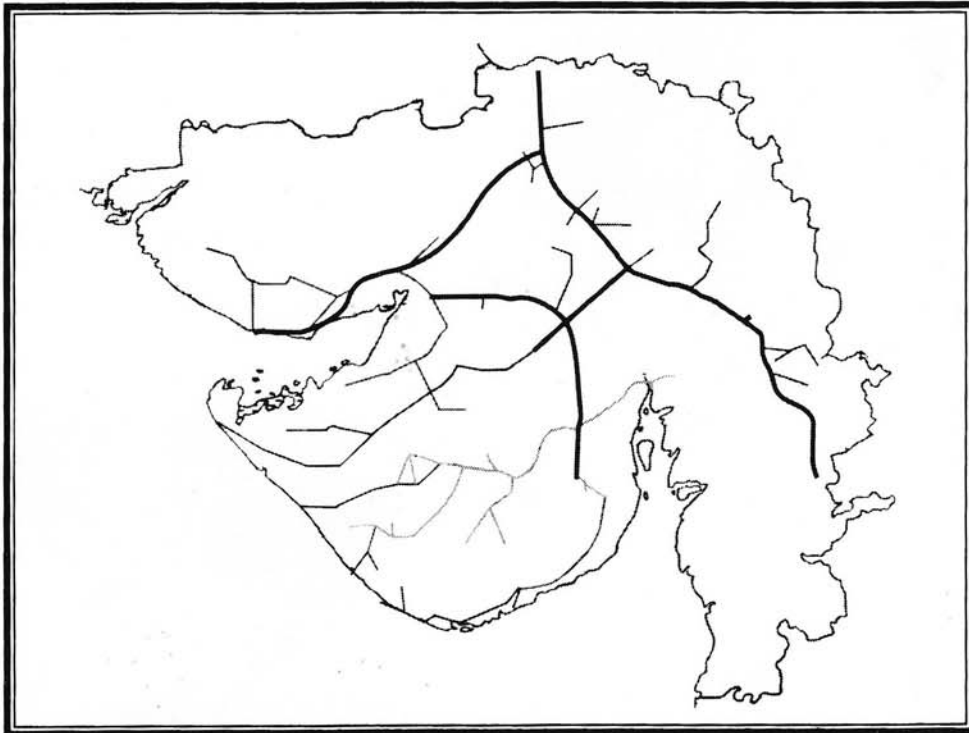


Concurrent Monitoring of the World's Largest Drinking Water Pipeline Project

A Study of Narmada Based Project in Gujarat

Study done by Pravah- Platform to mobilize action on drinking water and sanitation



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March 2007

Index

Acknowledgment	2
Foreword	3
1. Civic Monitoring of the Largest Drinking Water Project in the World	5
2. Status of Drinking Water in Narmada Villages	19
3. Status of Narmada Water Supply	33
4. Management of Narmada Water at the Village Level	51
5. Insights Emerging From Case Studies of Selected Villages	63
6. Concluding Observations and Inferences for Interventions	78
Selected References	87

Acknowledgment

We are happy to present this report on *Concurrent Monitoring of World's Largest Drinking Water Pipelines Project: A Study of Narmada Based Project in Gujarat*. This Project has been sponsored and supported by PRAVAH and IWMI TATA Water Policy Programme (ITP), Anand. We are thankful to Ms Nafisa Barot (PRAVAH) and Dr.Tushar Shah (ITP) for giving this opportunity to conduct this civic monitoring of the project.

The objectives of this monitoring go much beyond providing feed back from the field on a concurrent basis. The objectives also include awareness generation and empowerment of civil society and their organizations. This concurrent monitoring is therefore participatory in nature. A large number of NGOs and CBOs participated in the process of monitoring.

We are thankful to Mr. Jayesh Talati from ITP and Mr. Shalabh Mittal and Mr. Pramesh Balan from PRAVAH to providing active support in conducting the study. We are also thankful to all the NGOs and CBOs as well as the regional centers of PRAVAH for providing full support during the study.

We have received support of a number of officers and staff of regional office of GWSSB and WASMO during our study. We express our sincere thanks to all of them.

We are also thankful to PRAVAH secretariat as well as to Ms. Roja Santosh, Administrative Assistant at CFDA, for providing efficient secretarial support to the study.

We welcome suggestions and comments from readers on the project.

April 2006

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FOREWORD

Access to safe drinking water and sanitation has come high on the political agenda more due to poverty and conflict issues that are possibly hampering the overall growth, and not as a human rights concern. Access of these resources and services has been denied to the most vulnerable, especially women and socio-politically marginalized communities. Nevertheless these concerns are being brought to for by the civil society.

Millennium Development Goals (MDG) are being seen as the political commitment to achieve certain minimum welfare of all poor in the world. One of them is to ensure access to safe water and sanitation services to all by 2015 and 2025. India is committed to MDG and so also Gujarat. One of the major efforts of the Government in Gujarat has been that of supplying water to approximately 9633 villages and 139 towns, through the Narmada pipe water supply scheme. It is important, therefore, that the civil society as well as the government monitors the efforts of providing these services. The monitoring is not only in terms of its status of implementation but it is also in terms of its quality, the process followed and the outcome indicators of change as projected.

Pravah's initiative in this respect has been that of establishing a mechanism for participatory civic monitoring system to ensure that voices of the most vulnerable are heard. Pravah feels strongly that this kind of report will help providing opportunities to government, specifically Gujarat Water Supply and Sewerage Board, other departments and civil societies to engage in fruitful dialogue with community. It would also help to ensure course corrections and review of the scheme that may be required to achieve the desirable outcome. Pravah conducted this participatory concurrent monitoring of Narmada based pipeline project during 2005. It has been a revealing experience and we are happy to place before the people of Gujarat and the Government this monitoring report. We also hope that the report will be very useful to Water and Sanitation Management Organisation (WASMO) which is a special purpose vehicle set up to plan and implement participatory rural water and sanitation programme in Gujarat. The report should help the executive organizations in strengthening gender sensitivity, quality issues and safe delivery of Watsan services.

Pravah would like to thank all those Communities and Member Organizations, Officials who genuinely participated in various ways. We would also like to express our sincere thanks to Dr. Indira Hirway and Subhrangsu Goswami, CFDA for their very enthusiastic involvement to provide objective, qualitative and quantitative data analysis and report through rigorous participatory monitoring. Thanks to Pravah team members for their extremely hard efforts, the Board and Executive committee members for their valuable inputs and support. Last but not the least we would like to thank Prof. Tushar Shah and Mr. Jayesh Talati and IWMI for their support.

We are happy to report that this report was presented to the GWSSB and WASMO in a meeting. On behalf of Pravah members, I would like to express my sincere thanks to Secretary and Chairman of GWSSB Shri V. S. Gadhvi, CEO WASMO Dr. Jaipal Singh and Project Director Shri R. K. Sama, for their genuine interest and openness for holding the dialogue along with their team and patiently giving hearing to the critical observations made. We would like to also acknowledge with thanks the participation of WASMO and GWSSB team members in the study. Pravah members very much appreciate the commitment shown by the leadership within WASMO and GWSSB to seriously look deeper into the issues and alternatives flagged by communities and civil societies during discussions held with them and act on it. This clearly reflects in WASMO's present official view that local water resource development should be given priority and that devolution of power is a non-negotiable to ensure community's ownership, as well as to enable them to better govern their water system. That there is a realisation that bulk water supply could be seen as a support system and not necessarily as a 'life line'.

March 2007

Nafisa Barot,
President, Pravah

Civic Monitoring of the Largest Drinking Water Project in the World

Introduction

The Narmada Water Based Drinking Water Pipeline Project (NP Project for short) is perhaps the biggest drinking water project in the world. This project is planned to cover 9633 villages and 131 towns of Gujarat State. The project will cover entire Saurashtra and Kachchh as well as parts of North Gujarat (parts of Ahmedabad, Mehsana, Banaskantha, Sabarkantha) and Panchmahal. The capital cost of the project has been estimated to be Rs. 7470 crores (at 2001 prices), which includes investments in trunk mains, water treatment plants, pumping machinery, civil works and water distribution, and the operation and maintenance cost has been estimated to be Rs. 511.86 crores (at 2001 prices) per year. The project is extremely important for Gujarat, as it will cover more than 55 percent villages and more than 80 percent of the urban centers of the state.

It is essential to monitor such a huge project concurrently, as it will help in improving its performance of the project while under implementation. In stead of producing a post mortem report after the project is over, it is useful to give concurrent feed back to implementers and policy makers so as to enable them to introduce midway corrections when necessary. It was decided therefore by PRAVAH¹ and ITP² to initiate citizens' monitoring system to monitor the implementation of the NP Project concurrently for the year June 2004 – May 2005 with the academic support of Centre For Development Alternatives (CFDA)³. This monitoring system is participatory in nature in the sense that it involved a large number of NGOs, CBOs, people's organizations and citizens in the process of monitoring. It was thus an exercise of capacity building and empowerment of people - which is one of the major objectives of PRAVAH, a network of voluntary organizations and individuals spread over the entire state, working in the area of drinking water.

