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Government of Maharashtra
Tribal Development Department

**A REPORT ON SCARCITY OF DRINKING
WATER IN DINDORI TAHSIL
OF NASHIK DISTRICT**



Tribal Research & Training Institute
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P R E F A C E

Water is the basic requirement of human life, therefore, it is necessary that everyone gets adequate water supply not only for drinking but for other uses also. Keeping this objective in view, the Government has undertaken various programmes for providing drinking water supply in adequate quantity in rural and urban areas. During summer the problem of supply of safe drinking water assumes more importance when it is related to the large number of rural/tribal population spread over a vast area including isolated and inaccessible habitats.

It is a fact that during the famine, foodgrains & other essentials are imported by the Government. In case of epidemics, needed medicines, injections etc. are imported for the welfare of people. However, in case of scarcity of drinking water, no such type of import of water is undertaken because it is not feasible and possible for the Government to do so. Therefore, the problem of scarcity of drinking water is to be solved locally by increasing the water resources on the one hand and avoiding the mis-use of drinking water on the other.

Maharashtra is known as "scarcity State" in respect of water resources. Main source of water in the State is rainfall only. Each year, the number of drinking water scarcity villages is increasing. During the period of sixth and seventh Five Year Plan number of drinking water scarcity villages in the State were 17112 and 23306 respectively. The number of difficult villages and padas observed under the survey of 1992-93 was 16790 and 18426 respectively.

Till 1995, the State Government has spent about two thousand crores of rupees on the drinking water supply but the problem is not totally solved.

The practice of monitoring and implementation of the programme, evaluation of the programme, rectification of the defects known through the monitoring and feed back and purgative action thereupon etc. are some of the very important aspects of smooth going of any programme. The present evaluation study of drinking water scarcity was carried out in Dindori tahsil of Nashik district with the following objectives.

- 1) To study the structure of drinking water supply schemes and its administrative set up in the rural/tribal area.

2) To assess the impact of the existing Rural Water Supply schemes on the day-to-day life of the tribal people in Dindori tahsil.

3) To study the short comings or bottlenecks in the enforcement of Drinking water supply schemes and suggest the remedies.

4) To enlist the remarks and difficulties of scheme implementing officers while implementing the scheme in tribal area.

The present evaluation study was assigned to Shri M.R.Gosavi, Statistical Officer who drafted the report. Shri A.N.Raut, Investigator helped him in the field work. The report was supervised and examined by Shri D.M.Raskar, Deputy Director (IADP).

Smt. A.J.Gaikwad, Steno-Typist, Smt. S.S.Bhutkar, Steno-Typist Shri.K.P.kurde, Steno-typist & Mr.J.B.Avachat, Statistical Assistant of the Computer Section have spared no efforts in bringing out this reports.

It is hoped that the suggestions made in the report on the basis of observations noticed under the field work will be useful to the programme implementing authorities, the planners and the research scholars who are interested in the Tribal Development Programmes.

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CHAPTER-I

INTRODUCTION

Importance of water

Water is one of the most important natural resources for all the living organisms whether unicellular or multicellular, since it is required for their various metabolic activities. In addition, water is required in various activities such as domestic purposes, irrigation, shipping, sanitation, power generation and industries. More than three fourth of the earth is covered with marine and fresh waters which is available in oceans, rivers, ponds, lakes, glaciers, etc. Out of total global water content, only 3% fresh water is suitable for human use. In short, water is the most vital resource which has considerable influence on biotic organism. Besides, water has several other unique qualities from ecological point of view which render it the most suitable medium for living beings. It also has the property of dissolving and carrying in suspension a huge variety of chemicals.

1.1 Causes of water pollution

Pollution of water is also a problem in addition to the problem of scarcity of drinking water. Various causes of water pollution are as under :

The problem of water pollution is global and it could draw the attention of scientists only when it became hazardous to human health. In India, the problem of polluted water, started long back but intensified during the last few decades and the situation became more alarming at present.

Surface water contained in rivers, lakes, ponds and oceans alongwith the ground water forming the water table gets polluted by various sources. Various factors which cause pollution of the water are enumerated below:-

1) Sewage waste -

It is the result of urbanisation and is mostly discharged into water bodies. The sewage waste which includes human excreta etc. soaps, detergents and garbage containing waste papers, clothes, kitchen washing etc. is the main cause of pollution of water bodies. It also contains organic matter and pathogenic microbes especially the caliform bacteria (*Tiwari and Sen 1991*) and

larvej of gastro-intestinal parasites of human beings. The pollution strength of sewage waste is measured in the terms of Biological Oxygen Demand (BOD). Discharge of untreated sewage to the water bodies threatens the water sources and makes them unfit for human use, either for drinking or bathing.

2) Industrial effluent and heavy metals

It is generally observed that the oceans, the rivers and the ponds are mostly used as sink for dumping off effluent from industries which contain a variety of organic and inorganic chemicals and industrial wastes viz. acids, alcohols, phenols chemical dyes, oil, grease, plastic materials, suspended solids and heavy metals, etc. These are considered as potent water pollutants of surface water and are reported to cause severe damage to economically important fishes in the oceans, rivers and lakes. (Singhal and Abusaria 1991). In the due course of time, these effluent cause sudden environmental changes in the natural ecosystems and affects the aquatic flora and fauna adversely.

3) Agro-chemicals

In order to meet the growing demands of increasing population, agro-chemicals have been in use for augmenting food production. These include two major categories of compounds viz. chemicals and artificial fertilisers and biocides. The chief agrochemicals include phosphate and nitrate fertilisers while commonly used biocides are D.D.T. BHC. All these are sprayed in the crop fields and ultimately enter into the water system through leaching or agril. run off making the water unfit for human use.

4) Radio active wastes

Marine ecosystems are mainly the victims of the radio active pollutants which include a variety of radio isotopes viz.. Sr.⁹⁰, CS 137, Pu 239, Co 60, C 14. They reach the oceans directly or indirectly.

The nuclear power plant accidents, nuclear tests and use of radio isotopes in biological and medical tests researches contribute measurable amount of radio active substances to the surface water bodies directly as well.

5) Population explosion and Anthropogenic interference

Indiscriminate use of natural water reservoirs and major rivers for various human requirements e.g. drinking, irrigation, navigation, fishing, recreational purposes (picnic spots) etc. have also added to the problem of water pollution.

Enormous harvesting of other natural resources, for instance deforestation, has caused eco- degradation of terrestrial ecosystems. It has resulted in soil erosion and heavy silting of the rivers and lakes thereby disturbing the species diversity and ecological balance.

1.2) Assessment of Water Resource

The primary source of water is precipitation, much of which is lost by evaporations, a good deal of it runs-off and is called, "Surface water" and a small amount soak into the ground and is known as "ground water". The surface water is "feasible through rivers and streams, lakes, tanks and through man made reservoirs. The feasibility and local supply of water is determined by the rainfall regime, structure, terrain and soils of the regions. Out of total water resources available on the earth, 97.5% is available in the form of salted water, whereas 2.2% is available in the form of ice found in the areas nearing to south and north poles. Only 0.5% water is available in the form of surface water which is utilised to fulfil the needs of human beings. Ground water and surface water commonly form a linked system. Flow can be in either direction, and the rate of flow varies geo-graphically and temporarily. It has been estimated that about 30% of the total water flow in streams is supplied from ground water, and seepage from streams which is known to be principal source of inflow" to some aquifers (Biswas, 1978, 33).

1) Extent of usable water resources

Total water resource available in the world is estimated to 1454.328 Arab Kilo cubic meter which is classified in the following table.

Table No.1.1

Sr.No.	Particulars	Arab Kilo cubic meter
1.	Sea water	1370.00
2.	Ground water	60.00
3.	Water in the form of ice	24.00
4.	Lakes	00.23
5.	Water in the form of vapour	00.14
6.	Surface water	00.83
7.	Rivers/Nalas	00.12
Total		1454.3282

(Source : White Book of Govt. of Maharashtra, dated 26-7-95.)

India receive 90% of its rainfall during the period June to Sept. The total water resources collected through average annual rainfall in India is estimated to

4000 Arab cubic meters. Major portion of these water resources is transformed in the form of ice while some part of it as ground water and vapour. Hence, water resource available for human utilisation is only 690 Arab cubic meter. When surface and ground water are considered together, the total water resources available will be estimated to 1110 Arab cubic meter. (Irrigation Commission Report 1972).

1.3) Water Management in India

For water resource planning, Government of India appointed a National Water Commission under the chairmanship of former Food and Civil Supply Minister Hon. Ajit Prasad Jain in the year 1971. This Commission submitted its report in 1973. One of the major suggestions was to appoint National Water Resource Parishad under the chairmanship of Prime Minister for formulation of water policy at National level. Accordingly, in the year 1982 National Water Resource parishad was established under the chairmanship of the then Hon'ble Prime Minister Smt. Indira Gandhi. First meeting of this Parishad was held in July 1985. In this meeting following major suggestions were made:-

1) Water is most valuable resource of the nation and it should be utilised very carefully. A "Data-Bank" may be established to collect and maintain water resource statistics and estimate accurately the water available at National level. For this purpose the States should co-operate with each other.

2) An exhaustive planning should be made for all river basins in India to control the floods and optimum utilisation of water resources.

3) Wastage of water resources should be avoided and proper utilisation of surface and ground water resources may be made for the benefit of mankind.

