged by the State Government through grants. In addition, the Board Charges fee for issuing consents. Under the provisions of Water (P&CP) Cess Act, 1977, MPCB is empowered to levy a cess on usage of water by industries and the local institution. The cess collected by the board is to be deposited with Central Government out of which 80 percent of the amount is given back to the board for various activities like strengthening of infrastructure, marginal assistance to industries and local institutions to set up effluent treatment facilities, pollution control work and environmental education and awareness programmes During last 3 years Board had collected Rs.19.03 crores as a cess amount which was deposited with Central Govt.,and Rs.13.61 crores have since been returned to MPCB.

Policy on Pollution Control

8.5 In order to protect drinking water sources, fisheries and the existing drinking water schemes based on the rivers water, it is necessary to formulate a policy on location of industries near the water sources, rivers and catchment areas. Such policy has been already formulated by the Government in 1987 for the catchment supplying

water to Mumbai City. If a state wide policy is framed on permitting location for industries along river and near drinking water sources, the sources will be protected and water borne diseases will remain under control.

Disposal of industrial effluent and hazardous and toxic solid wastes

8.6 The Maharashtra Industrial Development Corporation (MIDC) has established chemical industrial areas in the coastal districts and also provided collection and disposal systems for the effluent in the saline zones of creeks and sea. However, it is experienced that the disposal points so decided earlier are not serving the purpose of maintaining the water quality at the disposal points due to sevaral reasons. Thereafter, it is necessary to take a serious review of the existing disposal points and arrangements made by MIDC and if necessary, based on technical information change those disposal points appropriately and run the disposal system properly, so as to prevent entry of disposed effluents back into creeks and other water sources during high tide. Similarly, while developing new industrial estates collection and disposal system of the industrial effluents should form an integral part of the development process. More attention is necessary in this respect on existing as well as future zones of chemical industries. Some of the units in the industrial estates generate hazardous and toxic solid wastes. The MIDC is also responsible for finding suitable place and system for disposal of such solid wastes in the existing and future industrial estates and having control over proper disposal.

8.7 It is obligatory on part of the industries to set up adequate effluent treatment plants to achieve the standards prescribed in the consents.The medium and large scale industries' response in this area is satisfactory. However, it is observed that due to financial constraints, small scale industries are not able to make these arrangements. Therefore SSI Units are not in a position to achieve the prescribed standards and follow strictly the conditious in the consent letters. In the MIDC estates at Tarapur, Dombivali, Roha, Taloja, Thane-Belapur, Mahad, Lote Parshuram, Ambarnath-Badlapur and Cooperative Industrial Estate as Jaisingpur (District, Kolhapur) schemes to set up common effluent treatment plants are being implemented. These are centrally sponsored scheme under which soft loans are provided through the World Bank. The scheme at Tarapur has become operational and the other schemes are progressing. The completion and commissioning of those scheme will substantially help in reducing water pollution from SSI units.

Essential Actions

8.8 A set of directives to industrial units is being prepared which includes specific aspects of treatment on effluent and management to avoid pollution. If the condition in the consent letter of MPCB stipulate the disposal of the treated effluents on land under irrigation, the directives enable consideration of the gradient of the disposal area towards a river, its proximity to the water source, soil characteristics in the area, the rate of evaporation, percolation in the irrigation area and flow of leaches towards the water sources. The MPCB presently

undertakes physical, chemical and biological testing of effluents for which the Board has established a central laboratory in Navi Mumbai and Regional laboratories at Nagpur and Aurangabad Regional laboratories will be set up at Pune and Nashik also. Grants are received for strengthening of these laboratories under the pollution centrol project of the World Bank.

Vigilance Committee.

8.9 In the past, several instances occurred polluting drinking water source on the rivers by effluent from the industrial estates. In case of such rivers, vigilance committees will be formed including local people so as to solve at the local level pollution problems and resulting difficulties in supplying pure drinking water. Such type of committee is already constituted for Patal-ganga river.

Chemical Fertilizers and Pesticides

8.10 Apart from the industrial and domestic liquid wastes, the pollution of the drinking water sources occurs as a result of un-abated use of pesticides for crop protection and chemical fertilizers and the agricultural run off which enters the rivers and the drinking water sources located on them. Therefore, the Directorate of Agriculture should take up a compaign to prevent pollution of water sources. It should fix norms and draw a schedule for the pesticides and fertilizer applications. It's strict implementation needs to be ensured by the State Directorate of Agriculture. Similarly, the "Training & Visits" programme needs to be undertaken on a wide scale to create awareness among cultivators. Suitable training will have to be given to the staff in the Directorate

of Agriculture. The management of agricultural run off and other measures will have to be carried out through the trained staff for preventing pollution of water sources by chemicals.

National River Action Plan

8.11 The State Government is implementing a scheme under National River Action Plan to clean the stretches of the rivers Godavari at Nashik and Nanded and Krishna at Karad and Sangli. To implement the schemes sanctioned for the Krishna and Godavari rivers the State Government is required to bear 50 percent of the expenditure and remaining finance shall flow from the Government of India. Identification of polluted stretches of other rivers and purification campaign will substantially help in preventing river pollution. The Government of India has already been requested to include river stretches at Pandharpur, Kolhapur and Paithan under the programme. Although expensive, these schemes can be implemented if policy decision is taken and pollution of drinking water sources from domestic waste water can be prevented.

Removing silts from Reservoirs

8.12 It is generally observed that large quantities of silt accumulate in the dams of major, medium and minor irrigation projects. The soil errosion is the main reason for silting. To prevent the errosion, it is necessary to undertake soil conservation works in the catchment areas on large scale so as to avoid pollution of drinking water source from the silt. Before taking up such measures, the Irrigation Department should take review of all dams in

its centrol and find out the magnitude of the silting. Suitable measures to prevent errosion of catchment areas will increase the life-span of the dams. Further, removal of the silt from reservoirs and percolation tanks will enhance the water availability in wells and bores in the nearby villages.

Importance of Educating people

8.13 It is not possible to solve the problem of water pollution only through legislations. It is necessary to create awareness among the people at every level and implement an integrated programme on pollution control. Emphasis is very essential on preventive measures as reducing pollution, minimising liquid effluents by using appropriate technologies and inclusion of environmental issues at all levels.

Awareness among the industrial Units

8.14 In order that the water sources are protected from the industrial and domestic effluents, it is necessary for industrial units and local self institutions that the liquid wastes are treated before disposal according to the conditious in the consent letter of the Board to achieve standards prescribed by the central Government under Environment (Protection) Act.As a social responsibility, it is absolutely necessary for industrial units to draw a programme for environmental protection and take a comprehensive review of the effluent treatment plants for their adequacy and the suitability of disposal sites and further minimising water use and recycling effluent. It is suggested that industries association should take a lead

and organise programmes to create awareness in this respect among industrial units.

Coastal Water Drawals

8.15 There are instances of heavy drawal of groundwater in the coastal areas to meet the drinking water needs. In some coastal belts, the groundwater has turned salty as a result of ingress of saline water. The Central Government has prohibited drawal of ground water in coastal areas through coastal regulation notification. In view of the statutory provisions, it is necessary to decide policy to prevent salinity of ground water in future and draw alternate plan of water supply.

National Technology Mission

8.16 Due to the presence of the chemical fluoride in the groundwater of some areas people suffer from flurosis. Similarly, iron is present in some areas. In such areas modern technology has to be adopted or alternate water source has to be created. The Central Government has established National Technology Mission and action is being taken in this regards.

(A) Rural Health and Environmental Sanitation Arrangement

8.17 In general , only regional pipe water supply scheme provide for filtration of water. Facilities for filteration can not be provided for smaller and independent pipe schemes. In some villages settling tanks have been constructed. In these schemes and also in open wells the alam and bleaching powder is often used for disinfection. The present system and

technology used for water purification is inadequate and needs much improvement to purify water easily in less expenditure

Adverse Effects of Unclean Environment

8.18. The major cause of contamination of water in rural areas is unclean environment. During the rainy season impurities are carried to rivers and nallahs. The open wells and bore wells for the existing water supply schemes are contaminated due to unclean surroundings. Sometimes, impure water enters due to defective construction. Very often due to leakages in the pipe water schemes, impurities enter into pipelines. Although pollution is mainly experienced due to big drainages and industrial effluents, unclean environment is also a major reason of pollution.