The quarterly reports of the monitoring (there were four such reports) have been shared, with the concerned government officials, NGOs and CBOs, and experts at different forums. This final report is comprehensive. It consolidates all the four quarterly reports to give a total view of the Narmada project. The ultimate objective of this monitoring is to move towards the goal of ensuring safe, adequate and sustainable water supply to all in the state, and this report aims at this.

¹ PRAVAH is a network of civil society organizations and academics working in the field of water and sanitation in Gujarat

² IWMI (International Water Management Institute) Tata Water Policy Research Program was established under a financial partnership between IWMI and Sir Ratan Tata Trust, Mumbai with the idea of promoting practical, policy research in water resources management

³ Centre for Development Alternatives (CFDA) is an academic research centre involved in research and related activities.

The Narmada Pipeline Project

This NP project is a part of the Sardar Sarovar Project, which is a multipurpose Interstate Project covering four major States (Madhya Pradesh, Gujarat, Maharashtra and Rajasthan) being implemented by Govt. of Gujarat. The Project comprises construction of a more than 120 M high and 1200M long concrete gravity dam across River Narmada near Village Kevadia of Distt. Baroda. The live storage capacity of the Reservoir will be 5800 million cubic meters (4.73 M.A.F.). The 458 Km. Long lined canal will irrigate 17.92 Lakh hectares of land in Gujarat and will also provide 616 million cubic metre (0.50 M.A.F.) share of water to Rajasthan. The project also includes a River Bed Power House with the installed capacity of is 1200M.W. and a Canal Head Power House with the production capacity of is 250 MW.

Initially the Sardar Sarover Project did not have any component of drinking / domestic water supply. However, looking to the severe depletion and degradation of water resources in the state, it was decided in the year 1990-91 (9th Plan) to use water from Narmada (i.e. Sardar Sarovar) to provide dependable water supply to the regions of Kachchh, Saurashtra and North Gujarat. It was decided to cover 4000 villages under the project. The number increased to 8215 villages and 135 towns in the late 1990s and to 9615 villages and 139 towns in 2005. The shape of the project also has changed over time, particularly after the drought of 2001, which is described as watershed in the drinking water policy in the state. In stead of waiting for Narmada canal water to reach the deprived regions of North Gujarat, Saurashtra and Kachchh and then using this water for drinking and domestic use, it was decided in 2001 to pump this water straight from Narmada and bring it to Kanial and Pariej reservoirs / tanks for the purpose of distributing it through 2700 km long pipelines to cover all the villages of Saurashtra and Kachchh and some villages of North Gujarat.

The project is now known as Narmada Pipeline Project. The main objectives of the project are as follows:

- ❑ To supply adequate and safe drinking water to the areas suffering from severe shortage of water supply.
- ❑ To feed the regional water supply schemes, which are not providing adequate water supply due to failure of their sources.
- ❑ To provide water supply to those regional schemes and individual (village) schemes which provide poor quality of water supply due to various reasons.
- ❑ To supply potable water to those towns and villages which have excess salinity, excess fluoride or excess nitrates in their water supply.
- ❑ To reduce out migration of people by ensuring drinking water and by promoting employment in the areas suffering from water shortages.

The actual Master Plan of Narmada Canal Based Pipeline Water Supply Project (NPP) covered all the seven districts (old districts) of Saurashtra, Kachchh, and five districts of Mainland Gujarat, i.e. Ahmedabad, Mehsana, Sabarkantha, Banaskantha and Panchmahals. The coverage of the Master Plan is presented in the following table.

Table 1.1
A. Numbers of Villages and Towns Proposed to be Covered under Actual Mater Plan of NPP

Districts	Total Nos. of Talukas in the Districts	Nos. of Talukas was covered under the Project	Villages	Towns
Jamnagar	10	10	751	17
Junagadh	15	15	1148	22
Amreli	10	10	595	12
Bhavnagar	12	12	876	16
Rajkot	13	13	856	12
Surendranagar	9	9	651	11
Kachchh	9	9	948	10
Ahmedabad	7	4	377	12
Mehsana	11	6	542	13
Banaskantha	11	6	490	03
Sabarkantha	10	4	568	04
Panchmahal	16	5	413	03
Total	133	103	8215	135

Source: Sardar Sarovar Master Plan, GSDWCL, 2001

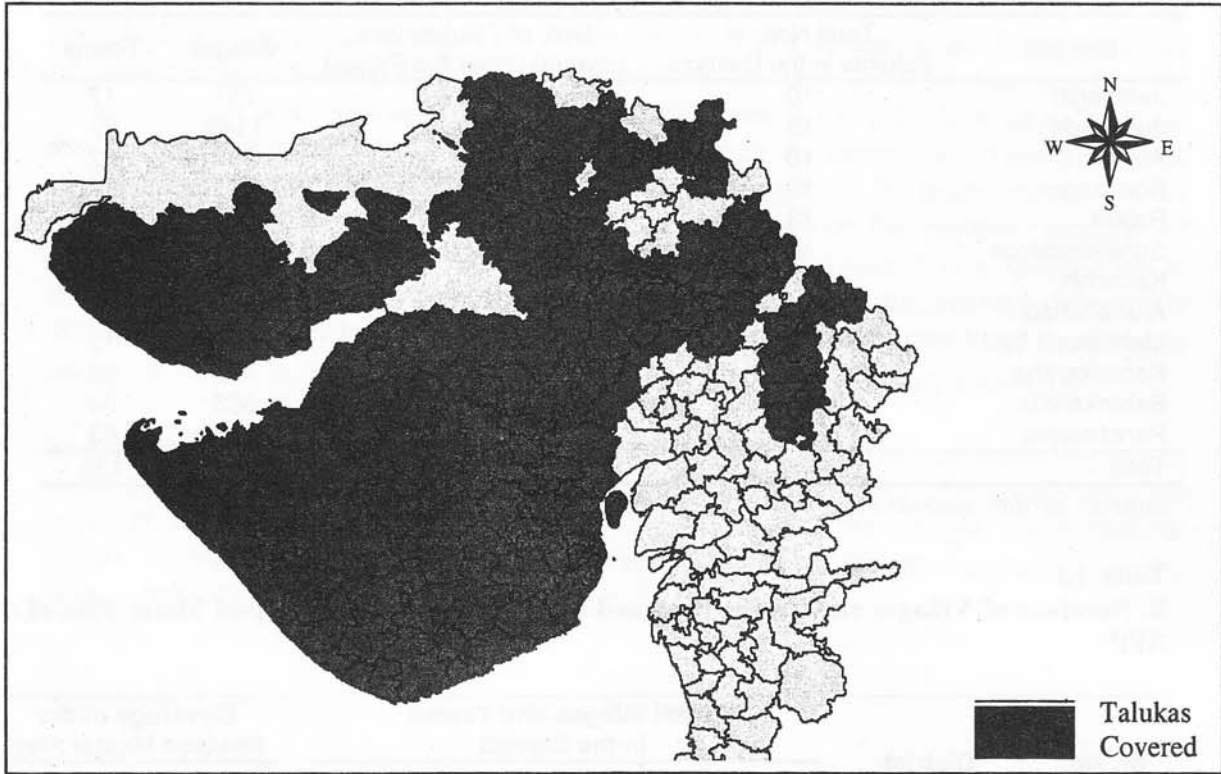
Table 1.1
B. Numbers of Villages and Towns Proposed to be Covered under Revised Mater Plan of NPP

Sr. No.	District	Total Vilages and Towns in the District			Coverage under Revised Master Plan	
		Inhabitated Villages	Un-inhabitated Villages	Towns	Villages	Towns
1	Amreli	615	2	8	615	8
2	Bhavnagar	790	8	13	790	13
3	Junagadh	923	115	12	923	12
4	Rajkot	844	2	10	844	12
5	Jamnagar	697	58	16	755	17
6	Porbander	182	0	5	182	5
7	Kachchh	886	64	8	886	8
8	Surendranagar	650	4	7	654	7
9	Ahmedabad	546	1	25	547	25
10	Sabarkantha	1372	17	8	956	6
11	Banaskantha	1244	5	6	791	2
12	Mehsana	593	10	8	285	4
13	Patan	517	0	5	402	5
14	Gandhinagar	299	0	10	299	4
15	Kheda	612	3	8	65	0
16	Panchmahal	1201	14	6	616	3
17	Dahod	693	0	4	23	0
Total		12664	303	159	9633	131

Source: Revised Sardar Sarovar Master Plan, GWSSB, 2005

However in 2005 a revised Master plan for the project was prepared, which covers 9633 villages and 131 towns from 17 districts. Some addition and delitions in number of villages has been made in this revised master plan. Lot of villages covered under the actual master plan was found to be un-inhabited during actual execution and thus was removed from the actual plan, where as some villages were added looking into the scarcity or demand from those habitations.