4) Proper co-ordination should be made between land and water utilisation.

5) To try to maintain purity of river and ground water.

6) The Central Water Commission has estimated the future demand for water of the country which is depicted in the following table.

Table No.1.2

(Unit Arab Cubic Meter)

Sr. No.	Particular (needs)	Year 1990	Demand				
			%	Year 2000	%	Year 2025	%
1.	Domestic	25	4.5	33	4.4	52	
2.	Irrigation	460	83.3	630	84.0	770	73.3
3.	Electricity	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
	i) Surface water	362	65.6	500	66.7	700	66.7
	ii) Ground water	190	34.4	250	33.3	350	33.3
TOTAL (i + ii)		552	100	750	100	1050	100

(Source - Central Water Commission Report -1991)

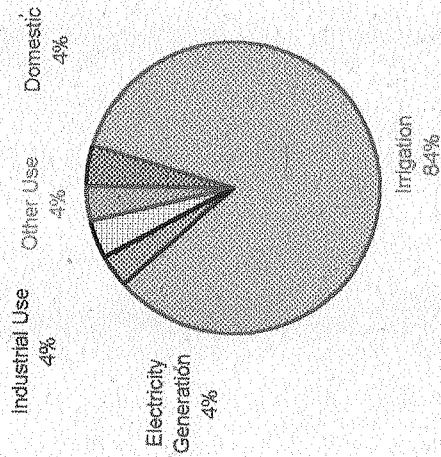
1.4) Water Resource Situation in Maharashtra at a glance

Maharashtra is known as a "Scarcity State" in respect of water resources. Average rainfall in the State is 1200 mm. Main source of water in the State is only rainfall. Out of the total rainfall of the State, fortyone percent is received by Konkan region most of which merge into the Arabian sea. Except some area of Southern Krishna basin in Western Maharashtra, remaining area and Akola, Buldhana districts in Vidarbha, adjoining portion of Western Maharashtra and Marathwada, Latur and Osmanabad districts are having very limited water resources. From the above facts it can be concluded that there is uneven distribution of water resources in the State.

The available surface water in the State is estimated to 123 Arab cubic meters. Out of which 74 Arab cubic meters water is usable. According to 1991 census, water available per person can be estimated to 984 cubic meter. Basinwise availability of water in the State is shown in the following table.

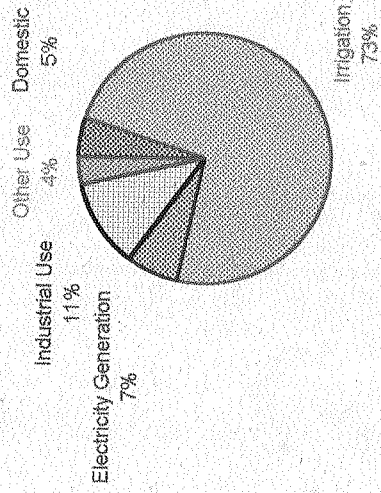
Estimation of Future Demand For Water Of The Country.

Year 2000



Total Demand 750 Arab Cubic Metre

Year 2025



Total Demand 1050 Arab Cubic Metre.

Table No. 1.3

Sr. No.	Name of basin	Population (Crores)	Available water (in Arab cubic meter)	Usable water (in Arab meter cubic)	Available water (in cubic meter per person)
1	2	3	4	5	6
1.	Godavari	2.88	38	74	1069
2.	Krishna	1.87	27		877
3.	Tapi	1.14	7		525
4.	Narmada	0.01	-		-
5.	Flowing towards west	1.99	51		1038
Total		7.89	123	74	984

(Source - White book, Govt. of Maharashtra dated 26-7-95)

Now a days the scarcity of water, especially potable water, has engaged the attention of the scientists, administrators very much. The increasing population, urbanisation and industrialization has put a heavy pressure on the water resources. It is, therefore, necessary to explore the causes of depletion of water sources and their pollution and revamping/revitalising of the same for the existence of living beings.

Chapter-II

Objectives, Methodology and Coverage under Study

2.1) Aims and Objectives

The following main objectives were kept in view for the conduct of present evaluation study.

1) To take stock of existing structure of "Drinking Water Supply Agencies" together with Administrative set up in rural/tribal areas in particular.

2) To assess the impact of the presently implemented Rural Water Supply Schemes for tribals.

3) To pin-point the shortcomings or bottlenecks in the implementation of Drinking Water Supply Schemes and suggest the remedial measures.

4) To know the reactions/repercussions of the implementing agencies in the tribal areas.

2.2) Hypothesis

"The existing Rural Drinking Supply Schemes have helped a lot to solve the drinking water problem of scarcity villages in tribal areas".

2.3) Research Methodology

It was decided to conduct field enquiry in Dindori block of Nashik district. For which two schedules were designed viz. the Household and the Appraisal Schedule. The present evaluation study was divided into three phases which covered -

- i) Survey of Tribal Households
- ii) Review of secondary data
- iii) Review of earlier studies.

2.4) Selection of area - villages

The case studies for present evaluation report was conducted in six scarcity villages in Dindori tahsil of Nashik District. Villagewise breakup of the tribal households selected/surveyed is presented in Table No. 2.1 given below.

Table No.2.1

Villagewise distribution of the household surveyed

District - Nashik

Tahsil - Dindori

Sr.No.	Name of village	No.of tribal households surveyed
1	2	3
1	Pingalwadi	14
2	Chausale	16
3	Nanashi	15
4	Dhakambe	17
5	Manori	11
6	Mavadi	13
Total		86

Besides the survey of above shown tribal households, various officials engaged in the implementation of rural drinking water supply scheme both at district/local level were also interviewed.

2.5) Research Tools and Techniques

Informal indepth interviews, group interviews and discussions as well as the participant's say etc. have been taken into account. These techniques were also supplemented by the questionnaire technique which was found to be extremely useful for collection of the data. The different schedules designed for collection of the data are given in Appendix-I.

2.6) Data Analysis

Data, both qualitative and quantitative in nature, have been collected through the survey and analysed manually in the office. The data have been presented both in the descriptive and analytical formats separately in the Chapter-IV. Before coming to the observations and conclusions on the basis of analysis of the data collected, it is essential to know about the policy of the Government in the Rural Drinking Water Supply programme. Implementation policy of the Government in respect of R.D.W.S.programme, Administrative set up, achievements etc. are discussed in detail in the subsequent Chapter No.III.

CHAPTER-III

Rural Drinking Water Supply Programme

3.1) Programme content and Guidelines

Under "Rural Drinking Water Supply Programme" the Government of Maharashtra has undertaken the responsibility to supply forty liters of pure water in a day to each person living in the rural areas. The problem of drinking water supply is being solved either by providing the wells, bore wells, piped water scheme etc. which is possible and economical in the specific areas.

Salient features of the scheme

1) Population criterion

Under this programme annual increase in population at the rate of 1.08 per cent is considered while planning for Rural Drinking Water Supply scheme. Estimates of population for next fifteen years are worked out to finalise the future demand of drinking water and accordingly the water supply scheme is designed.

2) Definition of scarcity village (Problem Village)

The problem village is differently defined by the Central and the State Government as under:-

i) Central Government -

The village which is not having a source of surface water supply within the distance of 1.6 km. or source of ground water supply within the depth of fifteen meters is to be known as "Problem village".

ii) State Government

The village which is not having source of public water supply within the distance of 0.5 km. is to be considered as "scarcity village".

3) Implementation of Rural Water Supply Programme

1) Normally, the piped water supply schemes are implemented in those villages which are having more than two thousand population. In these villages, water is provided through the common stand posts.

2) Generally, a bore well is provided for a village which is having about 250 population. However, (hamlets/wadis/padas) which are having about 80 population are also given the benefit of the scheme of bore well.

4) Financial implications -

Under this programme, the State Government provides funds from Minimum Needs Programme (MNP) while the Central Government provides financial assistance through the "Accelerated Water Supply Programme". However, in some cases the funds are also received from bilateral agencies.

5) Cost of financial implications

As a part of National Policy, from the sixth Five Year Plan, Rural Water Supply Programme is implemented in the State. The total cost of the Rural Water Supply schemes is borne by the Government. Prior to 1985 there was a practice of collecting "Public Contribution", however, it has been stopped from the year 1985 as the completion of the schemes were inordinately delayed for want of "public contribution". From the year 1980-81 to March 95 the Government has spent about two thousand crores of rupees over the Rural Drinking Water schemes.

6) Accelerated Rural Water Supply Programme

This programme (ARWSP) was introduced in the year 1972-73 as a part of the overall programme of special social welfare schemes. Under this programme, the central government gives financial assistance to the States and Union Territories for extending the water supply to villages or area where the problem is most acute. Preference is given to the villages predominantly inhabited by tribals and harijans and other backward classes. The following priorities have been adopted to cover the difficult areas:-

- a) *To cover 6th plan spillover problem villages (as per 1980 list).*
- b) *To cover all villages with no water source (1985 list). -*
- c) *To cover problem villages surveyed or identified subsequently.*
- d) *To cover all villages with contaminated drinking water.*
- e) *To cover all villages where per capita supply of water is less than 40 liters.*
- f) *To cover all hamlets and habitations.*

It is observed from the data that the amount of central assistance received by the State Government is increasing every year. This can be seen from the following table.