Environmental Sanitation Programme

8.19. The important constituents for clean environment in rural areas comprise latrines (both individual and community), gutters, water draining and cleaning of animal sheds. Surveys reveal that only about 5-6 percent of rural houses have toilets. Central and State programmes are being implemented for providing sanitation facilities. Yet, they have not gathered the required momentum. There is, therefore, a need to make available more funds for the programme by keeping the limit of expenditure for private toilets realistic.

Community toilet blocks will have to be provided to those who cannot afford private toilets or to the floating population and to women in particular. The community

toilets have not been successful earlier largely due to lack of maintenance / repairs facilities. In view of very small proportion of private toilets compared to large growth in population there is need to create common facilities. In his Budget Speech the Finance Minister had mentioned to provide an impetus to the programme of individual toilet blocks and construction of community blocks for women. At present, the programme is implemented from Centrally Sponsored Schemes. Details in this respect are given in annexure V.

Inclusion of Water Purification Measures in the Scheme

8.20 Water Supply means supply of pure water. Bleaching powder is currently used for purification of well-water. It has limitations inspite of many advantages. There fore, possibility of pollution should be studied as a part of the water supply scheme and suitably included in the design of the scheme so as to give administrative sanction to both together.

Integrated Project for Drinking Water, Environmental Sanitation and Health Education

8.21 As much attention as necessary is not given to pure water and clean environment. The major reason is lack of health education. People will understand importance of pure water and clean surroundings through health education Consequently, the demand and insistance for pure water and clean environment will increase and the implementation at the local level will be effective. Integrated projects for drinking water, clean environment

and health education will have to be prepared on the lines of the projects aided by the World Bank and British Government. As both the components have little share in the total expenditure of the project, there is no fear of large increase in the cost of the project.

Importance of Gutters

8.22 Village Gutters and soak pits are most neglected components of the environment. The main reasons are shortage of funds and lack of awareness and technical know-how. Further, village panchayats do not have technical staff for execution. In short, there is very little technical know how for maintaining clean environment and arrangements will have to be made to acquire it.

Arrangements for Water Testing

8.23 Currently 30 laboratories for testing water quality are functioning under the Public Health Department in the Civil Hospitals and Rural Hospitals. Samples of drinking water are collected through health workers from villages and cities and tested in the laboratories. The Government has issued detailed guide lines in connection with purifying water. It is necessary to establish Laboratories in stages in every Taluka. It is necessary to provide testing facilities at every Primary Health Centre in next 5 years so as to test water and make reports available to village panchayats within 24 hours.

Responsibility of Local Self Institutions

8.24 Adequate funds are not provided by local self institutions for purifications of drinking water. At present,

Panchayat Raj Institutions spend on water purification from the funds for maintenance and repairs. Since these funds are not adequate, it should be made obligatory to the local self institutions to make adequate provision for purification of drinking water. The Government also will have to consider to provide some assistance for some period.

Availability of Funds

8.25 Even though drinking water and clean environment are very closely related to the health, it does not get priority and adequate funds because the benefits are not properly noticed. It is, therefore, necessary to make a note of the benefits on health and savings in related expenditure while evaluating drinking water supply and environmental programmes. Adequate funds should be provided in view of the importance of pure water and environment.

(B) Health Related Aspects In Urban Areas

Watersupply and Health related problems

8.26 Maintenance of water supply works is an important aspects. People's health depends upon the functioning of watersupply works. The water supply Board does not face difficulties as it has years experience of the maintenance of water works. However, small municipalities may come across difficulties or may neglect. The maintenance of water supply works is more important than the expenditure involved. Especially, avoiding of water disinfection can create havocs. It is necessary to accept the expenditure and efforts on supply of pure and bacteria-free water as complimentary to the expenditure on public health.

8.27 The Chief Engineer (urban) of the Board has issued detailed instructions to the Regional Officers on the precautions to be taken to prevent outburst of epidemics. Observance of these instructions by the officers of local institutions also will be beneficial.

8.28 It is important that the pure and becteria-free water from the water works reaches to the consumers in the same state. It is, therefore, important that the work of giving connections to consumers from the municipal supply pipes is carried out by the licenced plumbers, particularly, rusting of G.I.Pipes develops minute holes allowing entry of dirt with surrounding water and creates possibility of pollution. In order to avoid it, the detailed instructions given by the Urban Development Department should be followed scrupulously.

Many adverse impacts can be avoided by proper observance of the instructions in the circulars mentioned above by the concerned.

8.29 It is better to see that the water source is basically free from pollution. Particularly, contact of water with human excreta can spread diseases like jaundice. It should be remembered that Water filteration reduces becteria but can not control virus totally. If therefore water is infected due to virus, people should be informed immediately and asked to drink only boiled water.The principle, "When there is doubt, shut it out," should be borne in mind and the water supply should better be stopped when pollution is feared by outbreak of jaundice. In this connection people should be taken into confidence for quick action.

8.30 In spite of taking precautions for water source while designing the scheme, the city expands in due course and again creates possibility of pollution. Besides pollution can occur due to other reasons like allowing molasses of sugar factories in the fields. In this connection Paithan, Sangli (Sheri Nalla), Kolhapur (Dudhali and Jayanti nalla), Karad, Ichalkaranji, Roha, Chavane, etc. are prominant examples. There is no need to worry when the flow in the river is much more because the self power of purification in water gets utilised. But, when the flow becomes thin in the summer, the pollution problem arises and diseases like jaundice and typhoid spread out.

8.31 Some times a city has to depend totally or mostly on the supply of water from bore wells. However at such times it becomes difficult to see continuously that the bore wells are free from pollution. In such circumstances water from all bore wells should be collected together at one place where simpler facility for water filteration should be provided. The water can be disinfected by the chlorine doses.

8.32 Considering all aspects, following recommendations are made :—

(1) The Chief Officer/Engineer (Water supply) should inspect water sources from time to time to ascertain that they are pollution-free and maintain reports.

(2) It should be ensured that the chlorine contents of water are minimum 0.2 P.P.M. in the village storage tank and also at the farthest place in distribution system.

(3) Only liquid chlorine should be used in the Urban Water supply schemes as far as possible. Whenever it is not available, T.C.L. Powder should be used for that period only.

(4) T.C.L. Powder should not be stored for a long time and it should be verified that the powder contains more than 25 percent dissoluble chlorine. The doses may be fixed accordingly.

(5) Every municipality should maintain a unit for carring orthotoleden tests, examine dissoluble chlorine dose in all parts of the city and ensure that it is adequate.

(6) The District Health officer should constitute a committee for safe water supply with the help of Municipal Health officers wherever necessary. The committee should include the chief officers of Municipalities and examine regularly water samples. In this connection, people should be taken into confidence.

(7) The pipes of domestic connections should not pass through gutters. Rusting of the pipes every 10 to 15 years and pollution due to entering of dirty water is possible. Changing of pipes and connections every 15 years should be made compulsory, otherwise it should be disconnected.

(8) In view of the importance of safe water supply, all municipalities have demand of Government assistance for procurement of T.C.L. powder.

8.33 A representative of the Civil Surgeon of the district should be made responsible to see and monitor for all municipalities adequate supply of T.C.L. powder, its quality, actual use of the powder as compared with the water supply and maintenance of account of the powder. Also care should be taken to prevent pollution of water sources from the disposal of waste material of hospitals.

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9. MAINTENANCE, REPAIRS AND SUSTAINABILITY OF SCHEMES

(A) RURAL WATER SUPPLY

Present status of Maintanance and Repairs of schemes

9.1 Lack of maintanance and repairs of schemes executed by incurring huge expenditure is a matter of as much concern as the water supply programme is. At present 27 per cent of schemes are in a state of disrepair due to various reasons and the full benefit of the programme is not being realised. The reasons are like faulty designs, inadequate sources, inadequate set up for maintanance and repairs, inadequacies in maintanance and repairs system and paucity of funds with Panchayati Raj Institutions. Some local institutions and people show indifference and negligence. As rural water supply schemes are totally subsidized by the Government, the people in some place expect the government to attend to even the smallest repairs. At times the repairing units do not get even the required help from the local community for carrying repairs.

9.2 A provision of 5 to 10 per cent people's contribution was included in the rural water supply programme which was deleted from 1st April, 1985 to avoid delays in

construction of the schemes. However, it is now necessary to review the matter and insist on people's contribution in rural water supply schemes on the lines of urban schemes. This amount can be given to Panchayati Raj Institutions by the Government in the form of a loan.