Map 1. Revised Master Plan Coverage of Narmada Pipeline Water Supply Project



Source: Based on Revised Master Plan, GWSSB, 2005

The project basically comprises of a large bulk water transmission system under which raw water will be received from the Narmada canal outlet, and pumped and transmitted through long and large diameter pipelines and distributed to the urban and rural centers listed above.

In terms of the transmission sections, the master plan project comprises and covers Lines A,B,C & D for Saurashtra region, Line D for parts of Ahmedabad, Line K for Kachchh, Line m for Banaskantha and Mehsana, Line H for Sabarkantha and some parts of Ahmedabad and Line P₁ and P₂ for Panchmahal district.

The whole project is handled mainly by three organizations: Gujarat Water Supply and Sewerage Board (GWSSB) is responsible for implementing the Distribution Network, Gujarat Water Infrastructure Limited (GWIL) is responsible for bulk transmission of water from Narmada to the villages and towns through various pipelines and Water and Sanitation Management Organization (WASMO) is responsible for promoting water committees (Pani Samitis) for local management of water supply.

The total work planned under the master plan project includes the total flow of 2,942.9 MLD water supply, through pipelines of now 3,251 km length, constructing 74 pumping stations and 101 treatment plants. The project aims at providing 70 lpcd for rural areas and 100 to 140 lpcd for urban areas, totally to 3,582 mld. The project will also provide 661 MLD for industrial use, which also included major upcoming industries in Jamnagar.

Table 1.2
Costs for Bulk water transmission in Master Plan

Transmission pipeline	Base Cost Rs. Lakhs	Cost including 5 % Physical Contingency Rs. Lakhs	Cost including 5 % Work Charge Establishment Charges Rs. Lakhs
Line A (Dhanki – Surendranagar – Rajkot – Kalawad – Dwarka)	103,461.40	108,634.47	94,066.19
Line B (Vallabhipur – Rajula – Veraval)	79,280.63	83,244.66	87,406.89
Line C (Maliya – Jamnagar)	48,044.85	50,443.84	52,966.14
Line D (Navda – Botad – Gadhada – Chavand – Chamardi – Gondal – Porbandar)	134,246.81	140,959.15	148,007.11
Line K (Maliya – Bhachu – Bhuj – Mundra – Mandvi – Rapar)	44,049.60	46,252.08	48,564.68
Line M (Kadi – Mehsana – Banaskantha)	17,472.24	18,345.85	19,263.14
Line H (Sabarkantha)	18,172.92	19,081.57	20,035.64
Line P1 (Panchmahals based on Panam dam)	3,509.93	3,685.43	3,869.70
Line P2 (Panchmahals based on Narmada Canals)	9,608.46	12,188.88	12,798.33
Other Outlets	7,500.00	7,875.00	8,268.75
On Going Schemes	56,900.00	59,745.00	62,732.25
Grand Total	524,246.84	550,455.98	577,978.87

Source: GWIL, Gandhinagar

The operation and maintenance costs of the project come to Rs. 511.86 crores per year, of which Rs. 339.26 crores are energy costs, Rs. 64.21 crores are maintenance costs and Rs. 128.39 crores are E & O costs.

Table 1.3
Bulk Water Transmission Master Plan Operation and Maintenance Cost (2004)

All costs in Rs. Lakh per annum					
Sr. No.	Transmission pipe Line	Energy Cost	Maintenance Cost	E & O Cost	Total O & M Cost
1	Line A (Dholidhaja – Surendranagar – Rajkot – Kalawad – Dwarka)	7,313.06	1,261.50	2,522.99	9,097.55
2	Line B (VaHabbipur – Rajula – Veraval)	5,353.48	1,238.15	2,476.30	9,067.83
3	Line C (Maliya – Jamnagar)	2,838.57	585.36	1,170.73	4,594.66
4	Line D (Navda – Botad – Gadhada – Chavand – Chamardi – Gondal – Porbandar)	10,437.20	2,045.21	4,090.42	16,572.83
5	Line K (Maliya – Bhachu – Bhuj – Mundra – Mandvi – Rapar)	3,536.68	534.72	1,069.45	5,140.85
6	Line M (Kadi – Mehsana – Banaskantha)	1,144.10	228.57	457.14	1,829.81
7	Line H (Sabarkantha)	1,792.65	237.74	475.47	2,505.86
8	Line P1 (Panchmahal based on Panam dam)	310.65	45.92	91.83	448.4
8	Line P2 (Panchmahal based on Narmada Canals)	986.45	144.42	288.84	1,419.70
9	Other Outlets	213.95	98.9	196.23	508.29
10	Total	33,926.79	6,420.49	12,839.40	51,185.78

Source: GWIL, Gandhinagar

Water Charges: Water charges are meant to meet the O & M costs and to provide for meeting the capital expenses for future replacement of the system. Considering the fact that flat rates irrespective of the quantity of water consumed lead to wastage of water, it has been decided to charge meter rates so that the sector is self-reliant, i.e. O & M costs are recovered from users and funds are provided to meet the replacement of capital/investments (the public sector is not burdened by these costs) and the demand for water is managed well and misuse is controlled. It also has been decided to subsidize the poorer sections of the population by charging higher rates to others.

It has not been possible so far to fix any charges, as 'the matter is under consideration.' The present rate of Rs 14/ per capita per year is too low to meet even the O & M cost of Rs 88/ per capita per person (at the rate of 70 lpcd), and if debt servicing added to it, the cost goes up to Rs 201.5. It is seems politically difficult to charge this rate. Perhaps this is the reason why no decision has been taken about the water charges under the project.

Implementation of the Project: The state government plans to complete that entire project during the Tenth Plan. In addition to the budget allocation of Rs. 2,300 crores under the plan, the state government plans to borrow Rs. 200 crores from financial

institutions and Rs. 60 crores will come from the government's equity in Gujarat Infrastructure Limited, bringing the total outlay in the Tenth Plan to Rs. 2,560 crores. For the remaining amount, the state government proposes to get financial assistance under externally aided programmes.

Some Unique Characteristics of the Narmada Project

Our discussions with GWSSB officers as well as the literature on the project indicate that there are certain unique characteristics of this regional pipeline project. This project has therefore certain advantages over the other regional schemes. However, these advantages need to be translated in to actual benefits through proper enforcement of these advantages. Some of the points that deserve careful attention of policy makers are as follows:

Design and network system of SSP: To start with, efforts are made under the Narmada project to distribute water under the gravity force, which was not the case with the other regional schemes. This will save expenditure on local pumping houses. However, this calls for redesigning of the existing distribution system as per the topographical slope, which again increases the cost. Secondly, water distribution within town or village will mostly use existing pipeline networks to reduce the capital cost of the project. This is likely to reduce the capital cost of the project, provided it is feasible to use old pipelines in the case of most urban centres.⁴ Thirdly, the quality of pipes used for Narmada project is supposed to be better than those used in other regional schemes. Four major types of pipes used for Narmada project are Mild steel pipes, ductile iron pipes, PVC Pipes and high-density Polyethylene pipes. As against this, the other regional schemes use AC (Asbestos Cement) Pressure pipes, R.C.C Cement pipes and PVC pipes. The shift in use of Ductile Iron and Mild Steel Pipes from AC Pressure is likely to reduce the problems of maintenance and quality of water supply. This shift is a positive direction towards pollution free water supply system, as A C Pressure (Asbestos Cement Pressure) pipes are considered as carcinogenic pollutant and banned in most of the developed countries like Australia, United Kingdom and New Zealand. It is important however that the asbestos pipelines are totally discarded.

Fourthly, it is argued that since water supply from Narmada is adequate, the flow and pressure of water supply will be good in the pipeline network. It will be possible to reach water to tail end villages under the pipeline scheme. However, it is important to note two points here: As several studies have shown, the tail end villages suffer from lack of water also because there are deliberate breakages and leakages in the system and if these are not prevented, water will not reach tail end or distant villages. Also, it is important to note here that there is no change in layout of distribution system under the Narmada project, as it remains basically a Tree System.⁵ The major disadvantage here is that if a pipeline breaks down or is closed for repairs, all the villages beyond the point go without water. Fifthly, the project assumes continuous flow of electricity. However, this assumption is does not seem to be realistic. Villages are likely to go without water if

⁴ For example, it has been reported that 'with the arrival of the Narmada waters, the municipal corporation of Rajkot [has] been forced to create a new network of pipelines.' (31st may, 2003, The Times of India).