TABLE No. 3.1

Yearwise financial assistance given by the Central Government

Sr.No.	Year	Financial assistance received from Central Government (Rs.in lakhs)
1	2	3
1	1992-93	2423.76
2	1993-94	5488.00
3	1994-95	6182.00

(Source - White Book of State Government dated 26-7-95)

The information regarding the infrastructure/achievements created in the State under this programme is shown in the Table below.

TABLE No. 3.2

Infrastructural achievements

Sr.No.	Particulars	No.
1	2	3
1	<u>Piped water schemes</u> i) State Level ii) Local Level	7936 7920
2	Wells	63901
3	Successful bore wells	1,18,429

The information about infrastructure/Assets created under RWSP in the districts having the Tribal Sub Plan Area is also available and the same is furnished in the following table.

TABLE No. 3.3

Districtwise schematic achievements

The infrastructure created upto 1-4-1995 in T.S.P. Districts under Rural Water Supply programme.

(No.of completed schemes)

Sr. No	Name of the District	Number of the schemes completed			
		Piped water scheme (State Level)	Piped water scheme Local Level)	Bore wells	Public wells
1	2	3	4	5	6
1.	Thane	139	261	3688	3188
2.	Nashik	422	138	7652	3279
3.	Dhule	245	350	4283	298
4.	Jalgaon	501	621	4117	2501
5.	Ahmednagar	410	239	5491	253
6.	Pune	378	688	5823	3576
7.	Nanded	594	427	3285	598
8.	Amravati	221	166	6085	5687
9.	Yavatmal	272	121	3008	4708
10.	Chandrapur	126	22	4285	3462
11.	Gadchiroli	39	-	3203	2342
Total		3347	3033	50920	29892

*Note - The information of complete district is given which include T.S.P.area as well as O.T.S.P. area.

(Source - Government White Book 1995-96)

3.2) Ground water for drinking purpose

Salient features

Ground water assumes very vital role in the field of drinking water supply. At present there are about one lakh bore wells in urban areas while in rural area. They are about 1.18 lakhs. Availability of Ground water in the State is estimated to about 25.4 lakhs Hectare meter. In order to increase and preserve the level of ground water table, the Government has passed "Maharashtra Ground Water (Drinking Water Regulation) Act 1993". Following four main aspects are covered in this Act.

- 1) Private party or individual can not take a borewell within the distance of 500 meters from the public water supply source. Only under the exception of circumstances and after considering the views of expert officials, the competent authority is empowered to grant such permission to them.

2) At the end of the rainy season or in the middle of the rainy season. The District Collector is empowered to declare the scarcity areas. Accordingly, from the point of view of public drinking water source, any activity of digging wells within one kilometer from the public water resource area is prohibited. (Clause No.4).

3) The competent authority can declare catchment area as "over exploited catchment area" in consultation with the technical experts. In such catchment area, before taking any well or bore well. Prior permission of the competent authority is necessary.

4) In the over exploited catchment area declared by the Collector, if any well affects adversely on the source of public drinking water, the competent authority can put prohibition on drawing water from such well for a period of six months i.e. from 1st February to 31st July (Clause No.8).

3.3) Measures taken up by the State Government to check the quality of drinking water

Through Public Health Department, the State Government has set up a water testing laboratories in District Civil Hospitals and Rural Hospitals. The samples of the water from villages and towns are collected by the employees working in the health department and the same are tested in the laboratories. Moreover, the State Government has also issued detail instructions regarding procedures to be adopted in regard to purification of water.

3.4) Repairs and Maintenance under the scheme

Responsibility of repairs, maintenance and management is entrusted to the local bodies. Management of piped water scheme of a village rests with concerned Gram Panchayat, whereas a piped water scheme of two or more villages is managed by concerned Zilla parishad with a view to meet the expenditure of repairs and maintenance.

These local bodies recover "water tax" from the people.

Regular recovery of water tax helps the local bodies to pay the salary of employees, meet the cost of spare parts, pay the amount of electricity bills and T.C.L. powder bills etc. required for purification of water.

In the year 1986, the Government has created "Repairs and maintenance fund" at district level. The State Government provides five percent of the State

provisions for water supply. Ten percent of the funds received from the scheme "Accelerated Water Supply Programme" are also kept aside for repairs. Moreover, every Zilla Parishad has to deposit minimum twenty per cent of its income in this fund. From this consolidated fund, local bodies undertake repairing and maintenance of these water supply schemes. Besides this, water supply schemes which are operated on electricity of "Low Power Transformers" are charged concessionally on the basis of domestic power consumption. In case of independent water supply schemes of villages, the Gram Panchayats are given fifty percent subsidies on electricity bills.

Repairs and maintenance of Bore wells

In the year 1978 the Government has established a three tier organisation for repairs and maintenance of bore wells. This organisation takes care of hand pumps/electric pumps in the district. In order to provide sufficient funds for repairs of hand pumps/electricity pumps, the rates of annual contribution to be recovered from the Gram Panchayats have been fixed. They are given in the table below.

TABLE - 3.4
Contribution rates prescribed

Sr. No.	Particulars	Prescribed Rates (Rs.)
1.	a) For the first bore well	300
	b) For the second bore well	250
	c) For the third bore well	200
	d) For the fourth and subsequent bore well	150
2.	For the bore well which is fitted with electric pump	1000

Yearwise grants sanctioned by the State Government to Zilla Parishads for repairs and maintenance of drinking water supply schemes are given in the following table.

Table No.3.5

Yearwise grants sanctioned to Z.Ps. for repairs/maintenance
(Rs.in lakh)

Sr. No.	Year	Grants sanctioned for repairs and maintenance of water supply schemes			
		State schemes	Central Sponsored schemes	Total	Remarks
1	2	3	4	5	6
1.	1993-94	478.00	549.00	1027.00	
2.	1994-95	660.00	618.00	1278.00	
3.	1995-96	1021.00	802.00	1823.00	

Source - Government White Book, dated 26-7-95

3.5) Profile of Programme Implementing Agencies

Drinking water supply programmes are implemented through three Government Agencies in the State. The brief description regarding set up, functions etc. of these agencies are given below.

i) Ground Water Survey and Development Agency (GSDA)

This agency is established in the year 1972 headed by the Director. Its State level Head Office is at Pune. GSDA is having its regional offices at the Headquarters of each Revenue Division. For each district, a district level office is set up under the supervision of Senior Geologist. The survey work of Ground Water in the district is assigned to Senior Geologist for implementation of bore well programme effectively. Bore well machines are also hired from private individuals as and when demanded. In every Zilla Parishad office, the post of Deputy Engineer is created to look after the boring and blasting of the scheme. Besides this, the work of repairs and maintenance of hand pumps and electric pumps is also assigned to him.

ii) Maharashtra Water Supply and Sewerage Board (MWSSB)

This board has been established in the year 1976 and assigned the work of piped water supply schemes in urban as well as in rural areas. The Member Secretary of this board is the Administrative Chief. Under Rural Water Supply Programmes, offices of the Chief Engineer (Rural), Superintending Engineer, and Executive Engineer (Rural) are set up at State, Regional and District level respectively. The work of Rural Water Supply Schemes are undertaken by these offices.

iii) Zilla Parishad (Z.P.)

1) In every Zilla Parishad, the Committee viz. "Water Conservation and Water Supply" is set up. Drinking water programme is implemented by this Committee with the help of construction and Health Committees. There is no separate agency at Zilla Parishad level for Rural Water Supply Programme. This programme is implemented through Executive Engineer (M.I.) in Zilla Parishad.

Under Rural Water Supply Programme drinking water wells programme is implemented through Zilla Parishads. "Bore Well programme" is put through Ground Water Survey and Development Agency", "Piped Water Supply Schemes" costing less than ten lakh rupees are undertaken by Zilla Parishads whereas the scheme costing more than lakh rupees are implemented through Maharashtra Water Supply and Sewerage Board. Administrative sanction to the piped water schemes upto Rs. five lakh is given by the Zilla Parishads. The scheme upto 10 lakh rupees can also be sanctioned by Z.P. with prior permission of Divisional Commissioner. The piped water supply schemes exceeding the financial limit of Rs. ten lakhs are sanctioned by the State Government.

2) District Level Committees and their functions

a) At the district level, the Committee viz. "District Co-ordination and Monitoring Committee" is set up to monitor and co-ordinate the functions of Zilla Parishad, G.S.D.A and maharashtra Water Supply and Sewerage Board. The District Minister (Palak Mantri) of the concerned district is a President of the Committee; whereas other Minister/State Minister is the Joint President. The President of concerned Zilla Parishad is appointed as Vice President. This Committee is assigned with the following tasks:-

1) To co-ordinate and monitor the various water supply schemes implemented in the district and to monitor the timely progress of the above mentioned schemes.

2) To prepare a list of problematic villages in the district and action plan for the district with the help of criterias prescribed by the Government.

b) Technical Sub-Committee

The Technical Sub Committee is set up to scrutinise the proposals and to find out solution for drinking water problems with minimum cost involvement. The Chief Executive Officer of Zilla Parishad heads the Committee and other members of the Committee include Senior Geologist, Executive Engineer Zilla Parishad (M.I.) and Executive Engineer (Environmental Engineering), Project Officer of Integrated Tribal Development Programme is also nominated as Member on this Committee.