Current status of handing over of schemes

9.3 A total of 15,856 PWS have been completed in the State. Of this, 7936 schemes have been completed by MWSSB in the state sector and 7920 schemes by Zilla Parishads in the local sector. From the state sector schemes, 619 schemes are yet to be transferred by the Board to Zilla Parishads/Village Panchayats.The often cited reasons for reluctance to take over the scheme are that schemes are not implemented as per design or that they do not function properly. The State Government has, therefore, issued guidelines providing for inspections and trial runs by commitee before transfer of the scheme.

9.4 An important impediment in respect to maintenance and repairs is the inadequacy of the administrative set up involved in implementation of the present programme. The MWSSB is responsible for execution of large pipe water supply scheme while the GSDA is responsible for the drilling of borwells. However, both these agencies are not responsible for operating the schemes after completion but the concerned local government institutions are responsible in rural as well as urban areas. The agency executing the scheme complain of improper maintenance and repairs by local institutions whereas the local institutions complain of faulty design and execution. The

facts in the complaints against each other remain unknown. Hence, while deciding on reorganizing of the administrative structure of water supply schemes the issue of maintenance and repairs needs to be given consideration to find out suitable system..

MWSSB arrears with Local self-Government Institutions

9.5 The MWSSB does not receive funds for maintanance and repairs of the schemes executed by the Board. This has created pressure on financial position of the Board. So far the Board has Rs.68 crore as dues with various local institutions. As a consequence plan funds are diverted for maintenance and repairs resulting in shortage of funds for regular schemes.

In order to solve this long-standing problem of maintanance and repairs the local institutions may be allowed to pay the arrears in easy instalments, and as an incentive the interest may be waved in case the local institution pays the principal. However,it will help to solve the problem if the Government meanwhile provides to the MWSSB interest-free loan in order to improve its financial position. As and when the arrears are recovered, the loan amount can be paid by the Board.

Maintenance and Repairs Funds

9.6 Local institutions persistently plead inability of maintanance and repairs and water purification due to paucity of funds. They demand that the Government should bear the cost of purification.

Raising of Maintanance and Repairs Fund

9.7 The Zilla Parishads and Village Panchayat pass resolutions to take over and run the schemes after completion. However, on completion of the scheme they demand assistance from Government for running it. A definite stand needs to be taken in this respect. It is necessary to make a provision that no new scheme will be sanctioned unless the concerned institution keeps aside specific amount for maintanance and repairs and passes a resolution to levy water tax.

Recovery of Water Tax

9.8 There are broadly three situations of economic condition of Panchayat Raj Institutions at various levels. While some Panchayati Raj Institutions levy and recover water tax, others levy water tax but not collect and yet others do not levy water tax at all. As a result, those who do levy and collect water tax feel guilty. Further, those institutions prepared for collection are discouraged. In some areas, the recovery of taxes has limitations due to the poor economic condition of people. This is especially so in tribal and inaccessible areas. In certain villages absence of assured year-round water supply acts as a deterrent for payment of water taxes. However, in some areas people are financially better off they have capacity to pay water tax, but no recovery due to indifference of people and lack of interest from the administration.

Government Assistance for Maintenance and Repairs

9.9 The following aspects are important in providing assistance by the Government for Maintenance and Repairs.

(i) The agency for maintanance and repairs has to be self-sustaining in due course. The expenses will go on increasing over a time and the Government cannot bear the expenditure endlessly in spite of the will.

(ii) It is necessasry for the government to give some assistance for some period for the maintanance and repairs. However, the following items will have to be considered:—

(a) This assistance should be linked to the recovery of water tax so that the institutions collecting more tax amount will get larger assistance from the Government.

(b) The assistance needs to be reduced gradually to make the schemes sustainable over a period.

(c) The assistance from the Government should be proportional to the economy of the region.

(d) The assistance should be linked to the anticipated expenditure and not the budgeted outlay.

Concession on Electricity Bills.

9.10 Electricity charges form major component of operational costs of pipe water scheme. It is necessary to rationalize the power subsidies to run the schemes properly. These subsidies can be reduced over time in stages.

(i) Villagy Panchayats are given 50 percent subsidy on electricity bills to enable them to run pipe water supply schemes. Similar benefit of subsidy should be considered for Regional Pipe Water Supply schemes of Zilla Parishads as ultimately the burden passes on to rural population.

(ii) The electricity bill of rural pipe water schemes are less when charged on H.P.basis. This concession is applicable at present to the pipe water schemes connected to the low tension power supply only. It will have to be considered to extend this concession to pipe water schemes connected to high tension power supply as the ultimate benefit flows to rural communities.

Recovery of water tax

9.11 The following aspects need to be borne in mind while levying water tax at village level :—

(a) It will be more facile to recover water tax a a part of property tax.

(b) The water tax should be linked to the facilities provided to the people and proportional to their economic conditions.

Raising adequate fund for Maintenance and Repairs

9.12 On transfer of schemes, the Panchayat Raj Institutions are expected to levy water tax within the prescribed limits and to meet the maintenance and repairs costs. The Government has prescribed the existing rates of water tax in June, 1982. It is necessary to review these rates in view of increase in the cost of maintenance and repairs. Details of Existing and proposed rates are given in Annexure-VI.

Maintenance and Repairs of Borewells

9.13 It would be appropriate to repair borewells in due course through women's groups and social organisations. A

time bound programme will have to be drawn to motivate and train this group. However it will take some time . Hence it is necessary to strengthen the machinery at taluka level meant for maintanance and repairs and remove its deficiencies. The Government will have to bear some part of the additional expenditure.The teams which were formed in 1978 should be able to repair electric pumpsets on bore wells and puping machinery of small pipewater schemes.

Contribution for Maintenance and Repairs of borewells

9.14 The cost of maintenance and repairs of handpumps and electric pumps on borewells is to be recovered by Zilla Parishad from Village Panchayats in the form of contribution in accordance with the prescribed rates. As a period of 15 years has been elapsed since rates are prescribed, it is necessary to revise the contribution rates for handpumps and electric pumps. It is proposed to revise these rates as follows:

(1) Borewell with hand pump ... Rs.500 p.a. each
(2) Borewell with power pump ... Rs.2500 p.a. each

Besides maintenance and repairs of borewells the village panchayat has to spend on procurement of adequate T.C.L. powder for water purification. In view of this, it is therefore necessary to levy water tax on open wells and borewells in villages without pipe water supply schemes. In this regard the tax can be levied as follows:

(a) Rs.25 per year per house for the villages/hamlets with water supply from open wells.

(b) Rs.50 per year per house for the villages/hamlets with water supply from borewells or from both borewells and open wells.

Separate Agency for maintanance and repairs of pipe Schemes

9.15 The maintenance work of pipewater schemes is looked after by the sub-division responsible for execution. However, the sub-divisions are unable to pay adequate attention to maintenance and repairs due to pressure of work. Inshort the workload of maintenance increases as the assests in the district in the form of schemes increase. The situation calls for a separate agency for maintenance and repairs. The Government can bear a part of the expenditure in the beginning.

System for Maintnance and Repairs of Schemes

9.16 Adequate financial powers need to be delegated from district level to village level to avoid delays in maintnance and repairs. In general, there is a belief that the repairs are to be carried out whenever fault occurs. Several times, lack of regular primary repairs increase the volume of repairs and the expenditure. The management techinic of maintenance and repairs has progressed a lot today. It is necessary to define maintenance and repairs suitably and declare a detailed policy on modes and periodicity of preventive maintenance. Further, there is a need to maintain a diary for every schemes which should be inspected and analysed from time to time.

Fixing responsibility for Maintnance and Repairs

9.17 Maintenance and repairs is the responsibility of Panchayati Raj Institutions. It is necessary to hold these institution entirely responsible. Further, limiting the responsibility only to officers and employees of the

institution will not help. It is necessary to make a clear provision in the act to hold the institutions responsible after fixing the responsibilities. Institutions also need to be provided with incentives for shouldering properly their responsibility. Priority for new or supplementary schemes will have to be given to village panchayats or Zilla Parishads recovering water taxes and carrying out maintenance and repairs timely and according to expectations.

(B) URBAN WATER SUPPLY

Introducing financial discipline for maintenance and repairs

9.18 As per the Municipal Act, the responsibility of providing safe and disinfected water supply to the citizens in their jurisdictions lies with the respective local institutions. Execution of all these water supply schemes is done by the MWSS Board, and after completion, the schemes are to be handed over to the local institutions, who pass a resolution to this effect before the sanction of the schemes. In practice, however, the local institutions are reluctant to take over the schemes after completion.