⁵ There are two layout or distribution systems: Under Tree System, water is at one end and villages are connected in series to the distribution pipeline, and distribution networks feed from ground level reservoirs or pumping station. In Star System, each village is directly linked by a main pipeline to the service reservoir or pumping station.

electricity fails at the place of storage facility. Also, due to power cut, overhead tanks may not get fully filled up. This may not maintain the pressure, with the result that water may not reach the tail end villages.

Operating System and Institutional sustainability: As regards the operating system of the NP project, a new technology is being used for welding the joints of pipeline in the Narmada project. The joints are supposed to be less subjected to leakages. As a result, in all areas where new pipelines are laid, the leakages are likely to be less. Valve men are hired under private contractors for operating valves for distribution of water and for taking care of small repairs. One valve man is hired for two to three villages (within 8 sq. km. of area). Secondly, Valve men are also responsible for purifying water at village level, for measuring residual chlorine at household level and for storage of chlorine/gypsum. The valve man is thus very important for O and M of the project. Secondly, the NP project plan suggests a filter plant at every group scheme where Narmada water will reach. It will be useful to see how much of this is practiced in reality.

Financial Sustainability: Financial sustainability is supposed to be a positive feature of the NP project. It is argued that the N P project will charge to meet the O & M costs as well as capital costs. It is also argued that though charges for Narmada water will be much higher than the existing charges, people will pay because the water will be supplied in adequate quality and regularly.

The feasibility report carried out by Gujarat State Drinking Water Infrastructure Company Limited (GWIL) has observed that the Narmada project is not free from risks. The report has identified the following major risks:

- ❑ Delay in the project (for various reasons) will increase the construction costs due to price escalation. This has already happened in the case of this project in the past. The total cost is revised several times and increased manifolds. This has made the diversion of state funds from other sectors to Narmada project.
- ❑ Delay in the completion of the project may take place due to several factors like, cost overruns, default of the contractors, default of the implementation authority, inadequate time budget, technology or design failures, statutory changes in regulatory requirements, natural or political forces or events and adverse environmental impacts.
- ❑ There is also a risk in terms of economic viability. Even if the project is technically able to produce the required output and achieve the expected operation performance, it may fail due to failure in raising revenues as expected during the development stage of the project. This is a great challenge for the state Government to generate revenue from the Narmada water supply.

The above risks factors demand good management and mitigating measures to reduce the chances of failure of the Narmada project.

Approach and Methodology:

Unique Nature of Monitoring: This concurrent monitoring is unique in several ways. To start with, the objectives of this monitoring are much wider than the objectives of conventional monitoring. In addition to provide feed back to implementers and policy makers on a concurrent basis, this monitoring aims at generating awareness among people and their organizations about the dimensions of the drinking water problem at the village level and about the concerns in the implementation of long distance pipeline schemes based on bulk transfer of water from one to another region. The study also aimed at training NGOs/ CBOs in undertaking field studies systematically and in using the results of the study for making government machinery accountable and for policy advocacy.

This civic monitoring therefore is participatory in nature. The participation started right from the formulation of the schedules to canvassing of the schedules to using the results of the study for different proposals. It is important to note that in order to remove the likely biases of NGOs / CBOs in field investigation, it was decided not to use local organizations to conduct field surveys. That is, each NGO or CBO was asked to undertake field work in a village where it had not worked.

Another important feature of this monitoring is the continuous dialogues with government officials, policy makers and experts during the course of monitoring. A workshop was organized after the first round of the survey to discuss the findings of the study. A detailed presentation was made to the government after the second round to highlight the major field level problems of the Narmada project. Again, discussions were held with PRAVAH members and other experts and government officials after the results of the third round. The findings of the report were also discussed at different forums at the state and the national levels⁶. As a result, the findings were disseminated and discussed widely to all the stakeholders at different levels.

In depth case studies of the different typologies of villages is also an important part of this civic monitoring. These case studies have provided in-depth additional information on the dynamics of the water supply and water distribution at the village level. These case studies have revealed the nature of the constraints that villages face while distributing the water supply to the different areas within the village and the problems of recovering water charges from people.

At the end of the four rounds of monitoring therefore, it has been possible to acquire a good understanding of how a huge pipeline project like the Narmada projects works at the field level on the one hand, and how to design community based follow up action on the other hand. PRAVAH is now in a position to design follow up steps including advocacy with the support of a large number of NGOs, CBOs and other civic society organizations.

Organization of Monitoring: As mentioned above, this is a collaborative project of PRAVAH, ITP (IWMI-TATA Programme) and CFDA. PRAVAH has been responsible

⁶ Presentations of the major results of the study were made at (1) IWMI-TATA Annual Meet of Partners, (2) seminar on NGOs and Experts organized by Jalseva and IWMI-TATA-Project at Bhuj, and (3) at a national seminar at VASAN at Hyderabad

for (1) organizing and monitoring the field surveys to support CFDA and ITP, (2) dissemination of the findings to all the stakeholders, (3) organizing dialogues with concerned networks at the state, national and international levels, (4) dissemination of the final report and policy advocacy and, (5) dissemination of quarterly reports on its website or its partner organizations' websites. The Regional Centers of PRAVAH in Saurashtra and Kachchh have been responsible for, (1) conducting training workshops at the regional level, with the support of ITP and CFDA, to train field level investigators, (2) organizing the survey using the Schedules – 1 & 2, with the support from partners, (3) conducting district level and regional meetings to discuss the major findings and to monitor the study. The ITP is responsible for (1) sponsoring the project and for overall partnership, (2) helping in designing schedules and monitoring the field surveys (3) further data analysis and other data support, (4) dissemination at different levels. CFDA has taken up the responsibility for providing the academic input to the project. It has been responsible for (1) designing the schedules in consultation with the partners, (2) monitoring the field surveys, (2) data entry and analysis, (3) preparation of quarterly reports and the final report and (4) dissemination of findings of the study in academic journals etc.

Participatory Mode of Monitoring: The participatory mode of monitoring was introduced in the study right from the beginning. The first meeting of PRAVAH members with representatives of ITP and CFDA was organized to decide whether there is a need to monitor the NP project, and if yes, how. It was decided to conduct a census of all villages covered under the Narmada project to know how the project was implemented in reality. The two schedules designed by CFDA and ITP were discussed in the first two meetings and were finalized. Schedule 1 was designed to collect information about the socio-economic characteristics and the overall status of water and sanitation in the Narmada villages. The schedule collected information on sources of water supply and the share of Narmada water in the total supply, quality and quantity of water supply, management of water supply, a brief history of water supply in the village and views of people regarding the overall situation of water and sanitation in the village. Schedule 2 was designed to collect data exclusively on the status of Narmada water in the villages. This schedule was canvassed four times a year to capture seasonal variations in the situation. The schedule collected data on the quantity and quality of water, regularity of water supply, management of water supply, water charges and recovery of the charges, payment of water and electricity bills by the village Panchayat etc under the Narmada project.

Both the schedules collected information for villages, and when required for *falias*, i.e. localities or areas within a village. Investigators were trained to collect village level information from the Sarpanch, the Talati, prominent leaders and others, and cross check it with each other when necessary. Collection of information recorded in the Panchayat offices was direct, while the other information was collected through multiple sources and when necessary by physical checking. In the case of information collected at the *falia* level also, the investigators were instructed to visit each house and cross check the data collected. The information collected at the village and *falia* levels is therefore fairly accurate and reliable.

When the study was started in April 2004, about 1300 villages of Kachchh and Saurashtra were covered under the project. The first task in monitoring was to prepare a list of the villages, from official records, where Narmada pipeline water has reached.

These villages were then allotted to different NGOs / CBOs for the purpose of data collection. As mentioned above, two schedules have been designed to collect the relevant information. Since a village is not a homogeneous unit, most of this information is collected from the each of the *falias* of the village to understand the access of different socio-economic groups to water and sanitation facilities. Schedule II was canvassed four times a year to capture seasonal variations in the situation.

Training Workshops and Follow Up Activities: The first workshop with NGOs was organized in March 2004 to discuss the desirability of conducting this monitoring and to assess their willingness to join this exercise. The objectives and approach of the proposed monitoring were discussed threadbare. Members accepted the desirability of the study, agreed with its approach and agreed to participate. Different NGOs took up the responsibility of conducting the survey for specific villages. NGOs were also identified for the villages, where NGO presence was not there.

The second workshop, the training workshop, was organized to orient and train NGOs for filling in the schedules. At the end of the workshop the programme for the four rounds of monitoring was worked out. This was followed by regional workshops for Saurashtra1, Saurashtra 2 and Kachchh regions for training the persons who actually were supposed to canvass the schedules.