Before launching of a Five Year Plan, survey of villages/wadis is conducted and list of problematic villages (from the view point of scarcity of water) is prepared. Action plan for every district is prepared. After taking into consideration the funds available for the district and the criteria prescribed by the Government. Accordingly, the programmes of drinking water supply are implemented. During the 8th Five Year Plan, survey of all the villages and wadis/padas in the State was undertaken during the year 1991-92. On the basis of this survey, position of the scarcity villages and wadis/padas in the State is presented in the Table below.

TABLE No. 3.6
State Level Villages/Difficult villages

Sr.No.	Particulars	Total No.of villages/wadi/ Padas
1.	Total No.of villages in the State	43020
2.	No. of villages/wadis not having source of public water supply	1768/8390
3.	No. of villages/wadis facing the problem of impure source of water	696/108
4.	No. of villages/wadis facing the problem of insufficient water supply	9362/8253
5.	No. of villages/wadis getting seasonal water supply	3964/1675
6.	Total No. of scarcity villages/wadis in the State	16790/18426

(Source - White Book of the Government, dated 26-7-96)

CHAPTER-IV

Data Analysis and Observations

Data collected through informal indepth and group interviews, group discussions with the various officials and review of earlier studies reveals the following points.

4.1 Geology of Nashik District

The Great Trap of the Deccan region covers Nashik district. It is entirely volcanic formation. The volcanic portion consists of compact, stratified basalt and an earthy trap. The basalt are the most conspicuous geological feature. To the west, they lie in flat-topped ranges, separated by valleys, trending from west to east. In some flows, the basalt is columnar and then it weathers into the fantastic shapes. The formation at the base of the traps is chiefly amygdaloidal and zeolitic minerals, especially apophyllite weathering into a grey soil.

As regards the soil, the valleys are filled with disintegrated basalt of various shades from grey to black, washed down by rains. It is of argillaceous nature.

It is observed that the above circumstances have placed large number of limitations on seepage and storage of ground water in Nashik district. Naturally it results into considerable decrease in ground water table after rainy season is over. On the basis of statement made by Minor Irrigation Z.P. Nashik, it is stated that water table goes down about 0.5 to 1.00 meter every month and finally results into drying of bore wells in the summer. Besides this, during kharip and rabbi season about eighty percent water is utilised from irrigation wells for crops which also causes the scarcity of drinking water in the district from February to May every year.

4.2 Rainfall statistics

i) Nashik District -

Rainfall is the main source of water for Nashik district. Records of the rainfall in the district are available for a good net work of fifteen stations for period

ranging from 23 to 83 years. The average annual rainfall in the district is 998 m.m.

In the narrow strip of the district in the close proximity of the western ghats the rainfall is very much heavier than in the rest of the district. On an average, the rainfall in this narrow, strip increases from 2351.6 m.m. (92.58") at Pient in the north to 3341.6 m.m (131.56") at Igatpuri in the south.

In the plateau region to the east of the western ghats, the rainfall decreases from the west to the east in general with some local variations due to topography. The rainfall in the region varies from 477.3 mm (18.79") at Satana to 753.1 m.m. (29.65") at Dindori. About 88 percent of the annual rainfall in the district is received during the south west monsoon season i.e. from June to September. July is the rainiest month. There is no much variation in the rainfall in the district from year to year. Rainfall recorded in the district during the year 1995 was 819.80 m.m. which is less than the average rainfall (82%) in the district.

ii) Dindori tahsil

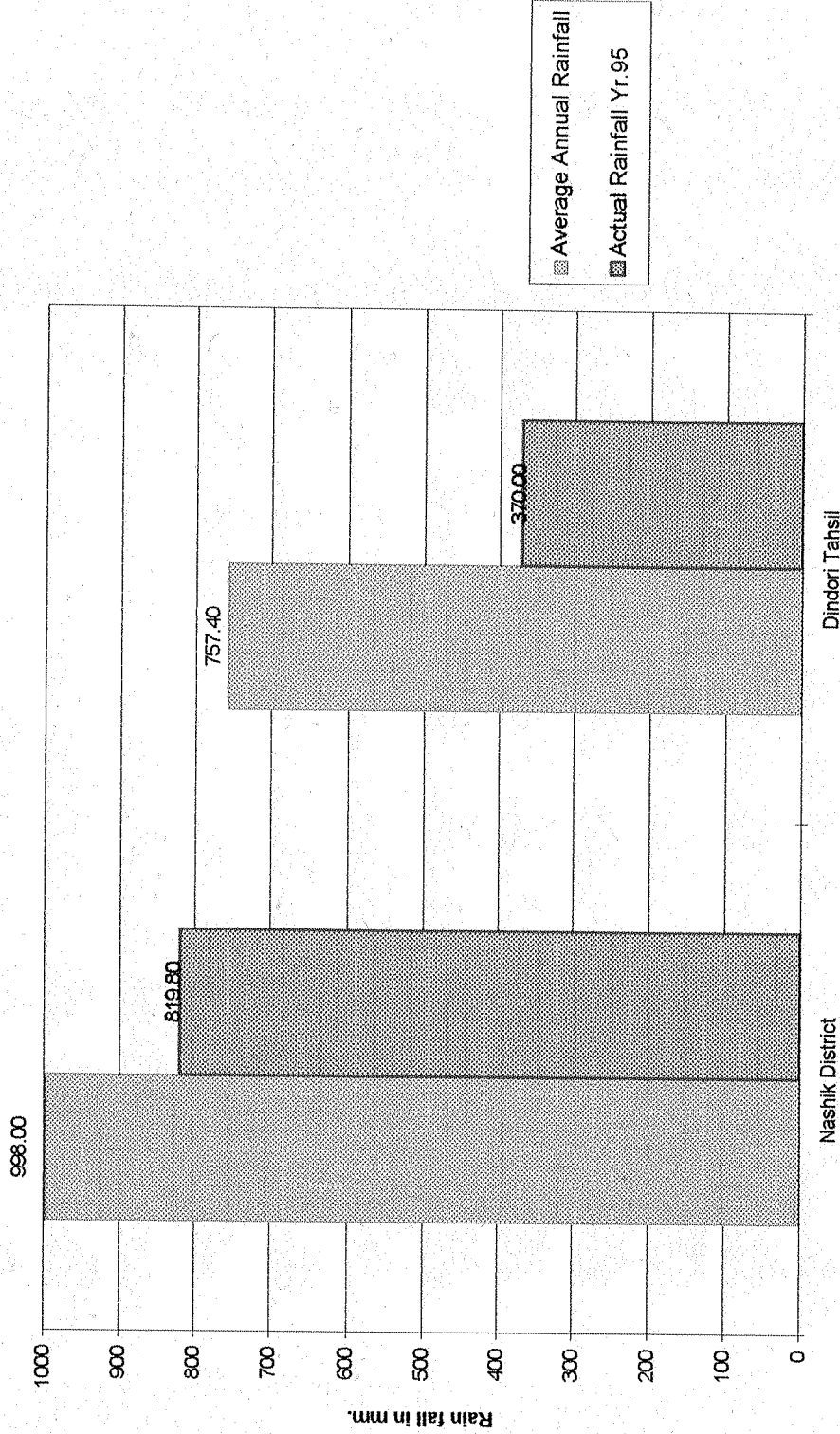
The monthwise rainfall received at Dindori Center during the year 1995 is presented in Table No. 4.1 below.

Table 4.1
Average rain-fall data

Centre - Dindori		Year - 1995		
Sr. No.	Months	Average rainfall (mm)	No.of rainy days	Actual rainfall received
1	2	3	4	5
1	January	2.3	0	0.0
2	February	0.5	0	0.0
3	March	1.8	0	0.0
4	April	8.5	0	0.0
5	May	20.0	0	0.0
6	June	116.5	13	1.0
7	July	235.8	11	143.0
8	August	155.3	10	18.0
9	September	133.8	7	155.0
10	October	56.2	5	53.0
11	November	23.4	0	0.0
12	December	3.3	0	0.0
Total		757.4	46	370.0

(Source - Tahsildar Dindori)

Rainfall Of Nashik District and Dindori Tahsil.



It can be seen from the above table that there was no rainfall at Dindori during the months January to May, November and December; whereas during remaining months though there was rainfall it was less than the average. In the year 1995, Dindori tahsil received only 370 m.m. rainfall which is less than the average rainfall (48.85%).

4.3 Appraisal of Water Resources

Nashik District is situated partly in the Tapi and partly in the upper Godavari basin. Nandgaon, Kalwan, Baglan and Malegaon tahsils are drained in the north and north-east by the Girna river and its tributaries. These tahsils lie in Tapi basin while all the remaining tahsils in the district fall in the Godavari basin and drained by the Godavari river and its tributaries. The Satmala range of hills provides a watershed between the above two basins.

Godavari and Girna are the two main rivers in Nashik district. Godavari rises in the Sahyadri ranges near Trimbak and drains through Nashik and Niphad tahsils. Girna rises at the west of the district in Surgana tahsil and flows through Kalwan and Malegaon tahsils. The other important rivers are Vaitarana, Darna, Mosam and Kadva.

4.4 Abnormal growth in population

Information regarding decadal growth of total and tribal population of Nashik District and Dindori tahsil is shown in the following table.