9.19 The prevalent policy is that the water works owned by local institutions should be maintained by the concerned local institutions only. In the recent past, the water works of Pune Cantonment, Nashik and Kolhapur and other towns have been handed over to respective local institutions.

9.20 Before formulation and sanction of the scheme, the local institutions should consider whether they are able to afford the maintanance/repairs expenses of the scheme. Once the consent for acceptance is given the local institutions

should not avoid taking over the schemes. It will, therefore have to be considered to make it incumbent on the Municipal Councils to charge realistic water rates so as to balance the income and expenditure of the scheme, and wherever necessary, to wipe out the deficit, either by indirect taxation or from other sources of revenue. It will have to be considered to treat financial irregularities in this respect on the part of the local institutions as a sufficient reason of inefficiency and to take action against such institutions. A suitable provision in the municipal act in this connection will have also to be considered.

9.21 Large sums are payable by local institutions to MWSS Board towards water bill, in respect of the state owned water works under the control of the Board. Even under such circumstances, the defaulter local institutions insist on taking up new schemes. The demand of local institutions that new scheme to be taken as Board scheme should not be conceded to.

9.22 Some local institutions are in the habit of not paying dues against water bill or loan amounts to the Board. Therefore, the MWSS Board is unable to spend funds on the development works for which the funds are released. In order to improve this situation, it is suggested that the District Collectors should not approve the annual budgets of those Institutions unless they make provision in their budget for repayment of Board/Government dues. Further, in spite of such provision in the budget if a local instituion fails to make the payment in the same year, the Collector should not sanction the budget for next year.

Revision of water rates by the local institutions from time to time.

9.23 The Maharastra Water Supply and Sewerage Board supplies water in bulk directly to the consumers, or through some Municipal Corporations/councils. In such cases,the water rates are decided on "no profit no loss" basis taking into account total expenditure and revenue of all the water works together. The items of expenditure mainly include water cess payable to Irrigation Department for drawal of water, electric bills, expenses on chemicals and establishment as well as maintenance and repairs.

9.24 Considering all the aforesaid factors, the MWSS Board has fixed water rates for bulk supply for both domestic as well as non domestic consumption effective from 1st May 1995. Accordingly in case of unmetered supply for the domestic use the water rate for supply through 15 mm diameter pipe line is fixed at Rs.80 per month. Compared to this, the rates charged to the consumers in respect of the water works run by Municipal councils, are ordinarily in a range of just Rs.15 to Rs.20 which is hardly 20 to 25 per cent of realistic tariff. It is no wonder that under these circumstances the operation of Municipal water works runs into heavy losses whereby even the maintenance and repairs expenses cannot be met with, and also the loans for the schemes can not be repaid.

In order to operate the water works at least on " no profit-no loss" basis, all the local institutions need to take into account the actual expenditure incurred in relation to the quantum of water generated, and then work out the water tariff on a rational and realistic basis. It is absolutely

necessary that every Municipal Council/Corporation takes steps in this direction.

Fixing minimum rates for water supply

9.25 Accordingly, the minimum water rate should be fixed at Rs.3 per thousand litre and levy of minimum water tax proportional to the expenditure should be made compulsory to the municipalities of various classes.

The aforesaid rates should be made applicable to domestic consumers only. Water rates for non-domestic and Industrial consumptions should be twice and four times respectively of the water rate for domestic consumption. These rates should come into force immediately.

Water Tariff-Separate Budget of Water Supply

9.26 Over a period of time, the ratio of domestic, non domestic, industrial water rates should be maintained as 1:3:5. Expenditure on electricity and establishment should be reviewed every year and water rates should be enhanced by 10 per cent. A separate budget for water supply should be got approved. The concerned Collectors should approve the Municipal budgets only after ensuring the aspect such as realistic water rates and income, provision for water bills payable to MWSSB/State Government, electricity bills, and loan installments. These funds should not be diverted elsewhere. Unless this is implemented, the budget for the next year should not be approved. If the entire expenditure towards water supply can not be met with, even after charging at aforesaid water rates, or if as a matter of policy, some sort of concession in the form of subsidy is to be offered

to water consumers, the concerned Municipal Council should make a specific provision in its budget to make up the deficit in respect of water supply from the property tax, octroi or any other revenue income. Without such provision the budget should not be approved.

9.27 After completion of the scheme, it is possible to carry out the maintenance of scheme on a contract. The MWSS Board is successfully following the practice of maintenance of schemes on contract basis. The local institutions have already recruited large number of employees and substantial portion of income is spent on the wage bills of employees. When agumentation scheme is completed, its maintanance can be entrusted on contract to a private agency rather than taking up permanant liability of additional employees by recruitment for maintenance work.

9.28 A good number of Municipal Corporations/Councils have already established a practice of employing private agencies for collection of octroi. Hence there should not be any objection in following the same practice at least for maintenance of water works. Further a condition can be imposed on the contractors to get this work done, as far as possible, through the existing available employees, and only where necessary, new employees should be appointed. While doing so, the concerned municipalities should take responsiblity to carry water upto the storage reservoir, and the work of distribution, billing and collection should be entrusted on the contractor. The contractor, should be asked to deposit a specific sum to the Municipal Council, so that increase in revenue could fetch more profit to the agency and encourage to provide better services.

If necessary, amendment to Municipal Act in this connection should be considered. Also the same system can be adopted to larger rural pipe-water supply schemes.

Concessions on electricity bills

9.29 The cost of daily maintenance of urban water supply schemes is continuously on the rise.The share of electricity bills is very large in the total expenses on maintanance. Very few cities can have water supply through gravity flow and hence water has to be pumped for most of the cities. Where pumping needs to be done twice or more a day, the elctricity bills solar to 30-6o per cent of total operational costs.

9.30 While 20 hours daily pumping in urban schemes based on 50 HP will fetch an elctricity bill of Rs.5,47,500, for an identical rural scheme it will be Rs.12,000/-. It means the disparity of 43 times.Besides, 50 per cent of amount of the bill is shared by the State Government in rural areas. Taking this into consideration, the electricity cost of urban scheme is 86 times the cost of rural scheme. Municipalities are reluctant to raise the water rates to this level. In order to maintain realistic water rates and make urban water supply schemes sustainable, the municipalities demand that the electricity should be charged on HP basis for cities also if this system continues in rural areas. The relevant rules should be changed accordingly.

Preventing water losses, increasing private connections and reducing public posts

9.31 Day by day the cost of water is on the rise whereas water availability is on the decline. Further cost of

constructition and maintenance of new schemes are going beyond capacity. Studies reveal that 25-30 per cent water losses due to leakages. It is therefore essential not only to stop obvious leakages, but also detect leakages and take steps to repair the same in order to prevent wastage of filtered water. The Municipalities should take on priority the survey of leakages and their repairs.

9.32 A 15 mm (1/2") diameter pipe connection is expected to supply water to 5 to 6 people. The total number of connections in a city can be arrived at the rate of one connection for 6 persons to 90 per cent of population, 10 per cent population being assumed as below poverty line and excluded. In reality, the actual member of connections in many cities is half or 2/3 rd of the expected mumber. It can be therefore inferred that either there exists illegal connections or a tap serves 12 people or more. It is necessary to change this situation early. Water rates should be based on actual number of pipe connections. Houses with more than 6 persons should be compeled to take more connections. This will reduce complaints of inadequate water supply and simultaneously increase the revenue from water cess.

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10. PLANNING AND IMPLEMENTATION OF PROGRAMME

Programme Management

10.1 The drinking water programme being extensive and complicated needs continous improvements in its management so as to maintain quality of the work and complete the scheme within the prescribed period. In this context, improvement will have to be made in programme planning, work systems and working of the agencies implementing the schemes. Similarly, measures will have to be taken to over come all difficulties in implementation. The following items relating to management are important.

Action Plan for Implementation of Scheme

10.2 The modern management practices need to prepare action plan (plan for implementation of plan) also alongwith the scheme as its part. On the same lines, while preparing the design of a water supply scheme, detailed and in depth analysis as how the scheme will be implemented should be included as a part of the scheme. The analysis will cover details of funds, manpower and machinery requirements.