Table 1.4
Training Workshops conducted

Nature of Training Workshop	Number of Workshops	Number of Participants	Number of Organizations
State Level Workshop	1	Avg. 45	44.
Regional Level Workshop	4	Avg. 80	34
District Level Workshops	4	Avg. 40	23

Conducting Surveys for Data Collection: The first round of the survey was conducted for the period May to July 2004. This period, the period before monsoon, is usually a period when the water crisis is at the peak. For many NGOs, this was the first experience of conducting a systematic survey. It was not therefore easy for them to fill in the forms accurately. In spite of the training workshops in Ahmedabad and at the Regional Centres, some lacunas were found in this round. Efforts were made to remove these lacunas while validating the data, and resurvey was done in some cases. A special training workshop was organized at the end of the first round to discuss the major mistakes and to improve in the next rounds. Workshops were also organized at the regional centers to reach all the NGOs participating in the monitoring.

Villages Covered Under the Monitoring

The adjoining table presents information on the numbers of villages covered under the monitoring in the four rounds.

Table 1.5
Villages Covered under the Narmada Project and Under Monitoring

Districts (Name)	Revised Master Plan Coverage*	Actual Coverage as on April 2004**	CMS Study Coverage***			
			May – July 2004	Aug – Oct 2004	Nov. 04 – Jan, 05	Feb. – Apr 2005
	(No of villages)	(No of villages)	(No of villages)	(No of villages)	(No of villages)	(No of villages)
Ahmedabad	170	134	121	97	118	111
Amreli	613	248	218	251	242	248
Bhavnagar	795	312	281	276	279	280
Jamnagar	751	59	51	51	13	13
Junagadh	1035	41	47	62	61	61
Kachchh	645	275	NA	184	121	167
Rajkot	856	219	269	267	188	194
Total	4865	1224	987	1188	1022	1074

Source: * GWSSB, 2005,

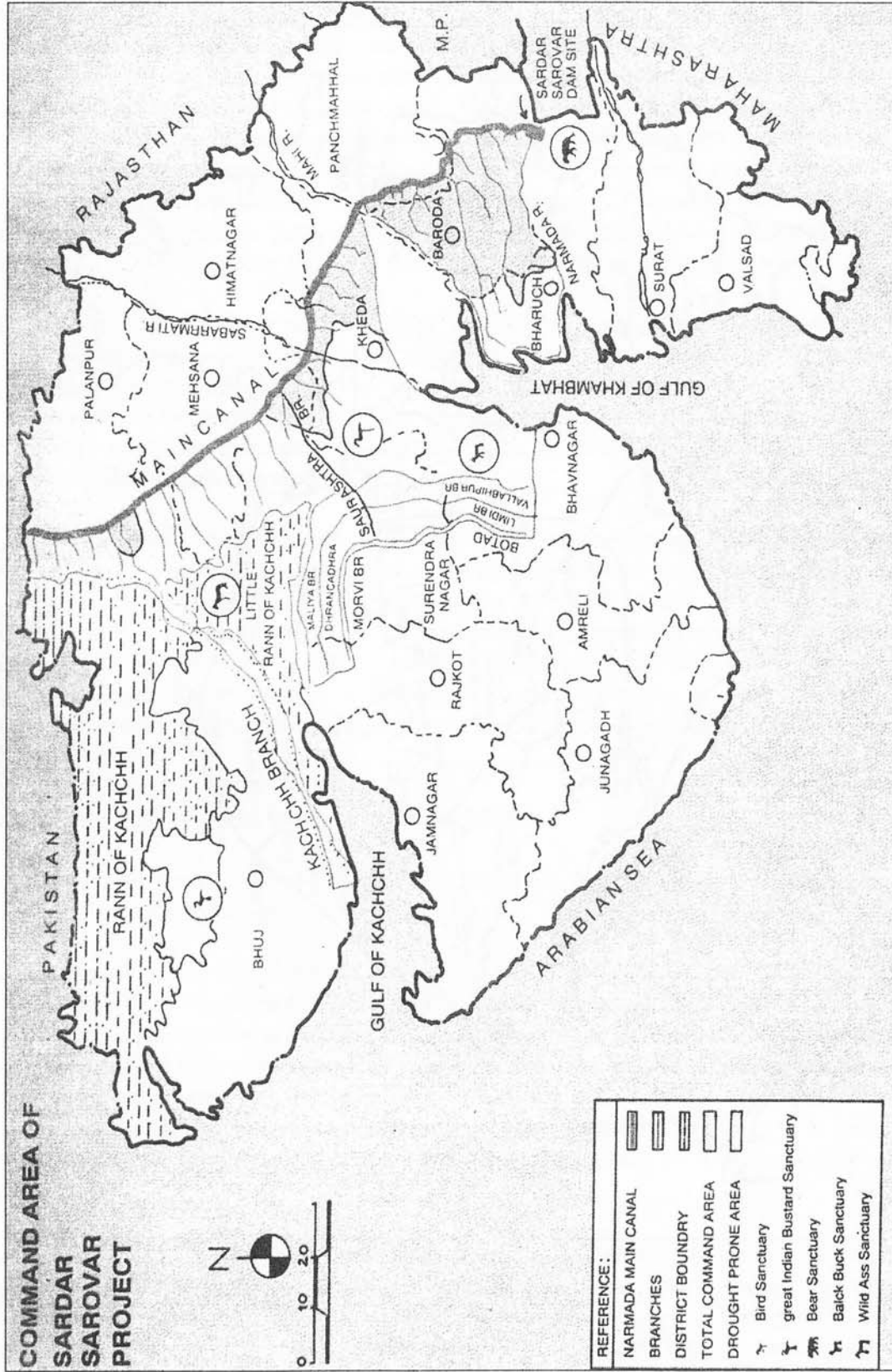
** GWSSB, 2004

*** Primary Survey 2004-2005

Presentation of This report:

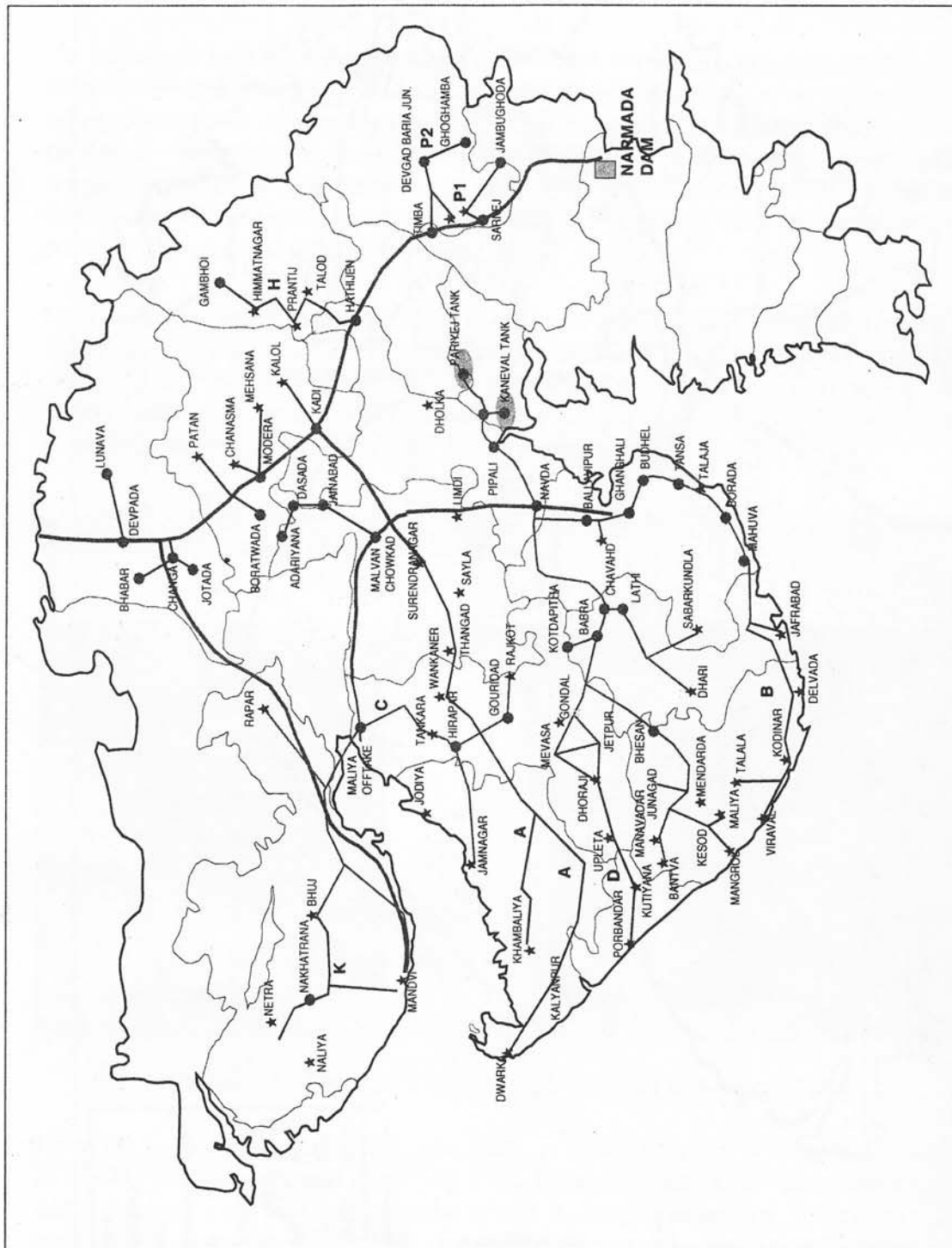
This report is divided in to five sections. After this first introductory section, Section Two describes the overall status of drinking water in the villages under study. Section Three presents the findings about the working of the Narmada project in the villages. It basically describes the adequacy, regularity and dependability of Narmada water to these villages under the project. Section Four discusses some of the critical issues of the project, such as issues related to quality of water supply, use of local water resources, improving the O & M of the project, financial viability of the project, local management of water supply including intra village distribution of water etc. Section Five in the end, presents the inferences for improving the working of the project and for modification of drinking water policy in the State. It also suggests mid course corrections in the project.