Table No.4.2

Sr. No	Census Year	Nashik			Dindori			Growth Rate			
		Total	Tribal	%	Total	Tribal	%	Nashik		Dindori	
								Total	Tribal	Total	Tribal
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1.	1971	2369221	561202	23.69	136883	65371	47.76	-	-	-	-
2	1981	2991739	701647	23.45	163928	80783	49.28	26.28	25.03	19.76	23.58
3	1991	3851352	931069	24.18	208229	108140	51.93	28.73	32.70	27.02	33.86

Nashik district includes 17 towns, 1814 inhabited villages and 4 uninhabited villages having 38.54 lakh population. It can be seen from the above table that as compared with the 1981 census data, annual population growth rate of the district comes to 2.87%.

Dindori tahsil has 143 villages having 2.08 lakhs population spread over 1323.2 sq.kms. The Scheduled Tribe population of the tahsil is 1.08 lakhs which forms about 52% of the total population. Thus, concentration of tribal population in this tahsil is heavy. Out of 143 villages in the tahsil, 117 villages having 1.66 lakh total population are covered under the Tribal Sub Plan Area. Annual growth rate of population of this tahsil is 2.70%.

The decadal growth rate (1981-91) of tribal population in Nashik district and Dindori tahsil comes to 32.7 and 33.9 percent respectively. The general population growth rate (1981-91) of Nashik district and Dindori tahsil works out to 28.7 and 27.02 percent respectively.

It can be seen from the above analysis that continuous explosion of population is also one of the causes of scarcity of drinking water.

4.5 Land use pattern

Land utilisation statistics of Nashik district and the Dindori tahsil for the year 1992-93 is shown in the following table.

Table 4.3
Land use in Nashik/Dindori

Sr. No.	Particulars	Nashik District Area ('00' hectares)	Dindori Tahsil Area ('00' hectares)
1	2	3	4
1	Total geographical area	15633	1323
2	Area under forests	3306	217
3	Area not available for cultivation	2418	225
4	Total fallows	1099	173
5	Net area sown	8598	708

It is observed from the above table that percentage of the net area sown in the district comes to 55 whereas it comes to 53.51 percent in the Dindori tahsil. Percentage of area under forest to total geographical area in the Nashik district and Dindori tahsil is 21 and 16 respectively.

4.6 Irrigation facilities

Information regarding sourcewise irrigated area of Nashik District and Dindori tahsil for the year 1992-93 has been obtained from District Inspector of land Records which is presented in the following table.

Table 4.4
Area irrigated by source
Year 1992-93

Sr. No.	Particulars	Nashik District Area in hectares	Dindori Tahsil Area in hectares
1	2	3	4
1	Surface irrigation	13855	1200
2	Well irrigation	110616	15225
3	Net area irrigated (1+2)	124471	16425
4	Total Area under irrigation	151789	18314
5	Total geographical Area	156333	132300

It is seen from the above table that wells are major source of irrigation in the district and in the tahsil. Percentage of area irrigated by wells to total irrigated area in the district comes to 73 whereas in case of Dindori tahsil it is 83 percent.

4.7 Measures undertaken to overcome the scarcity of drinking water

4.7.1) It is observed that in the Nashik district the drinking water scarcity usually occur in January and lasts up the end of June. Under these circumstances, the drinking water is supplied to the affected areas by Tankers or by bullock carts upto August depending up on water scarcity situations in the villages. Other remedies over the scarcity of drinking water include completion of piped water schemes which are in progress, special repairs to piped-water schemes, temporary piped water schemes, construction of bore wells, supply of water by bullock carts/tankers etc. requisition of private wells, deepening of existing wells, digging of small pits in the river bed etc.

4.7.2) Information of villages having scarcity of drinking water in Nashik district and Dindori tahsil has been collected from the Executive Engineer (M.I.), (East), Nashik for the year 1995-96 which is depicted in the following table.

Table 4.5**Scarcity villages in the district/tahsil**

Sr. No.	Particulars	Ref. Year 95-96 Nashik District	Ref. year 95-96 Dindori tahsil
1	2	3	4
1	Total No.of villages (1991 Census)	1818	143
2	Total No.of Wadis/Padas	1180	79
3	Villages having sufficient water supply throughout the year	1435	115
4	Wadis/Padas having sufficient water supply lthroughout the year	863	74
5	No.of water scarcity villages	383	28
6	No. of water scarcity wadis/padas	317	5

It is seen from the above table that as many as 21% villages in Nashik district and 20% villages in Dindori tahsil were facing the scarcity of drinking water during the year 1995-96. This was due to the less rainfall during the year 1995.

4.7.3) The Chief Executive Officer, Zilla parishad, Nashik prepared the Action Plan of Nashik district for the year 1995-96 to solve the problem of drinking water scarcity in two stages, which is shown in the following table.

Table 4.6
Stagewise status of District - Action Plan

Sr. No	Particulars	Oct.95 to Dec.95		Jan.96 to Mar.96		Tentative expenditure (Rs.in lakh)
		Villages	Wadies	Villages	Wadies	
1	2	3	4	5	6	7
1	Completion of piped water scheme	-	-	23	-	58.00
2	Special repairs of pipe water schemes	7	-	22	-	

Sr. No	Particulars	Oct.95 to Dec.95		Jan.96 to Mar.96		Tentative expenditure (Rs.in lakh)
		Villages	Wadies	Villages	Wadies	
1	2	3	4	5	6	7
3	Arrangement of temporary/supplementary pipe water scheme	7	-	10	-	51.00
4	Taking of new bore wells	113	111	81	182	117.29
5	Repairs of electric pumps	21	2	15	20	2.21
6	Deepening of wells	72	6	137	26	25.66
7	Digging of small pits in the river bed	3	4	7	10	0.52
8	Requisition of private wells	6	-	11	26	5.70
9	Water supply by bullock carts/tankers	93	64	77	53	81.00
Total		322	187	383	317	341.38

4.7.4) Similarly, the Action Plan for scarcity of drinking water villages was also prepared for Dindori tahsil for the period from 1.1.96 to 31.3.96. Information of the Action Plan is presented in the following Table.

Table 4.7

Action Plan for Dindori Tahsil

(Period - 1-1-1996 to 31-3-1996)

Sr. No	Particulars	No.of	
		Villages	Wadis
1.	2.	3.	4.
1	Completion of ongoing water supply schemes	5	-
2	Repairs of piped water schemes	4	-
3	Deepening of wells	6	-
4	Digging of small pits in the river bed	1	-
5	Taking of New bore-wells	6	3
6	Supply of drinking water by bullock carts/tankers etc.	6	2

4.7.5) Information regarding bore wells, hand pumps and electric pumps in Dindori tahsil was obtained from the Senior Geologist, G.S.D.A. Nashik. It is given in the following table.

Table 4.8
Schematic physical achievements in Dindori tahsil

Sr. No	Particulars	Period		
		1993-94	1994-95	1.4.95 to 30.11.95
1	No. of Total bore wells taken during the period	36 (467)	81 (483)	17 (222)
2	No. of Successful bore wells out of at Sr.No.1	28 (335)	50 (323)	15 (161)
3	No. of hand pumps installed	22 (294)	42 (290)	11 (148)
4	No. of electric pumps installed	2 (29)	5 (50)	-

(Note - Bracketed figures show the information of Nashik District)

It was learnt that under the bore-well programme of Nashik district, the G.S.D.A. has spent about 2.55 crores of rupees during 1-4-93 to 30-11-95.

It can be concluded from the above information that all possible efforts are being made by the concerned Government offices to supply the drinking water in the scarcity villages of Dindori tahsil of Nashik district.

4.8 Review of data collected in field visits

4.8.1 The research team of this Institute visited some of the scarcity villages in the tahsil and collected the requisite data which is presented in the following table.

Table 4.9
Population Growth during 1981-1991 in Dindori Tahsil

Sr. No.	Name of viillage	Population 1981		Population 1991		Decadal Growth rate	
		Total	Tribal	Total	Tribal	Total	Tribal
1	2	3	4	5	6	7	8
1.	Pingalwadi	300	300	418	415	39.33	38.33
2.	Chausale	1154	1111	1408	1378	22.01	24.03
3.	Nanashi	2616	2093	3070	2511	17.32	19.97
4.	Dhakambe	1553	355	2139	512	37.73	44.23
5.	Manori	388	74	474	93	22.16	25.68
6.	Mavadi	1232	396	1440	509	16.88	28.53

It can be seen from the above, table that growth rate of population varies from village to village ranging from 16.88 to 39.33. In case of tribals the growth rate is higher than the general growth rate and it varies from 19.97 to 44.23.

4.8.2) Irrigation sources

The data regarding sources of water supply available for irrigation in Dindori tahsil has been presented in the following table.

Table 4.10

Sr. No.	Name of viilage	No. of sources available for irrigation					
		well	Oil Engine	Electric Pumps	Percolation Tanks	Cannal	Other
1.	Pingalwadi	5	5	2	-	-	-
2.	Chausale	20	10	10	-	1	-
3.	Nanashi	22	7	5	2	-	-
4.	Dhakambe	113	16	80	-	-	-
5.	Manori	97	8	67	-	1	-
6.	Mavadi	138	2	90	-	-	-

Main source of irrigation in the surveyed viilages is the wells. The water available from the wells is utilised for both kharif and rabbi crops. Over utilisation of ground water from the wells for irrigation purpose ultimately results into the scarcity of water in the summer.

4.8.3 Sources of Drinking Water Supply

The information regarding sources of drinking water supply available in the surveyed viilages is presented in the following table.