Proposed Working

10.3 It is necessary to adopt the system of "Memorandum of understanding" (MoU) with Maharashtra Water Supply and Sewerage Board (MWSS Boord) and other agencies. The memorandum should have reference to the period required to the agency for completion, fund requirements, quality of work and expectations from the Government. For example, it will include disbursement of funds, administrative sanction, etc. Further, provisions on incentive for good work done by agencies compared to criteria fixed and penalty for defaults will have also to be considered.

Planning of Master Plans

10.4 Master plans for the State and Districts will have to be prepared for proper management and planning. For implementation of the master plans, action plans will have to be prepared and executed according to the time schedule. Hasty scheme design and frequent changes will make proper implementation of programme impossible. The most important part of the management is adequate supply of funds and manpower. If more schemes are taken up without corresponding funds, the schemes will not be complete in the proposed time and there will be increase in expenditure. Similarly, if more work compared to the staff provided for both surveys and implementation is taken up, the schemes will not have the required quality, the execution will be faulty and consequently the objective will not be achieved.

10.5 There are orders for obtaining approval of the District Coordination and Monitoring Committee to the Master Plan for rural areas. All members of parliament

(MP), Members of Lagislative Assembly and Council (MLA,MLC), Zilla Parishad Office -bearers and chairman of Taluka Panchayat Samitis are members of the committee. Hence it can be assumed that the plan approved by the committee will have a general consensus and will not need early changes.

Implementation System

10.6 The scrupulous compliance of the orders to maintain quality of the schemes is essential. The order mainly include reliability of source, completion of various sub-works in the proposed order, fixing responsibility of faults on contractor, selection of contractor, not to devide schemes for contracts, etc. It will be useful to evaluate the work from a third party for maintaining quality of scheme and checks during implementation on the lines of the World Bank aided projects. For the evaluation, help can be obtained from Engineering Colleges and other technical institution in the state. Supply of water from the scheme before its completion in all respects will create many complications and the scheme will not function effectively.

Improvement of Management

10.7 Considering importance of management improvement in the water supply programme, complete modernisation of Maharashtra Water Supply and Sawerage Board, Ground Water Survey and Development Agency and Zilla Parishads is necessary. The modernisation will help maximum work through the computer related technics of computorised messages, designing and management. Services of a suitable institution can be utilized for advice on modernisation.

Reliability of Sources

10.8 The success of watersupply scheme mainly depends upon its water source. Hence, efforts are necessary to increase the reliability of the source so that the expenses on the scheme do not go waste. It will be appropriate to allot the work of certifying sources of groundwater scheme upto Rs.10 lakh to the senior Geo-physicist. The sources of the scheme above Rs.10 lakh can be certified by a technical committee. It is necessary to decide after studying more how to ensure water supply from the source for next 35 years. Strengthening of groundwater source should essentially be an integral part of the design of water supply scheme based on groundwater.

Realistic Parameters

10.9 In order to cut down cost of a scheme, the parameters assumed for making the proposal are unrealistic. Hence some pipe-water schemes experience shortage of water. It includes water losses, enhanced capacity of storage tank and reducing pumping hours, etc. Therefore, action will have to be taken to make scheme proposals realistic.

Revival of schemes out of repair or special repairs

10.10 Some defects or difficulties crop up in due course in the schemes executed. At some places the sources are becoming inadequate. Hence the supply of water is not adequate and it does not have the required pressure. The distribution system is not adequate in all areas or sufficient water with proper pressure is not reached at all places. Therefore, an additional storage tank will have to be built or additional distribution pipe-lines have to be laid.

Similarly, pumps of more capacity or more lifting devices will have to be installed for filling storage tanks quickly. Some water pipes leak or break. In short, the old schemes should be revived in such a way that they are renewed to function again to the capacity. With such improvements, water facility can be given to people with less expenditure. It is necessary to consider whether provision can be made in the present programme for revival and special repairs of the old schemes. Obviously, enquiry is necessary to find out whether the planning and implementation of the scheme was basically faulty.

Provision for cost overrun

10.11 Pipewater supply schemes have large coverage and expenditure. The capital cost of the scheme increases more due to distant water source and population growth. The work on the source is also complicated and has to be undertaken in the summar only. This allows a small period for actual work in a year. Usually, four to five years period is required between sanction and functioning of a scheme. In case of some schemes the period is still more. Taking into account both expenditure norm (Rs.5 lakh) and period (more than 12 months), rise in cost has to be allowed to the executing agencies according to Government prescribed rules. It is obligatory also. Meanwhile the rates of the material (C. I. Iron, pre-stressed pipes, volves, etc.) also rise largely. However, there is no procedure to make provision for price escalation. As a result, the work lags behind. Rise in the cost has to be allowed. It increases the budget of the scheme. The revised budget has to be got sanctioned from the Government. It makes delay and long period elapses. Again cost increases.

All these factors should be considered thoroughly and provision for possible price escalation should be made in the budget of the scheme according to the budgetted cost of expected time for completion.

Common Scheme for Urban and Rural Areas

10.12 While formulating a scheme on some specific water source, its optimum utilization is expected. Water needs of a city are satisfied by designing a scheme of water supply through pipe-lines from a dam as a source. However, the rural area on route is not necessarily considered while drawing the scheme. Provision is made in some schemes for water supply to the villages on the way. But this is not policy though this is a fact.

When the villagers see that a pipe line passes through their village they naturally demand water from the pipe line. There are difficulties in accepting the demand. Agitations take place if the demand is not accepted. A situation making damages to the pipe line arises. However, if pipes of suitable capacity are not provided in the beginning to include such demand, it becomes difficult to make provision suddenly. Suitable measures can be taken if consideration is given at an early stage.

Urban Development Department sanctions urban scheme while Rural Development Department sanctions rural schemes. These two departments rarely act together. The major reason behind it is that the rural schemes are taken up with the minimum cost and within the norms. This is considered through the District Coordination Committee. Pipe-water schemes are decided only when the problem can

not be solved by open wells and borewells. Moreover, use of surface water comes when non-availability of ground water is certified by the Groundwater Survey and Development Agency. The planning of urban schemes however goes on separately.

In order to have a positive change in the situation described above, a water source for each city should be decided for the future. Some work has already been done for 200 cities in the state. In some cases changes would be done if necessary. For a city if the water source is a dam and water has to be carried from the dam site to the city through pipes, the needs of the villages along the pipe-line should essentially be considered. Water in bulk should be supplied to the villages from the joint scheme owned by the city and the expenditure should be shared by the Rural Development Department. A separate rural schemes form the pipe line onwards will have to be taken up which will include sub-works of pump-house, storage tank, distribution system and filtration centre, if necessary. A policy decision should be taken for maintanance and repairs of the joint schemes. The Municipal Corporation / Municipality should look after the maintanance and repairs of the main schemes while responsibility of maintenance and repairs of the rural portion and payment of electricity bill should be taken by Zilla Parishad and Village Panchayats.

Time Schedule for Scheme Sanctioning

10.13 There are complaints in general that much time goes in designing and obtaining administrative sanction

of new, augmenting and revised schemes. Hence, change in the work culture and time schedule for it will be useful. Further, it is necessary to mordernise and computerised the survey and designing work to avoid delays in including administrative sanction.

Man Power Availability

10.14 The drinking water programme is implemented through Local Government Institutions, Maharastra Water Supply Board and Ground Water Survey and Development Agency. These Institutions complain that the man power with them is not adequate in comparision of the work load. For the quality work, suitable manpower according to norms will have to be made available. Further, the norms and criteria need to be updated by mordernisation and computerisation of the work.

Training

10.15 It is necessary to arrange regular training courses for increasing efficiency of the technical staff in Government Departments. Training is mainly in the following three types:—

(1) Technical

(2) Planning and execution of work, and

(3) Soliciting people's participation.

Although the officers and staff are technically qualified, more training is needed due to frequent changes in the technical work.

Providing Trained Staff

10.16 The village panchayats have to shoulder more responsibilities. They get funds under Jawahar Rojgar Yojana also in addition to the state Government scheme. The village panchayat implement mini water supply schemes and have responsibility of their maintenance and repairs. Hence technical staff will be needed at village panchayat level for undertaking development works like drinking water schemes, water conservation, sanitation, etc.

Spread of Technical know-how

10.17 Compiling of technical know-how available and experience gained elsewhere and providing to all is an important aspect of enhancing the technical knowledge. This work can be done by other technical organisations better than the Government. The suggestion was made in the workshop arranged at Pune. Moreover, the expenses on publications can be recovered from the Government/ Non-Government organisations.