Map 2. Narmada Canal Network



Source: GWSSB, 2001

Map 3. Narmada Canal Based Drinking Water Pipeline Layout Plan



Source: GWSSB, 2001

Status of Drinking Water in Narmada Villages

Government of Gujarat decided to cover all the villages of Saurashtra and Kachchh, and parts of North and Central Gujarat under the proposed Narmada Project. This is because it believed that all these villages suffer from shortage of potable water supply, at least in the summer months and or in drought years. It will be useful to study the overall status of drinking water in these villages after Narmada water has entered the villages. It will also be useful find out the status of other sources of water supply and their adequacy as well as dependability. In this Section we present the data relating to the overall status of drinking water in the villages covered by the Narmada project. This presentation also provides insights into the dynamics of the problem of drinking water in these villages.

Villages Covered Under the Narmada Pipeline Project

When the civic monitoring of the Narmada Project began in May 2004, 1122 villages of Saurashtra and Kachchh were already covered under the project. These villages are from five districts of Saurashtra (i.e. Jamnagar, Amreli, Junagadh, Rajkot and Bhavnagar), and from Kachchh and Ahmedabad districts. District wise details of the covered villages are presented in the following table. Taluka wise detail is given in annexure 2.1

Table 2.1
Districts, Talukas and Villages Covered Under the Narmada Project, 2004

Districts	Number of Taluka Covered	Number of Villages Surveyed	Number of HH Covered	Total Population	Average HH Size
Ahmedabad	4	121	36330	205768	5.7
Amreli	6	236	80647	454851	5.6
Bhavnagar	9	281	92104	551789	6.0
Jamnagar	2	37	13193	68193	5.2
Junagadh	8	62	25668	137315	5.3
Kachchh	7	159	51637	250466	4.9
Rajkot	8	226	98146	518847	5.3
Total	44	1122	397725	2187229	5.5

Source: GWSSB 2001 and Primary Survey Data

The table shows that maximum coverage is from Bhavnagar district (281 villages of 9 talukas), followed by Amreli (236 villages from 6 talukas), Rajkot (226 villages from 9 talukas, Kachchh (159 talukas from 7 talukas) and Ahmedabad district (121 villages from 4 talukas). The lowest coverage is from Jamnagar district, where only 37 villages from two talukas have been covered so far! The coverage is basically determined by the progress of the construction of main pipelines. It does not have any other implications about the intensity of the water problem etc. The following table makes this clear.

Table 2.2
Villages Covered Under the Revised Master Plan and the Actual Coverage (2004)

Sr.No.	District	No. of Villages under Master Plan	Actual Coverage	Percentage of Villages Covered
1	Ahmedabad	170	121	71.2
2	Amreli	613	236	38.5
3	Bhavnagar	795	281	35.3
4	Jamnagar	751	37	4.9
5	Junagadh	1035	62	6.0
6	Kachchh	645	159	24.7
7	Rajkot	856	226	26.4
Total		4865	1122	23.1

Source: GWSSB, 2001

The Narmada Project is expected to cover 4865 villages from the 7 districts, which have been covered under the project so far. Of these only 1122 villages (23.1 %) have been covered by 2004 (June). The coverage is very small (4.9 %) in Jamnagar while it is around or more than one third of the total villages (40 percent) in Amreli, Bhavnagar and Ahmedabad. The overall picture indicates a very slow progress of the project.

Use of Local Source of Water Supply

An important feature of all the villages is that they all use multiple sources of water supply. The major local sources are wells / borewells, irrigation wells on farms, village ponds as well as rainwater harvesting structures (RRWHS). Some villages also depend on small multi village schemes depending on a near by dam or a tube well, some others get tankers from outside. Tankers are particularly important in Jamnagar, Bhavnagar, Kachchh and Rajkot villages, which get public (GWSSB) tankers as well as private tankers to meet their demand for water.

Wells and Bore wells are the most common local source. About 66 percent villages covered under the Narmada project use well / bore well water, and 32 percent villages use water from local irrigation wells. All the Narmada project villages in 13 talukas (out of the total 41 talukas) spread over all the districts, use well / bore well water, and more than 80 percent Narmada project villages in another 8 talukas also use well water. In addition, about 23 percent villages use water from local pond. In short, use of local sources is predominant in all the Narmada project villages. However, this does not necessarily mean that local sources are adequate to meet the local demand.

Small multi village schemes (Juth Yogana) also are an important source of water supply, as 41 percent villages use this water. Narmada water is sent through pipelines of these schemes when their sources of water dry up. It is important to note that roof water collection tankas are emerging as a source of water supply in several villages, particularly in Rajkot, Bhavnagar and Amreli districts.

Table 2.3
Non-Narmada Sources of Water Supply in Narmada Project Villages (%)

District	Narmada Villages Reported	% of villages using following local sources					
		Juth pipeline	Well/ Bore/ and pump	Village Pond	Irrigation Well	Tanker	RRWHS
Ahmedabad	93	8.6	25.8	15.1	1.1	0	18.3
Amreli	233	70.4	90.1	17.6	42.9	6	28.8
Bhavnagar	221	28.5	73.3	17.6	39.8	14.5	61.1
Jamnagar	19	57.9	47.4	21.1	26.3	26.3	0
Junagadh	52	83	88.7	58	83	1.9	0
Kachchh	113	44	27.6	28.4	6.9	10.3	16.4
Rajkot	215	22.8	68.8	20	25.1	7.9	17.7
Total	946	41.1	66.5	22.8	31.6	8.5	29.1

Note: All villages use Narmada water, though it may not be to meet the total demand.

In short, Narmada water is *not the only source* of water supply in any of the villages. Along with Narmada water, people use other sources also, many of which are local sources.

Quality of Local Sources: In order to assess the perception of people about the quality (mainly taste, odour and colour) of local sources of water, a question was asked whether they considered the quality good enough for drinking. This data was collected falia wise in each village. It appears that a large majority of falias (70 to 100 percent) considered this water of 'good quality'. Though this perception does not have any scientific validity, it indicates that the sources, if necessary after treatment, are potable.

Table 2.4
Quality of Water from Local Sources: Perception of People

Districts	Surveyed Falias	Nos. of Falias with opinion that water quality is good	% Falias with opinion that water quality is good
Ahmedabad	693	663	95.7
Amreli	979	717	73.2
Bhavnagar	1058	915	86.5
Jamnagar	156	23	14.7
Junagadh	10	8	80
Kachchh	472	371	78.6
Rajkot	787	646	82.1
Total	4155	3343	80

Source: Primary Survey 2004-05

Major Problems Related to Drinking Water in the Villages

The villages were asked to rank their problems as per their importance. An exhaustive list of the usual problems faced by them was listed to choose from. The most important water related problem in the villages turned out to be shortage of drinking water in the summer months. About 42 percent villages consider this as an important problem. This percentage varies from 57 in Rajkot to 19 in Jamnagar. The low percentage in Jamnagar should be viewed in the context of the fact that 35 percent villages in Jamnagar have

drinking water problem through out the year and another 25 percent villages have excessive fluoride in its water! If we add the percentage of villages that suffer from shortage of water through out the year, it becomes clear that more than 60 percent of villages suffer from shortage of water supply either in the summer months or through out the year! This is in spite of the fact that these villages receive Narmada water through the pipeline project!