Table 4.11
Sources of drinking water supply

Sr. No.	Name of viilage	Available Sources drinking water supply				
		Pipeline scheme	Public well	Hand Pump	Electric Pump	other
1.	Pingalwadi	-	1	1	-	-
2.	Chausale	-	1	2	2	-
3.	Nanashi	1	2	1	-	-
4.	Dhakambe	-	1	1	2	-
5.	Manori	-	2	4	-	-
6.	Mavadi	1	2	3	1	-

The discussion with the Gram Sevak, Sarpanch and other elderly local persons revealed that during the period January to June, scarcity of drinking water occurs in their villages. The bore wells and other sources of drinking water in the villages almost get dried by the end of April or May due to lowering of ground water level. In this period the drinking water is supplied either by tankers or by bullock carts depending upon the gravity of the scarcity of drinking water in the villages.

4.8.4 Area under principal crops

The data regarding area under different principal crops of the selected villages has been presented in the Table No. 4.12.

Table 4.12

Area under main crops in Dindori Tahsil

(Area in Hectares)

Sr. No.	Name of village	Principal crops												Total
		Paddy	Wheat	Jowar	Bajari	Barley	Sugarcane	Grapes	Onion	Groundnut	Fodder	Other		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1.	Pingalwadi	30	20	75	-	50	-	-	-	5	-	-	180	
2.	Chausale	66	120	295	-	300	-	-	2	4	-	-	787	
3.	Nanashi	101	90	87	-	-	1	-	1	17	-	876	1173	
4.	Dhakambe	22	66	82	85	-	-	8	-	145	-	570	978	
5.	Manori	2	19	2	-	-	6	-	2	11	160	62	264	
6.	Mavadi	10	65	100	4	-	7	47	3	37	-	-	273	
	Total	231	380	641	89	350	14	55	8	219	160	1508	3655	

The above table reveals that area under sugarcane and paddy in the surveyed villages is 245 hectares. These crops require more water as compared to other crops. It was also noticed that cultivators in the villages are following the old traditional methods of irrigation in which wastage and consumption of water is more as compared to the drip irrigation or the sprinklers system etc.

4.8.5) Information of Scarcity of Drinking Water

The information regarding the monthwise scarcity of drinking water experienced by the surveyed villages has been presented in the following table.

Table 4.13
Scarcity period of drinking water

Sr. No.	Name of viilage	Month						
		Jan.	Feb.	Mar.	April	May	June	July
1.	Pingalwadi	✓	✓	✓	✓	✓	✓	✓
2.	Chausale	✓	✓	✓	✓	✓	✓	✓
3.	Nanashi	✓	✓	✓	✓	✓	✓	✓
4.	Dhakambe	✓	✓	✓	✓	✓	✓	✓
5.	Manori	✓	✓	✓	✓	✓	✓	✓
6.	Mavadi	✓	✓	✓	✓	✓	✓	✓

(✓ Indicates scarcity of drinking water)

From the above table it can be seen that due to less rainfall during the year 1995 the scarcity of drinking water was experienced in all the surveyed villages mentioned above right from the beginning of the year. This scarcity becomes more intensive in the month of April uptill the rains start. During the year 1995 tankers were used for supply of drinking water given to Pingalwadi, Chausale, Dhankambe and Manori villages from the second weak of April. Besides this, other measures taken were deepening of well, repairing of hand pumps. The detail action plan of the year 1996 is depicted in the Table No. 4.7.

It was learnt that during scarcity period people have to cut down their requirement of water which include taking a bath once in a two or three days and use of minimum water for washing purpose etc. It was observed that during survey time the tribal women have to fetch the water from the wells/rivers etc. which are located at a distance of more than one to three kolimetres.

4.9) Other analytical points

Following other points, were also revealed from the discussions with the programme implementing officers at State/District/Tahsil and village levels.

4.9.1) The problem of supply of drinking water in Dindori tahsil of Nashik District is the result of non-availability of water in the tahsil due to less rainfall alongwith unequal distribution of water from village to village.

4.9.2) Due to heavy cutting of trees, rainfalls has been adversely affected and as such the process of refilling of ground water table has become slow.

4.9.3) As most of the rural water supply schemes are based on ground water, the question of purification of drinking water has been neglected. Similarly, due to setting up of new industries resulted into the pollution of water to a great extent. Today the polluted water has become a great problem.

4.9.4) Proper management of completed water supply schemes has also become serious problem. Reasons for this problems can be listed as (i) lacunas in planning and implementation of schemes, (ii) paucity of funds with the local bodies, (iii) Indifferent attitude of people and local bodies, (iv) tendency to rely totally on Govt. aids etc. (v) Inefficiency of technical staff to carry out repairs in time, (vi) non-availability of spare parts.

4.9.5) In the past, the village lakes, malgujari tanks etc. played very important role in the field of drinking water supply. Construction of Malgujari tanks in Chandrapur, Gadchiroli and Bhandara districts helped in solving the problem of drinking water. But nowadays these tanks are neglected and they are used as the source of water for animals and washing purposes etc. only. Due to paucity of funds repairing of ponds, lakes and K.T.weirs is not made in time.

4.9.6) It is learnt that domestic and industrial drainage water, use of chemical fertilisers and pesticides etc. are the main factors responsible for water pollution. In some areas, excess percentage of fluoride, iron or other minerals makes the water non potable.

4.9.7) Under water supply programme, filtration system is provided only under big pipeline schemes. Under small pipeline schemes it is not possible to provide

filtration systems. At present, under such schemes, only bleaching powder and alum is mixed in the water to make the water free of germs.

4.9.8) Importance of clean surroundings

It is usually noticed that unclean surrounding is the main cause of water pollution in rural area, some examples of it are listed below.

i) During the rainy season, muddy water gets mixed with the rivers, nalas and reservoirs and the water becomes polluted.

ii) Water of wells and bore wells also becomes non potable due to unclean surroundings.

iii) The water gets polluted if it is mixed with the impure water or if the pipeline is leaking or old one.

iv) Diarrhea, amoebiasis, cholera, typhoid, jaundice and round-worm etc. are some of the diseases introduced or spread by impure and polluted water supply.

CHAPTER-V

Suggestions to Overcome the Scarcity of Drinking Water

As discussed in the preceding chapters, despite of various efforts made by the Government every year, the problem of scarcity of drinking water is not fully resolved; but it becomes acute in thousands of villages in the State every year. In order to solve the problem of drinking water in scarcity villages, following suggestions are made after giving due consideration to the opinions/views of the concerned Govt. officials, voluntary organisations, social workers and the villagers etc. alongwith the field observations.

5.1 Availability of water and its proper utilisation_-

Water resources in Maharashtra are scarce to a great extent. Therefore its proper utilisation is very much essential. The following suggestions are made.

a) Over exploitation of ground water is the consequence of more intensive cultivation of land. The conservation of water will be achieved by restricting the use of ground water. Nearly 85% of the water from irrigation projects is used for irrigation purpose and remaining is utilised for non-irrigation purposes.

Conservation of water will best be achieved by curtailing the demand for ground as well as surface water. Use of sprinklers and drippers and selection of appropriate cropping pattern will provide quite effective in achieving the economy in water use. In future, efforts will have to be made to encourage the farmers to adopt these new methods of irrigation instead of the old traditional methods of irrigation.

b) As seen earlier, the basic problem of water supply is non-availability of water. Therefore while solving this problem, factors like planting more trees, restoring environmental balance, conservation of water table, economic and minimum utilisation of water etc. should be given due consideration.

Availability of ground water is limited due to uncertainty of rains. Due to geological situation and cutting of trees on large scale in some areas, the process of refilling of water is observed to be very slow. Hence, the work of conservation of forest and social forestry should be taken up immediately on priority basis. It is seen that, every year during the rainy season lakhs of tree plants are planted by

the students, social workers, Government officials, voluntary organizations etc. However, they are not looked after properly. The result is heavy mortality of the plants.

It is, therefore, suggested that maximum efforts should be made to save the planted trees by timely supply of water and mannuers etc. to them at the initial stage. This will faciliate thick afforestation and will ultimately result into fair rainfall.

General suggestion -

Every year, some of the North/Eastern States of India face the flood havoc, while some South/West States of the country like Maharashtra suffer from water scarcity. Both in flood affected States as well as in the droughted States crores of rupees have to spent for rehabilitation and welfare of the people.

It is, therefore, suggested that all these State Governments should request the Central Government for operation of "Grid Water System" by which the flood can be controlled on the one hand and the drought situation will be vanished on the other. Though this grid system is very expensive, it is to be thought over for the welfare of people of Independent India.

Effective implementation of the provisions of "Maharashtra Ground Water (Drinking Water Regulation) Act, 1993" in the future will help to maintain the level of water table to some extent.

c) Water conservation of both surface and ground water in the small catchment areas of the villages will increase the availability of water and help to solve the problem of drinking water during summer season. Work of soil conservation will also help to stop soil erosion and naturally it will prevent the mixing of mud in water etc. during rainy season. Whereever possible, the counter bunding on the private as well as Government land should be done. Similarly, Nala bunding should be done on priority basis.

5.2 Planning and Timely execution of drinking water schemes in rural areas.

a) *Consideration of abnormal growth of population -*

Review of the population data shows that annual growth rate of population of Dindori tahsil and Nashik district is 2.7 and 2.9 respectively. However, while planning for rural water supply schemes, the general annual population growth

rate worth 1.08 percent is taken into account. Due to the difference between these two growth rates, the water supply scheme faces paucity of drinking water in a short period and scheme fails to fulfil the requirement of the people for a longer period as expected or visualised.