Establishment of Standards Institution

10.18 Social organisations are telling to relax and update the technical standards relating to water conservation and drinking water. These standards obviously need different for different areas. Some social organisations have completed with the previous experience very useful and effective work. They complain, however, that they have to follow old pattern. It was suggested in the work shop at Pune that the standards should be fixed by an autonomus institution like Bureau of Indian

Standards instead of the Government. The autonomous institution should include Government representatives, technical institutions related to central and state Governments, Colleges, representatives of industry, well-known experts and social organisations. Even if the recommendations of these institutions are not made statutory, the institutions will be definitely useful in increasing professionalism. Such institutions at state level will help in strengthening techniques besides fixing standards only. The institutions will advise increasing standards of current works with minimum expenditure.

Participation of Social Organisations

10.19 The participation of social organisation in drinking water and water conservation programmes is very important. Many social organisations in the state have done valuable work in this field. The organisations can participate more and more as and when they get more technical personel. These organisations can further be utilized for making other programmes successful.

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11. FUNDING OF WATER SUPPLY PROGRAMME

Expected Requirement of Funds

11.1 There is large demand of funds from all districts for the drinking water programme. As compared to the demand available funds are very inadequate. According to the Master plans prepared by all districts for tackling drinking water problem, the need of funds is Rs. 4,000 crore for rural areas and Rs. 2700 crore for urban areas (excluding Greater Mumbai),the total being Rs. 6,700 crore. The funds will have to be raised from all sources, for example, State Government, Central Government, external aid agencies, local development fund., private institutions, etc.

Financial Assistance From Central Government

11.2 The funds from Central Government for rural water supply under accelerated programme are continuously increasing. Similar assistance is being received, since recently, in urban areas for cities having population below 20,000. The amount is limited in comparison. It is necessary to get funds in urban areas for the cities with population upto 40,000. For both rural and urban areas more funds are required from the Central Government. The state Government will have to insist in the National

Development Council on more funds by giving priority to drinking water in the central plan. Suitable climate on this aspect will have to be created at the national level.

Provision by State Government

11.3 According to Central Government criterion, the State Government has to make available at least the matching amount of the central assistance. The State Government, therefore has to provide funds in increasing scale in both urban and rural areas for drinking water and other programmes. All Government programmes are meant for welfare of people. If first priority is given to drinking water programme, other programmes will get less priority. Hence there should be preparedness at all levels.

External Aid Agencies

11.4 Efforts will be made to obtain maximum funds from World Bank and other external aid agencies. However, all agencies insist on measures for scheme becoming sustainable, adequate contribution from the local people for operating the scheme and sharing capital expenditure. It is important to consider this aspect for obtaining funds under externally aided projects.

Funds For Pollution Affected Schemes

11.5 The State Government can think over to levy a special cess to raise more funds. If new schemes are necessary due to contamination of water source from industrial pollution, the concerned industries, alternatively, can be asked to share a big portion of the expenditure. The Central Government has to be persuaded in this connection.

Assistance From Local Development Programme

11.6 About Rs.250 crore will be available in the year from State Government's local development programme and Central Government's local development programme of the Parliament Members. The provisions in the order of local development funds include 20 per cent utilization for drinking water. There are demands at all levels for giving priority to drinking water schemes. If the proportion of 20 percent is increased to 50 or 75 percent, more funds would be available for the programme.The Central Government can also be requested to provide more funds for drinking water from the local development programme of Parliament Members.

Funds from Private Agencies and Individuals

11.7 Providing drinking water is considered as a noble work. Hence funds can be raised in large scale from the agencies and individuals interested in rural upliftment. In view of the size of assistance received from private agencies and individuals for rehabilitation of earthquake affected people, substantial funds would be available for this programme also. For this purpose, a useful scheme will have to be prepared and permission of Central Government obtained for exemption in income tax to the donors.

Linking of Expenditure on Temporary Measures with the Permanent Measures.

11.8 The expenditure on urgent temporary measures every year go almost waste. People therefore demand permanent measures. Provision of funds is made for permanent measures under plan schemes. However, non-

plan provision is to be made for temporary measures. Hence, while preparing design for temporary measures, it is necessary to make it in the context of the Master Plan so that the temporary measures will help in taking up permanent measures later. Further, formal provision in the budget for temporary measures will help in operating the scheme.

Privatisation of Drinking Water Supply Schemes

11.9 The Central as well as State Governments have initiated steps for privatisation of basic projects traditionally hitherto considered as State's responsibility in view to make more funds available in the free economy. With the objective, action has been oriented in the sectors like roads, power, telecommunication, etc. Privatisation of irrigation projects is also being considered in the state. The privatisation of Hyderabad Metropolitan Water Supply Project is under consideration of the Government of Andhra Pradesh. There are some limitations in adopting privatisation process to rural water supply scheme. However, some solution can be considered in this respect.

Dues of MWSS Board from Local Institutions

11.10 The Maharashtra Water Supply And Sewerage Board has to receive dues of Rs.180 crore from the Municipal Corporations and Councils and Rs. 68 crore from Panchayat Raj Institutions. The total amount equals to the total transactions of the Board in a year. This has created big pressure on Board's finance. The dues are increasing continuously. It has created shortage of funds for new schemes and the schemes in progress. The Board, therefore,

has to borrow from open market at higher interest rate. This problem has to be solved to give impetus to the drinking water supply programme. The measures in this counection can include payment of dues in instalments according to a time schedule and arranging loan without interest to the Board against the dues.

Waiving of People's Contribution.

11.11 The local institutions have to deposit an amount equal to 10 percent cost of the Urban Water Supply Schemes in the form of people's contribution. This condition has been waived recently for "C" class municipalities. However, "A" class and "B" class municipalities have to arrange people's contribution and borrow 66.66 percent and 50 percent loan respectively in addition to Government grants. But the experience of people's contribution is not encouraging. Some of the municipalities do not have capacity to pay while others have capacity but no will and divert the amount elsewhere. Some municipalities pay the first instalment of people's contribution and keep pending remaining instalments.

11.12 The execution of schemes is held up for want of payment of the contribution. Meanwhile the cost of the scheme increases. The water supply to people is delayed. Thus, the people suffer. Further, the work starts where first instalment is paid. However, it can not be stopped even if the remaining instalments are in arrears in order to fulfil the conditions in the contract. A sub-work is held up if it is not started. However, it causes wastage of time for completion of the scheme. It is also not fair to keep idle the amount already spent.

11.13 The local institutions demand that the condition for people's contributions should be scrapped. Anyhow the local institutions have to raise loans and repay by levying water taxes and there is no burden to the Government. In view of all these aspects, the condition for people's contribution should be waived for all municipalities and the loan amount should be increased to that extent. Honourable Chief Minister has agreed to it and made an announcement also while replying to discussion on the demands of the Urban Development Department.

11.14 The revised mode in this connection for the water supply schemes should be as follows.

Percentage Distribution of expenditure

Sr No	Local Institution	Total No	People's Contribution	Government Grants	Loan
(10	(2)	(3)	(4)	(5)	(6)
1	Corporation (excluding Greater Mumbai)	12	Nil	23	77
2	"A" Class Municipalities	23	Nil	25	75
3	"B" Class Municipalities	45	Nil	40	60
4	"C" Class Municipalities (1981 census population 15000 and above)	96	Nil	50	50
5	Other "C" Class Municipalities	67	Nil	100	Nil

Projects for World Bank Loan Assistance

11.15 A project of the cost of Rs.313 crore had been prepared and submitted to the Central Government in the year 1985. It comprised of Kalyan-Dombivali,

Thane-Bhivandi, Ambarnath, Ulhasnagar, Bhayandar, Vasai-Virar and New Mumbai and surrounding areas. The cost increased to Rs.614 crore after re-valuation according to the directives of the Central Government. A guarantee was given on 7th November 1990 as demanded by the Central Government that financial provision would be made for the project.

However the Central Government issued instructions in the year 1991 to estimate population growth on 1991 census basis. Meanwhile it was decided to take up a separate project for the cities of Kalyan and Dombivali. A new project on the Surya Dam was prepared for the Vasai Virar area. The City and Industries Development Corporation (CIDCO) has undertaken a project of the capacity of 100 million litres based on Hetawane dam by preparing a project on Morve dam to be constructed for New Mumbai.