The worst hit talukas, in terms of problems of drinking water are Ranpur (Ahmedabad), Kukavav (Amreli), Mahuva, Talala, Umralla and Vallabhipuv (Bhavnagar), Bhuj (Kachchh) and Gondal (Rajkot) where more than 70 percent villages report that they suffer from shortage of water supply through out the year or in the summer months! In addition Keshod, Manavadar and Mendarda of Junagadh, Babra and Lathi (Amreli) and Jasdan and Morbi (Rajkot) talukas also suffer from severe shortage of drinking water in the summer.

The table goes on to show that about 22 percent villages find that regional pipeline schemes, i.e. the schemes based on transfer of water supply from distance, do not work properly. This includes 11 percent villages, which find irregular electricity creating problems in pumping the water in the pipelines. All the villages in six talukas in Junagadh consider regional pipeline schemes as ineffective. As regards the other problems, about 14 percent villages have complaints about the quality of water i.e. excess fluoride and excessive hardness; while more than one fifth of the villages find that the wells are getting day by day. In short, the villages covered under the Narmada Project have a variety of problems even when they are covered under the project.

Table 2.5

Problems Related to drinking Water in Narmada Project Villages

District	Villages surveyed	% of villages ranked the following problem as the most critical problem (ie, Rank 1)								
		P1	P2	P3	P4	P5	P6	P7	P8	P9
Ahmedabad	121	7.4	55.4	0.8	5	2.5	4.1	21.5	10.7	35.5
Amreli	236	26.3	50.8	16.5	19.1	3	1.3	5.9	23.3	25.8
Bhavnagar	281	26	23.1	3.6	3.2	3.9	14.2	25.3	6.8	6
Jamnagar	37	35.1	18.9	35.1	2.7	0	2.7	2.7	2.7	2.7
Junagadh	62	3.2	53.2	0	0	1.6	90.3	93.5	3.2	90.3
Kachchh	159	19.5	30.8	8.8	7.5	14.5	12.6	20.1	8.2	17.6
Rajkot	226	14.6	57.1	4.9	0.4	0.9	3.1	4.4	8.8	12.8
Total	1122	19.9	41.9	7.8	6.6	4.2	11.8	18.9	11	20.9

Note: Prob 1: Round the year water problem, Prob 2: Water scarcity through out the year, Prob 3: Excessive Fluoride in the drinking water, Prob 4: excessive hardness in water, Prob 5: Dependence on tanker water, Prob 6: Regional scheme not effective, Prob 7: Canal water not available, Prob 8: Scarcity of electricity for pumping water, Prob 9: Wells getting dry day by day.

Changes in the Shares of Different Sources of Drinking Water During the Past 20 Years

Some significant changes have taken place in the relative shares of the different sources of drinking water during the past twenty years. To start with, the importance of ground water has declined as a source of drinking water. For example, about 81 percent villages used local wells and bore wells as a source twenty years ago. This percentage declined to 78.6 ten years ago and to 66.1 at present. Similarly, the use of pond water also has declined from 38.4 percent (villages) twenty years ago to 33.1 percent 10 years ago and to 22 percent at present. It is important to note, however, that at present 66 percent of villages use ground water (wells / bore wells) and 22 percent villages use pond water to satisfy at least part of their demand for drinking water.

Another important change is a big jump in the dependence on regional schemes, i.e. on transfer of water from surplus to deficit regions. Twenty years ago less than 10 percent villages depended on such transfers. At present, however, 34 percent villages depending on such transfer, indicating about four times increase in their share.

Again, rainwater harvesting has spread over the years. Their number has increased from 25 twenty years ago to 233 at present. Though rain water harvesting meets only a small fraction of the total needs, it is important that about 20 percent villages have started rainwater harvesting. There is definitely a possibility of building on this development.

The importance of irrigation wells has increased, mainly because the village wells and bore wells used for drinking are drying up or the quality of their water is degrading. As against 202 villages that used irrigation wells twenty years ago, 245 villages now use water from wells located on farms. The share of these villages has increased from 18 percent twenty years ago to 31.8 percent at present. This indicates that there is ground water in these villages for irrigation, but it is not available for drinking purpose to common people. The use of canal water has remained more or less the same – during the past twenty years.

The changing shares basically indicate two points: declining role of local ground (and surface) water and increasing dependence on transfer of water from surplus to deficit regions. The Narmada Pipeline Project is a part of this development.

Table 2.6
Changing Shares of Drinking Water Sources

	No of villages using following water sources					
	Ground water	Pond water	Rain water	RWSS	Irrigation well	Canal water
Twenty Years Back	911 (81.2)	431 (38.4)	25 (2.2)	110 (9.8)	202 (18.0)	42 (3.7)
Ten Years Back	882 (78.6)	371 (33.1)	51 (4.5)	290 (25.8)	228 (20.3)	46 (4.1)
In Recent Years	730 (66.1)	359 (22.0)	233 (20.8)	380 (33.9)	245 (31.8)	42 (3.7)

Source: Primary Survey 2004-05

Note: Figures in bracket indicate percentages

Status of Local Sources

Local sources of water supply are not really well maintained. This is because at the advent of outside water, less attention is paid to local sources. In the villages under study, 40 percent ponds, 45 percent wells, 30 percent bore wells, 40 percent hand pumps and 20 percent tube wells are not in working condition. This is either because ground water has dried up, or because the quality of water has deteriorated or because no attention is paid to their maintenance and operation.

The taluka level data indicate that the neglect of wells and borewells is maximum in Lathi, Liliya and Rajula talukas (Amreli district), where over drafting of ground water has resulted in the depletion and degradation of ground water. The neglect is also very high in Keshod, Vanthali and Bhesan talukas (Junagadh district) and in Bhuj and Mundra talukas (Kachchh district) for similar reasons.

Table 2.7

Status of Local Sources of Drinking Water Supply in Narmada Project Villages

Dist	Percentage of local sources in working condition						
	Pond	Well	Bore well	Hand pump	Irrigation well	Tube well	RRWHS
Ahmedabad	71.1	57.0	100.0	70.3	69.4	0.0	98.5
Amreli	32.4	54.1	67.9	58.2	95.6	0.0	100.0
Bhavnagar	66.9	65.8	75.6	61.5	87.7	71.9	90.8
Junagadh	2.0	80.0	80.0	48.0	77.3	100.0	0.0
Kachchh	53.0	38.7	64.1	37.5	68.3	100.0	94.6
Rajkot	75.6	56.7	59.6	52.8	85.8	95.2	68.3
Total	58.9	54.4	71.9	57.2	85.9	80.9	90.6

Source: Primary Survey 2004-05

Ponds are discarded or filled in and the land is used for other purposes. The neglect of ponds is particularly very high in Junagadh district (in all talukas) in Gandhidham and Bhuj talukas of Kachchh district.

An interesting observations emerging from the table is that not all the newly constructed roof water harvesting structures are in working condition! At least 10 percent of these tankas are not working at present. In Jasdan taluka (Rajkot district) about 86 percent tankas are not in operation. This percentage is 30 in Tankara taluka (Rajkot district), 25 in Bhuj taluka (Kachchh district), 30 in Shihor taluka (Bhavnagar district) and 16 in Umralla and Vallabhipuv talukas (Bhavnagar district). The rest of the talukas have their RRWHS in good condition. The reasons appear to be the neglect on the part of owners or lack of adequate rainfall to fill in the structures. This aspect however requires careful investigation.

Table 2.7 also indicates that significant local sources are still in working condition. Many of these are used only for washing & cleaning and for watering and cleaning animals. The sources are many times seen as a source of water for domestic use and not for

drinking. However, they have still a good potential to be developed as sources of drinking water.

It was necessary therefore to find out what do these villages – mainly the Sarpanch or Pani Samiti Head think about the feasibility of developing local sources for meeting the demand for drinking and domestic use water.

The response is quite encouraging. About 73.7 villages (439 villages out of the total 609 villages that responded) think that they can augment enough local water if adequate support is provided for developing local resources. The response, however, varies widely from taluka to taluka. In Lathi and Padadhari talukas none of the village Sarpanchs / Pani Samiti heads thinks that his / her village can generate enough water locally to meet the local demand. In Liliya (Amreli), Botad (Bhavnagar), Ghogha, (Bhavnagar) also majority of villages believe that they cannot generate adequate water supply locally. On the other hand, in Dhandhuka (Ahmedabad), Bagasara (Amreli), Mahuva (Bhavnagar), Gandhidham and Mundra talukas (Kachchh) all villages seem to be thinking that if enough efforts are made, they can generate adequate water supply to meet the local demand for water. In the rest of the talukas also majority of villages believe that there is a potential in their respective villages to generate local water to meet local demand.

Table 2.8
Can Local Water Sources Meet the Demand for Drinking Water?