It is therefore, suggested that before undertaking the drinking water supply scheme, the growth rate of population of rural areas, may be worked out correctly by applying incremental and geometrical increase methods. Similarly, temporary increase in the population due to migration and pilgrims etc. may also be taken into account for such planning so that schemes will prove useful and will serve for longer period. This will obviate the planning for supplementary schemes in the immediate future.

b) Provision of water for animals and for other use -

Water requirement of the village cattles alongwith water required for the use of restaurants, brickkilns, new construction works, Weekly bazars, Educational institutions, Gram panchayat offices etc. may also be accounted for while planning for rural water supply programme.

c) Under rural drinking water supply programme, problem of drinking water is being solved by applying various criteria and methods. But in case of remote and hilly villages/hamlets there are some limitations. In these villages/hamlets the level of ground water is generally very low and sources of water is not easily available. This calls for the revision of the criterion prescribed.

Besides, refilling Trench and Handpump scheme may be implemented for small tribal villages which are remote and situated on the hill slopes. under this method, a trench is filled with sand and toe stones for refilling of the water. At the downwards side of the trench, "Hand pump" is fitted. This method is useful for the villages situated on the slopes of the hills. In such areas Rejuvenation of water source can be effectively made by applying schemes such as forest lakes, forest bandharas, levelled trench etc. The habitats which have more than 250 population should be covered by more than two sources of safe drinking water. Simultaneously, these habitats should be linked with the approach road so as to fulfil the above requirements. In case of habitats/having 250 population or more land which are situated in the remote parts, three to four cisterns or openwells should be provided to meet the requirement of safe drinking water. The

construction of anicuts in tribal area will prove as one of the best sources of safe drinking water. However, it should be observed that water should be free from all contamination.

In case of small tribal villages, jacket well, bore blast, rain water recharge, borewell fracture, seal cementation, cut off wall, dical intrugen, inverted umbrella etc. can be useful for supply of drinking water according to geographical situation of the village.

d) Prices of materials required for the schemes show increasing trend and contractors are required to be paid at higher rates. At present this point is weighed little at the time of sanctioning the scheme. This causes delay in completion of the schemes. It is, therefore, suggested that some provision for escalation may be made at the time of sanctioning of the scheme after taking into account the total period required for completion of the scheme.

e) In order to provide drinking water schemes to large number of villages, the schemes should be of low cost. They should be designed in such a way that their usefulness will not be decreased on one hand and they will prove useful throughout their life span without any hindrance on the other.

f) According to the officials of the G.S.D.A. the planning of supply of drinking water to the villages having more than 2000 population should not be based on ground water resources only. Some other sources of water should be taken into account.

g) A good deal of implementing officers opined that they experience a lot of difficulties due to inadequate staff. It is therefore suggested that adequate staff should be provided after giving due consideration to their difficulties for smooth functioning and execution of schemes.

5.3 Repair and maintenance of rural water supply schemes -

5.3.1 At present the problem of repairs and maintenance of existing water supply schemes has become very serious. Nearly, 27 percent of the schemes are out of gear and rural people are deprived of the benefit of the schemes.

Some important causes of break down of the schemes are stated as (1) faulty designing of the schemes, (2) inadequate source of water, (3) insufficient machinery for repair and maintenance, (4) lacunas in the methods of repairing, (5) paucity of funds with the local bodies etc.

As rural water supply programme is implemented through Govt. grants, people expect that Govt. should bear cost of minor repairing also. This tendency of people needs to be changed.

It is, therefore, suggested that the Govt. should provide assistance for repair and maintenance only after considering the following points.

a) Assistance should be sanctioned after taking into account the economic situation in the rural areas.

b) Assistance to local bodies should be curtailed because, in future huge amount will be required for repairs and maintenance. Similarly, the local bodies should be encouraged to become self sufficient in the future by creating their own additional sources of income such as water tax, etc.

c) Water tax may be recovered as a part of house tax and the rate of water tax may be fixed after considering the facilities provided and economical status of the people living in tribal areas.

5.3.2 Repairs and maintenance of bore wells

a) It is suggested that the repairs and maintenance of hand pumps and electric pumps may be carried out with the help of tribal women or voluntary agencies in future. Time bound training programmes for this purpose may be arranged. However, the existing machinery of repair and maintenance at tahsil level is required to be strengthened by removing lacunas.

b) The concerned Zilla Parishad should recover the repairing charges of hand pumps and electric pumps from the village panchayats. The rates of contribution may be revised as under:-

i) Annual contribution of hand pump - Rs.500/-

ii) Annual contribution of electric motor - Rs.2500/-

c) Normally repairing is done after break down of the scheme. In majority of cases, proper consideration is not given for periodical maintenance which results into increase in the volume of repair works in the future. It is therefore suggested that local Govt. servants of the village such as Gram sevak, Talathi and other influential persons should be made responsible for periodical maintenance of the pumps.

d) Nowadays, there is increasing demand for separate private connections. If these connections are given the village panchayat should collect additional

revenue from the user by levying special water tax and use the same for repairing and maintenance of existing water supply scheme.

5.3.3 Problem of contaminated water -

This problem is becoming a challenge in the tribal areas. Therefore following few suggestions are made to overcome this problem.

a) Sources of safe drinking water should be supervised by the "Gram Panchayat members" because they are well aware of the local problems and have direct link with the local people. Care should be taken that factors causing water pollution such as drainage water, mud, etc. should not to mix in the drinking water.

The village level Govt. servants such as the school teachers, the Village Development Officers, Agriculture Extension Officers, the Anganwadi workers, the Revenue Inspector or the Talathi, the Gram Sevak and the other influential persons should take active participation to teach about the health care of the people who are suffering from different water borne diseases.

It is necessary to educate tribal women through audio-visual aids such as posters, documentary films and social gathering camps. Those who maintain clean drinking water in their areas should be awarded prizes.

b) It is also necessary to keep surrounding clean by providing lavatories, gutters and cattle sheds and by maintaining them properly. Breakage or cracks to the pipeline of water supply should be repaired immediately so as to avoid water pollution .

c) It is necessary to establish water testing laboratory at tahsil level also. Because filtration technique helps to reduce bacteria but can not control virus. If virus is detected people will be informed immediately and they will be advised to drink the water only after boiling or purification.

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आदिवासी संतोषन व प्रशिक्षण संस्था

महाराष्ट्र राज्य, पुणे-४११००१

पिण्याच्या पाण्याची समस्या व त्यावर कायम स्वस्वी करावयाच्या
उपाययोजना यासाठी पाहणी १९९५

प्रपत्र क्रमांक-[१]

आदिवासी कुटूंबांसाठी भरावयाचे प्रपत्र

चौक -१

सर्वसाधारण माहिती

१. १] जिल्हा ----- १. २] तालुका -----
१. ३] स.आ. वि. प्र. ----- १. ४] अ] गावाचे नाव -----
व] पाडा -----
१. ५] कुटूंब प्रमुखाचे नांव -----
१. ६] जमातीचे नाव:- -----

चौक -२

कुटूंबाची माहिती

२. १

अ. क्र.	बाब	पुंस	स्त्रिया	एकूण
१.	कुटूंबातील एकूण व्यक्ती			
२.	कुटूंबातील साक्षर व्यक्ती			
३.	कुटूंबातील मिळवत्या व्यक्ती			
४.	कुटूंबातील एकूण मुले [१४ वर्ग खालील			

२. २ अ] कुटूंबाचा मुख्य व्यवसाय -----
व] दुय्यम व्यवसाय -----
क] वार्षिक उत्पन्न :- १] शेतती -----
२] शेतमजुरी -----
३] पशुपालन -----
४] जंगल जमीन -----
५] इतर -----
६] एकूण -----

२.३. कुटूंबाची शोती विकासक माहिती.

अ. क्र.	वाळ	वागायत		जिरायत		एकूण	
		एकर	गुठे	एकर	गुठे	एकर	गुठे
१.	मालकीची						
२.	खंडाची						
३.	जंगल खात्याची अतिक्रमण केलेली						
४.	महसूल खात्याची अतिक्रमण केलेली						
५.	शासनाने पड्डित जमीन वाटप केलेली						
६.	इतर						
	एकूण						

२.४ कुटूंबाच्या मालकीचे पशुधान

वाळ	गाई	बैल	म्हशगी	रेडे	शोब्या	मेंढ्या	कोबड्या	डुकरे	सदके	इतर
दवणी [संख्या]										
संकरित/ सुधारित [संख्या]										

२.५. अ] शोतीसाठी व पशुधानासाठी वापरण्यात येणारी पाण्याची साधने आपल्या मालकीची आहेत काय? होय/नाही.

ब] होय असेल तर सिंचन साधनांचे प्रकार:- विहिर/ओढा/नदी/कालवा/इतर.

क] नाही असेल तर पाणी कोठून उपलब्ध होते ?

१] शोतीसाठी -----

२] पशुधानासाठी -----

ड] वरील वाळ क्र. "क" साठी एकूण वार्षिक खर्च किती येतो? -----

चौक -3

पिण्याच्या पाण्याच्या तोंडीबाबत माहिती.

3.1 अ) आपणा पिण्यासाठी कोणते पाणी वापरता? (✓ = खुण करा)

घरातील नं.	ग्रामपंचायतीचा नं.	विंधन विहिर	दुतर विहिर	कालवा	तळे	ओढा	नाला/नदी

ब) कुटूंबासाठी रोज लागणारे पाणी [लिटर]

क) पाण्याचे स्त्रोताचे घरापासून आणणारे अंतर [कि.मी.]