In view of the above developments, a stage-II project was prepared for Thane, Bhivandi, Ulhasnagar, Ambarnath, Badlapur and Bhayandar Municipalities and surrounding rural areas and also including partial need of Kalyan Corporation. The stage-II project has been prepared by excluding the areas of Kalyan -Dombivali, Vasai -Virar and New Mumbai from the project prepared in the year 1985. The Ulhas river is the basic source of the project. Unless construction of a dam on the river Poshir, a Tributary of Ulhas, adequate water can not be supplied to the project area. The Poshir dam is hence included in the stage-II project.

The Poshir dam has a storage capacity of 355 million cubic meter and provision of 225 million cubic meter for water supply. It can supply 710 million litre water daily to the project area. The total cost of the project is Rs.863 crore and Rs.169 crore will be required for construction of the dam. In the first stage, total work of Rs.569 crore including construction of dam is proposed. Large forest land will have to be acquired for the dam. Even after timely provision of funds and actual starting of the work, water supply can begin after 8 to 9 years only. The plan of the project was submitted to the Central Government in October 1992. The central Government instructed on 17th March 1993 to conduct "Environmental Impact Assesment Study" and obtain approval of the Central Water Commission. Compliance of these instructions will be completed by March 1996. While action is being taken in this direction, the Central Government has been requested to send the project proposal to the World Bank. It will save the period of appraisal by the World Bank. The Government will pursue the matter.

Improvement in LIC's Loan Pattern

11.16 Life Insurance Corporation of India (LIC) provides loan for water supply scheme in the proportion of its cost at the rate of 66.66 percent of first Rs. one crore, 50 percent of Rs. 2 to 5 crore, 40 percent of Rs.5 to 10 crore and 25 percent of the remaining amount. In addition to Government grants, people's contribution and actual loan from LIC, it is necessary to raise loans from open market. Compared to funds available, the requirement from open market is large and costly.

Therefore, the Government should request LIC to sanction loan at flat rate of 50 percent of the cost instead of 66.66 per cent of first Rs. one crore and there after at decreasing rates.

11.17 Since the urban schemes are bigger in size, the execution period is also longer. Hence the expenditure exceeds the budget. Some time some changes are also made according to the circumstances. A revised administrative sanction is therefore to be obtained. However, for the revised scheme, LIC considers only an increase of 25 percent of the original cost for the additional loan and lends only an amount of 25 percent of the increase considered. Instead, for the schemes requiring revised administrative sanction also loan amount should be as in the case of new schemes and it should be 50 percent minimum. LIC sanctions loan to every scheme separately on its merits. Some time it makes delay in mobilizing funds and consequently execution of the scheme. Therefore, LIC will be requested to consider all urban water supply schemes together instead of examining each scheme separately and made loan available.

11.18 LIC imposes condition of Central Government approval according to the prevalent practices for giving loan to the schemes costing above Rs. 10 crore. This delays the execution of the scheme. Further, the cost of the scheme goes up as now a days the distant water source has to be tapped. In view of this situation and rising prices, the cost limit of Rs.10 crore for the Central Government approval should be raised to Rs.25 crore. The

Government may request LIC in connection with the recommendation.

Fund requirements of Greater Mumbai

11.19 An expert committee was appointed on the water supply of Greater Mumbai and it has submitted report also (December 1994). In order to meet the water needs of Mumbai in future upto the year 2015, minimum four projects will have to be undertaken according to the report on the Vaitarna, Kalu, Gargai and Shai rivers at the estimated cost of about Rs.1717 crore. It is necessary that the Government makes provision in the annual budgets for the projects. Besides, an amount of about 535 crore will be required for sewerage projects.

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12. ADMINISTRATIVE SET UP FOR WATER SUPPLY PROGRAMME

Involvement of various Departments in the execution of Water Supply Programme

12.1 The departments dealing with the subject water supply at the Mantralaya level are Rural Development and Water Conservation, Urban Development, Irrigation, Public Health, etc. Within the Rural Development Department, the Rural Development Division is responsible for rural water supply whereas the water conservation Division holds responsibility of water conservation, Minor Irrigation and watersheds development, Groundwater survey and Development Agency. Urban water supply is under the administrative control of the Urban Development Department. The Irrigation projects are involved in both the rural and urban water supply. Purification of water is an important part of water supply and it is connected with Environment and Public Health Department. Temporary measures to covercome water scarcity are undertaken by Rural Development and Water conservation Department as wells as Revenue and Forest Department. The Rehabilitation and Assistance Division of the Revenue Department arranges water supply by tankers, river-pits, deepening of wells and acquiring private wells. The Rural

Development Division carries out work of drilling bore wells, temporary water supply schemes and special repairs of water supply schemes and bore wells.

State Level Field Agencies

12.2 There are two field agencies at the state level. The Maharashtra Water Supply and Sewerage Board is one of the angencies. The Board is under the administrative control of the Urban Development Department. The other is Groundwater survey and Development Agency under the administrative control of the Water Conservation Division. The GSDA has broadly two assignments, namely, to carry out groundwater surveys and action for enhancing groundwater reserves, and mechanical lifting of water, i.e., through bore wells and other means.

12.3 There are following district level agencies for drinking water supply :—

(i) Panchayat Raj Institutions as -
  (a) Zilla Parishads
  (b) Panchayat Samitis
  (c) Village Panchayats.

(ii) Municipal Corporations and Councils

(iii) Maharashtra Watersupply and Sewerage Board.

(iv) Groundwater Survey and Development Agency

(v) Soil Conservation and Watersheds Development Agency.

(vi) Irrigation Department.

(vii) Minor Irrigation Department (state sector)

Administrative Set-up for Water

12.4 The present administrative set-up for tackling drinking water problem could not meet people's expectations. People's representatives at all levels have brought to notice the deficiencies in the set-up and expressed dissatisfication during discussions on water supply programme, in the water conference held on 5th June 1995 and in the meetings held by Honourable Chief Minister in various parts of the state. The Honourable Chief Minister desired in the water conference that the representatives should make suggestions in this regards.

Present Set-up-Deficiencies and Complaints

12.5 Various aspects of the drinking water programme are handled by different departments and agencies at Mantralaya and field levels. Further, an agency is controlled by more than one department. This results in improper planning and implementation of the programme so also administrative and technical coordination and monitoring. For example, the Maharashtra Water Supply and Sewerage Board looks after the schemes in both rural and urban areas. However, the urban Development Department has administrative control over the Board. While the schemes based on groundwater are executed by the GSDA. The agency functions under the administrative control of the Water Conservation Division. There is no provision of the supervision of the schemes costing upto Rs.10 lakh implemented by the Minor Irrigation Department of the Zilla Parishads.

12.6 The operational responsibilities of a scheme cannot be fixed specifically as there are different agencies for

execution of the construction and operation of the scheme. The agencies creating the schemes, namely, MWSS Board and GSDA are of the opinion that the schemes are not in condition for want of proper maintenance and repairs after completion. However, the Zilla Parishads,Village Panchayats, and Municipal Corporations/Councils who run the schemes have opinion that the schemes are basiclly defective. It is difficult to find out the facts in this respect and take further action.

12.7 The powers and responsibilities in the prevailing agencies and system are separated. It has defeated the important principle of efficient management. At present,the local institutions, i.e.Municipal Corporations and Councils in urban areas and Zilla Parishads, Panchayat Samitis and Village Panchayats, have statutory responsibility of drinking water supply. But the agency executing the scheme does not have authority over the supply. The recovery of water tax is the responsibility of the agency running the scheme. Hence the local institutions are not willing to operate the schemes. Similarly, the agencies creating the schemes are held responsible for the defects in the scheme, but have no control over the agencies operating.

12.8 The Maharashtra Water Supply and Sewerage Board is also critised a lot. Even though there are some defects in its working, it should be agreed that the Board cannot function effectively within the present framework. The Board has to receive Rs.250 crore in dues from the local self institutions. This has created big pressure on the Board's finance. It cannot give adequate attention to the implemention of schemes. The loan borrowed by Municipal councils has to

be repaid by the Board. Since the Board is not a Government Department, it does not have a control over local self institutions. Neither the Board can work as commercial organisation like Maharashtra State Electricity Board. Powers for recovery are not given to the Board. In short, the Board does not have merits of a Government Department or a commercial organisation but has to face their demerits. As regards administrative powers at district level, the District Collector is responsible for urban areas while the Chief Executive Officer of Zilla Parishad has responsibility of drinking water in rural areas. The MWSS Board and GSDA are separate organisations without any control on the organisations of Municipalities and Zilla Parishads.