ड) पिण्यासाठी वापरावयाचे पाणी कधीपर मुक्कळ प्रमाणात आपणात उपलब्ध होते काय? होय/नाही

इ) नाल्यात पाणी टंचाईचे महिने [वर्ष १९९४-९५]

3.2 अ) पाणी टंचाईच्या काळात ग्रामपंचायत/जिल्हा परिषद मार्फत करण्यात येणा-या पर्यायी व्यवस्थेसंबंधी सविस्तर माहिती [वर्ष १९९४-९५] खाली देण्यात यावी.

ब) तुमच्या मते पाणी टंचाईच्या तमस्थेवर कायम स्वस्वी कोणाती उपाय योजना करता येईल?

सर्व्हेक्षणाची तारीखा:-

सही/-

दुस्ता-

=====

आदिवासी संगोपन व प्रशिक्षण संस्था
महाराष्ट्र राज्य, पुणे-४११००१

पिण्याच्या पाण्याची समस्या व त्यावर कायमस्वामी करान्याची
उपाययोजना यासाठी पाहणी-१९८५

ग्राम पातळीवरील माहिती संकलन प्रपत्र

चौक क्रमांक-१

सर्वासाधारण माहिती

- | | |
|--|---------------------------------------|
| १.१. जिल्हयाचे नांव ----- | १.२. पंचायत समितीचे नांव ----- |
| १.३. तालुक्याचे नाव ----- | १.४. ए.झे.पि.का ----- |
| १.५. गावाचे नांव ----- | १.६. गावाखालील वाड्यांची संख्या ----- |
| १.७. माहिती देणा-या अधिका-याचे पदनाम ----- | |

चौक क्रमांक-२

गावाची भौगोलिक माहिती

२.१. गावाच्या भौगोलिक क्षेत्राचे वर्गिकरण मीटरमध्ये घावे [संदर्भ वर्ष -२४-२५]

एकूण भौगोलिक क्षेत्र रकाना २ ते १० ची क्षेत्रीय	जंगले	ओसाड आणि नापिक क्षेत्र	विंगरभोती वापरा खालील क्षेत्र	कायमस्वामी पट [५ वर्जा वरील]	कायम स्वामी कुराणे व चराऊ राने	किरकोळ पड	चालू पड [१ वर्जा-करिता]	इतर पड [२ ते ५ वर्जा पड]	पेरलेले/निव्वळ क्षेत्र
१	२	३	४	५	६	७	८	९	१०

दुसोटा/ तिसोटा क्षेत्र	पिकाखालील एकूण क्षेत्र [१० म ११]
११	१२

२.२. गावातील बागायती क्षेत्राचा ताहिल [तर्फा क्र. १२.७-२५]

(क्षेत्र हेक्टरमध्ये)

निव्वळ बागायत क्षेत्र				इतर साधनांनी भिजलेले	दुसोटा तितोटा बागायती क्षेत्र	एकूण बागायत क्षेत्रा रजाना लेरीज [१ ते ६]
कालवे	तळी	विहिरी	विंधण विहिरी			
१	२	३	४	५	६	७

२.३ गावातील विहिरी/विंधण विहिरींची संख्या खालील चौक्यात घावी.

उपयोग	विहिरींची संख्या		विंधण विहिरींची संख्या	
	वापरात असलेल्या	वापरात नसलेल्या	वापरात असलेल्या	वापरात नसलेल्या
	पाण्या अभावी	इतर कारणांमुळे	पाण्या अभावी	इतर कारणांमुळे
१. विंध्याच्या पाण्यासाठी				
२. शेतीसाठी				
३. इतर वापरासाठी.				

२.४ गावातील सिंचनासाठी [बागायत शेती] वापरण्यात येणा-या ऑईल इंजिन्स व पंप सेट्सची संख्या खाली घावी.

ऑईल इंजिन्स	विद्युत पंप सेट्स

[सूचना:- विहिरी वरील व इतरत्र, बागायत शेतीसाठी वापरात असलेल्या वरील साधनांची संख्या घावी]

- २.५ अ) बारपाही पाणी असलेले गावातील एकूण तलाव संख्या:-
- ब) त्यापैकी मारगेमारी साठी वापरतात असणारे तलाव संख्या:-
- क) सतस्यव्यवसाय करणा-या कुटूंबांची संख्या :-

चौक क्र. ३

गावाची लोकसंख्या विषयक माहिती

३.१ लोकसंख्या [तपशील आधील चौकोनात भरा]

जन्मगणना	एकूण लोकसंख्या			अनु. जमातीची लोकसंख्या		
	पुस्र	स्त्रिया	एकूण	पुस्र	स्त्रिया	एकूण
१९९१						

३.२ गावातील सर्व कुटुंबांपैकी [संख्या]

वाढ	भोतकरी कुटुंबे [अल्प व अत्यल्पभू- धारक सोडून]	अल्प भूधारक कुटुंबे	अत्यल्प भूधारक कुटुंबे	शासकीय कारागिरी कुटुंबे	भोतकरी निवृत्ती करणारी कुटुंबे
१	२	३	४	५	६
एकूण कुटुंबे					
अ. ज. कुटुंबे					

३.३. अ) दारिद्र्य रेषेखालील एकूण कुटुंबे

ब) वरीलपैकी अ. जमातीची कुटुंबे

चौक क्र. ४

पिण्याच्या पाण्याच्या सोयीलाबत माहिती

४.१ पिण्याचा पाण्याचा तपशील

प्रकार	संख्या	नसल्यास अंतर [कि. मी.]	लाभ घेणाऱ्या एकूण लोकसंख्या	
			एकूण	एकूण पैकी अनु. जाती अनु. जमाती
साधी विडिर				
हात पंप				
आजगी नळ				
सार्वजनिक नळ [स्टॅण्ड पोस्ट]				
ओढे/नाले				
अंतर				

सूचना:- १] गावात ज्या साधनांपातून सार्वजनिक पाणी पुरवठा होतो त्या साधनांचा तसेच खाजगी नळांचा तपासिल वरील चौकात घावा.
२] गावात कोणतीही सार्वजनिक तसेच उपलब्ध नसेल तरच, ग्रामस्थ देवून पिण्याचे पाणी आणतात अशा साधनांचे गावठाणा पातूनचे अंतर घावे. उर्वरित साधनांसाठी अंतर देऊ नयेत तसे फुली [x] भरावी.

४.२ अ] सर्व पाड्यांत/वाड्यांत पिण्याचे पाणी उपलब्ध आहे काय? होय/नाही.
ब] जर वरील उत्तर "नाही" असेल तर

अ. क्र.	वाडीचे/नाम पाड्याचे.	पाड्याची/वाडीची लोकसंख्या	
		एकूण	एकूण पैकी
		अनु. जाती	अनु. जागी

सूचना:- सर्व साधारण जानेवारी ते जून या काळातील पिण्याच्या पाण्याची उपलब्धता विचारात घ्यावी.

४.३ अ] गेल्याच पांच वर्षात "टंचाईग्रस्त" होते काय? होय/नाही.
ब] जर वरील उत्तर "होय" असेल तर खालील चौक भरावा.

वर्षे	टंचाईचे महिने [होय- Y नाही- N]												टंचाईचे कारण तक्रितांक	कारण तक्रितांक	
	०१	०२	०३	०४	०५	०६	०७	०८	०९	१०	११	१२			
९१															अवर्षा -१
९२															क्षारता -२
९३															प्रदुषण -३
९४															भूगर्भातून पाण्याची पातळी खाली गेल्यामुळे -४
९५															इतर कारणामुळे-५

तरील चौकात "टंचाईग्रस्त" गावात सर्वो पिण्याच्या पाण्याची निवडीत आहे.

४.४. गेल्या पांच वर्गात उद्भवलेल्या ताथीच्या रोगाबाबत तपशील.

वर्ग	ताथीचे रोग				
	कॉलरा साथगुस्त लोकसंख्या	कावीळ साथगुस्त लोकसंख्या	डिफ्थेरी साथगुस्त लोकसंख्या	डायरीया साथगुस्त लोकसंख्या	इतर साथगुस्त लोकसंख्या
११					
१२					
१३					
१४					
१५					

४.५ अ] गावात दूषित पाण्याची समस्या आहे काय? होय/नाही
ब] वरील उत्तर "होय" असेल तर खालील चौक भरावा.

ह्यापैकी कोणाच्या प्रकारे पाणी दूषित झाले?	होय/नाही (Y/N)
फ्ल्युरीसिल [किरणोत्सर्गिक द्रव्य असणारे]	
लोह	
गिनी वर्स [नास्त्रे जंतू]	
सॅलॅनिटी [क्षारता]	
इतर कारणे	

क] पाणी शुद्ध करण्यासाठी आपणासर्फत कोणाती उपाययोजना केली जाते?

४.६ पाणी टंचाई समस्याला तोंड देण्यासाठी कोणाच्या तात्पुरत्या व्यवस्था करण्यात येतात ?

8. 6: आपल्या अंते गावातील पाणी टंकाई तसल्येवर लोणत्या कनय्य स्वामी
उपाय योजना करता येतील ?

संदेशाणाची तरतीस-

तडी/-

दुपटा-