12.9 The administrative set up will have to be reorganised at both Mantralaya level and the field level. The set up at all levels should be consistent with each other. If powers are given to a single agency instead of various agencies for the same work, it can be held responsible also.

12.10 Creation of a separate department at Mantralaya level is necessary for drinking water supply. The new department will implement at state level the drinking water programme by concentrating its attention fully on the programme.The entire responsibility of drinking water in both rural and urban areas will rest with the new department. All field organisation connected with the programme will remain under the control of the new department.

12.11 This separate department will decide total policy of the drinking water in the state and suitably implement

it. Similarly, the rural and urban water supply together can be considered. It has a great importance in Maharashtra due to increasing urbanisation of rural areas. A single and all inclusive programme and scheme on the source can be drawn for urban and rural areas.

12.12 The separate department for drinking water when created can acquire professional skills in connection with the programme. It can bring improvements in the concerned organisations. Further, minute attention can be given more to the aspects so far neglected in reference to drinking water supply.

12.13 On reorganising the departments in any manner, arrangements will have to be made for the coordination between the departments. For example even after creating a separate department for drinking water supply, the problem will remain connected with the Irrigation Department, Health Department, Environment Department so also with Industry, Rural Development and urban Development Departments. Coordination between all departments and monitoring will have to be maintained. For the purpose a Water Resources Authority is necessary under the chairmanship of the Honourable Chief Minister. Powers to take decisions on water supply will have to be given to the Authority.

12.14 After creation of the Water Resources Authority and a separare department for drinking water, there will be coordination and consistency at the state level in the drinking water programme. In relation to this, the reorganisation of the field agencies, their nature and

jurisdiction can be decided so that coordination and unanimity will be achieved in the entire programme and planning and implementation of the programme will be a success.

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ANNEXURES

ANNEXURE I

Central Assistance received by the State since Seventh Plan Period under Accelerated Rural Water Supply Programme.

Sr. No. (1)	Financial Year (2)	Assistance received (3)
1	1985-86	1844.88
2	1986-87	2348.70
3	1987-88	3265.10
4	1988-89	2735.40
5	1989-90	2286.65
6	1990-91	3313.35
7	1991-92	3490.00
8	1992-93	2423.76
9	1993-94	5488.00
10	1994-95	6182.00

ANNEXURE II

Assets created till 1st April 1995 under Rural Water Supply Programme (Only completed schemes)

Sr	District	Piped Water Schemes (State Sector)	Piped Water Schemes (Local Sector)	Bore Wells	Community Wells
(1)	(2)	(3)	(4)	(5)	(6)
1	THANE	139	261	3688	3188
2	RAIGAD	153	324	1282	2949
3	RATNAGIRI	358	480	2067	3038
4	SINDHUDURG	103	109	2167	2708
5	NASHIK	422	138	7652	3279
6	DHULE	245	350	4283	298
7	JALGAON	501	621	4117	2501
8	AHMEDNAGAR	410	239	5491	253
9	PUNE	378	688	5823	3576
10	SATARA	437	1131	1800	404
11	SANGLI	255	164	5794	1208
12	SOLAPUR	388	135	4462	2182
13	KOLHAPUR	379	454	3211	946
14	AURANGABAD	350	311	5967	4884
15	JALANA	211	374	4848	1298
16	PARBHANI	240	275	6163	35
17	BEED	274	148	2973	81
18	NANDED	594	427	3285	598
19	OSMANABAD	203	82	2996	6
20	LATUR	298	83	6487	200
21	BULDHANA	239	189	2581	1060
22	AKOLA	208	78	2640	4561
23	AMRAVATI	221	166	6085	5687
24	YAVATMAL	272	121	3008	4708
25	WARDHA	141	44	1566	33
26	NAGPUR	213	467	3589	3780
27	BHANDARA	139	39	6916	4636
28	CHANDRAPUR	126	22	4285	3462
29	GADCHIROLI	39	-	3203	2342
	TOTAL:	7936	7920	118429	63901

ANNEXURE III

The State Government fixed water rates for the first time in 1960. The rates have been revised under Government notification dated 30th June 1982 as follows :—

		Minimum Rate	Minimum Rate
(A)	Annual General Water Rate per family. Without Aqua meters	Rs.18 (For hutments	Rs.150 Rs.6)
(B)	Domestic pipe connections of 12 m m diameter-annual	Rs.101	Rs.200
(C)	Domestic pipe connections of 20 m m diameter -annual	Rs.201	Rs.300
(D)	Water connections for Non-domestic uses-annual	Double the rates at 'B' and 'C' above.	
(E)	Pipe connections provided with Aqua meters		
	(1) Domestic uses	Minimum Rs.0.60 per thousand litres, Maximum Rs 1.20 per thousand litres.	
	(2)Non-domestic uses	Double the rates against (1) above.	

ANNEXURE IV

Statement showing amounts sanctioned by the Government for the maintenance and repair funds of zilla parishads.

(Rupees in lakhs)

Sr No	Financial Year	Grants Sanctioned for maintenance and repairs		
		State Plan	Centrally Sponsored Plan	Total
(1)	(2)	(3)	(4)	(5)
1	1986-87	400.00	...	400.00
2	1987-88	470.39	...	470.39
3	1988-89	500.00	273.00	773.00
4	1989-90	392.00	228.63	620.63
5	1990-91	608.71	331.00	939.71
6	1991-92	564.00	298.00	862.00
7	1992-93	478.00	285.54	763.54
8	1993-94	478.00	549.00	1027.00
9	1994-95	660.00	618.00	1278.00
10	1995-96	1021.00	802.00	1823.00
	Total	5572.10	3385.17	8957.27

ANNEXURE V

Sanitation Programme

(1) Under the state sponsored Rural Sanitation Programme, grants are permissible for private toilets at the rate of Rs.1200 from State Government and Rs.400 from Zilla Parishad (total Rs.1600) per toilet for families of all communities.

(2) Under the Centrally Sponsored Rural Sanitation Programme grants are permissible to families below poverty line per toilet at the rate of Rs.1000 from Central Government, Rs.500 from State Government and Rs.500 from Zilla Parishad (total Rs.2000). Further, this scheme includes programme of community toilets for women only by utilizing 10 percent grants of the Programme.

(3) Since 1985-86, the number of private toilets contructed are 25000 under state sponsored programme and 35000 under centrally sponsored programme. The progress since 1992-93 is as under :—

(Rupees in lakhs)

Year	Centrally Sponsored Scheme		State Sponsored Scheme	
	Expenditure	No of Toilets	Expenditure	No of Toilets
(1)	(2)	(3)	(4)	(5)
1992-93	029.67	02472	031.60	02321
1993-94	186.24	14000	011.70	01093
1994-95	200.09	17380	049.25	03836
1995-96	424.00*	29000*	236.40*	19000*

*Anticipated.

ANNEXURE VI

Existing and Proposed Water Rates

Sr No (1)	Type of Water Supply (2)	Existing Water Rates (3)	Proposed Water Rates (4)
1	General annual water rate per family	Minimum Rs 18 Maximum Rs.150 for Hutment Rs.6	Minimum Rs.75 Maximum Rs.250
2	Without Aquameter	Minimum Rs.101 Maximum Rs.200	Minimum Rs.360 Maximum Rs.450
	(a) Domestic connection of 12 mm diameter annually		
	(b) Domestic connection of 20 mm diameter annually	Minimum Rs.201 Maximum Rs.300	Minimum Rs.750 Maximum Rs.1000
	(c) Non-domestic connection	Double the rates against (a) & (b) above	Double the rates against (a) & (b) above.
3	Pipe-water connections provided with Aquameters		
	(a) Domestic use per thousand litres	Minimum Rs.0.60 Maximum Rs.1 20	Minimum Rs. 1.25 Maximum Actual expenses of water supply plus 10 paise
	(b) Non-domestic uses	Double the rates against (a) above	Double the rates against (a) above
4	Pipe water connections of 20 mm diameter		Admissible for public and commercial institutions only

Sr No (1)	Type of Water Supply (2)	Existing Water Rates (3)	Proposed Water Rates (4)
5	Fees and deposits for private connections		
	(a) 12 mm diameter pipe.		Fee Rs.75
	(b) 20 mm diameter pipe		Fee Rs 120
	(c) Deposits for private connections		
	(I) For domestic uses		Deposit Rs.300 to 500
	(II) For non-domestic uses		Double the amount against (I) above

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