DISTRICT	Narmada villages	Response to the question "If the local sources are developed, will it cater to the need of your village?"			
		No	Yes	% No	% Yes
Ahmedabad	69	3	66	4.3	95.7
Amreli	101	34	67	33.7	66.3
Bhavnagar	201	52	149	25.9	74.1
Junagadh	44	7	37	15.9	84.1
Kachchh	96	23	73	24.0	76.0
Rajkot	98	41	57	41.8	58.2
Grand Total	609	160	439	26.3	73.7

Source: Primary Survey 2004-05

This table, however, should be read in the context of the following:

- ❑ The villages were asked about the potential of the local sources only. This did not include the problems of farmers siphoning away harvested water supply, which is a big hurdle in making a village self reliant on local sources.
- ❑ This was a very limited question about the potential of water resources. It did not include feasibility of managing distribution of water within the village, maintenance of local sources, financial costs or financial viability of local source management.

While concluding the discussion it can be observed that the villages covered under the Narmada Project are not without problems relating to drinking water. In fact, a significant percentage of these villages suffer from water shortages and have quality problems of water. This is likely to be due to the fact that Narmada water is not available to them on a regular basis.

Each of these villages has multiple source of drinking water many of them being local sources. These sources are neglected due to several reasons, and our study shows that it is feasible to develop these local sources to meet at least a significant part of the local demand. Some villages, however, go the extent of stating that, if supported adequately, they can augment their own water resources to meet the local demand.

On the whole, it appears that the neglect of local sources in the Narmada project villages is not desirable. It will be useful to develop these relatively cheap sources to minimize the financial burden of paying for expensive Narmada water. Another inference emerging from the discussion is that there is a need to examine why the villages covered under the Narmada project are deprived of regular and adequate water supply. The next section will do this investigation.

Annexure – 2.1
Districts, Talukas and Villages Covered Under the Narmada Project, 2004

District	Taluka	Number of Villages Surveyed	Number of household	Population	HH Size
Ahmedabad	Barwala	18	6011	37560	6.2
	Dhandhuka	58	14895	84283	5.7
	Dholka	25	9053	47827	5.3
	Ranpur	20	6371	36098	5.7
Amreli	Amreli	48	15458	84855	5.5
	Babara	58	19534	116775	6.0
	Kukavav	41	16563	88111	5.3
	Lathi	43	15169	86196	5.7
	Liliya	31	9434	52620	5.6
	Rajula	15	4489	26294	5.9
Bhavnagar	Bhavnagar	34	10058	61333	6.1
	Botad	46	18215	104866	5.8
	Gadhada	60	22260	133325	6.0
	Ghogha	33	9183	56589	6.2
	Mahuva	11	4010	26347	6.6
	Sihor	20	7379	46314	6.3
	Talaja	9	4794	30721	6.4
	Umralla	19	6068	34389	5.7
	Vallabhipur	49	10137	57905	5.7
Jamnagar	Dhrol	11	3780	21457	5.7
	Jodia	26	9413	46736	5.0
Junagadh	Bhesan	3	1830	10859	5.9
	Junagadh	5	1625	7845	4.8
	Keshod	3	3756	18171	4.8
	Maliya	5	2396	15167	6.3
	Manavadar	17	5744	28604	5.0
	Mangrol	9	2838	17944	6.3
	Mendarda	5	2438	12499	5.1
	Vanthali	15	5041	26226	5.2
Kachchh	Anjar	6	2088	9204	4.4
	Bhachau	26	12416	57796	4.7
	Bhuj	83	22743	106671	4.7
	Gandhidham	2	441	2057	4.7
	Mandavi	17	6937	37889	5.5
	Mundra	3	605	2784	4.6
	Rapar	22	6407	34065	5.3
Rajkot	Gondal	37	19475	92052	4.7
	Jasdan	101	37047	218993	5.9
	Jetpur	18	10132	53403	5.3
	Maliya	15	4243	19776	4.7
	Morbi	26	10435	52118	5.0
	Padaghari	14	6468	29655	4.6
	Sangani Kotada	2	4923	20475	4.2
	Tankara	13	5423	32375	6.0

Annexure – 2.2
Non-Narmada Sources of Water Supply in Narmada Project Villages (%)

District	Taluka	Narmada Villages Reported	% of villages using following local sources					
			Juth pipeline	Well/ Bore/ and pump	Village Pond	Irrigation Well	Tanker	RRWHS
Ahmedabad	Barwala	18	12.5	59.0	28.0	0.0	0.0	27.8
	Dhandhuka	52	23	43.0	25.0	0.0	0.0	19.2
	Dholka	23	34.8	49.2	7.8	13.6	0.0	8.7
Amreli	Amreli	47	97.9	89.4	12.8	29.8	10.6	6.4
	Babra	52	9.6	82.7	5.8	5.8	0.0	13.5
	Bagasara	6	0.0	100.0	0.0	66.7	0.0	0.0
	Kukavav	42	100.0	97.6	38.1	71.4	2.4	50.0
	Lathi	40	97.5	97.5	2.5	62.5	12.5	22.5
	Liliyamota	32	100.0	93.8	46.9	68.8	3.1	65.6
	Rajula	14	0.0	64.3	0.0	14.3	14.3	42.9
Bhavnagar	Bhavnagar	32	3.1	15.6	46.9	3.1	12.5	56.3
	Botad	41	2.4	85.4	2.4	65.9	9.8	19.5
	Gadhada	41	0.0	100.0	2.4	90.2	46.3	70.7
	Ghogha	10	10.0	70.0	20.0	30.0	0.0	60.0
	Mahuva	5	60.0	20.0	0.0	80.0	0.0	0.0
	Sihor	19	26.3	52.6	47.4	10.5	10.5	57.9
	Talaja	6	0.0	66.7	0.0	16.7	0.0	0.0
	Umralla	19	78.9	100.0	5.3	5.3	5.3	89.5
	Vallabhipur	48	77.1	83.3	20.8	25.0	4.2	95.8
Jamnagar	Dhrol	6	100.0	100.0	0.0	83.3	66.7	0.0
	Jodiya	13	38.5	23.1	30.8	0.0	7.7	0.0
Junagadh	Bhesan	3	100.0	100.0	46	100.0	0.0	0.0
	Junagadh	5	80.0	100.0	80.0	80.0	0.0	0.0
	Keshod	2	100.0	100.0	38	100.0	0.0	0.0
	Manavadar	15	100.0	100.0	85	100.0	0.0	0.0
	Mangrol	7	28.6	42.9	14.3	28.6	14.3	0.0
	Mendarda	5	80.0	100.0	80.0	80.0	0.0	0.0
	Vanthali	14	100.0	100.0	41	100.0	0.0	0.0
Kachchh	Bhachau	36	52.8	16.7	27.8	0.0	2.8	25.0
	Bhuj	43	27.9	25.6	20.9	4.7	11.6	14.0
	Gandhidham	1	100.0	100.0	0.0	0.0	100.0	0.0
	Mandvi	15	26.7	46.7	13.3	13.3	0.0	0.0
	Rapar	18	83.3	33.3	66.7	22.2	27.8	22.2
Rajkot	Gondal	25	44.0	84.0	4.0	76.0	12.0	68.0
	Jasdan	75	13.3	70.7	2.7	21.3	14.7	1.3
	Jetpur	17	35.3	70.6	11.8	64.7	0.0	47.1
	KotdaSanga ni	1	100.0	100.0	0.0	100.0	100.0	100.0
	Maliya	43	9.3	58.1	55.8	4.7	0.0	11.6
	Morbi	39	12.8	66.7	33.3	0.0	0.0	7.7
	Padaghari	2	100.0	100.0	50.0	100.0	100.0	0.0
	Tankara	13	76.9	61.5	0.0	23.1	0.0	23.1

Annexure – 2.3
Quality of Water from Local Sources: Perception of People

DIST	Taluka	Surveyed Falias	Good Quality*	DIST	Taluka	Falias	Good Quality*
Ahmedabad	Barwala	105	94.3	Jamnagar	Dhrol	45	17.8
	Dhandhuka	329	94.8		Jodia	111	13.5
	Dholka	157	95.5		Total	156	14.7
	Ranpur	102	100		Keshod	3	33.3
Total		693	95.7	Manavadar		7	100
Amreli	Amreli	206	56.3	Total		10	80
	Babara	256	90.2	Kachchh	Anjar	32	100
	Kukavav	169	69.8		Bhachau	97	56.7
	Lathi	164	74.4		Bhuj	176	79
	Liliya	115	77.4		Gandhidham	7	100
	Rajula	69	59.4		Mandavi	63	68.3
Total		979	73.2		Mundra	14	100
Bhavnagar	Bhavnagar	111	100	Rapar		83	97.6
	Botad	176	84.7	Total		472	78.6
	Gadhada	214	88.3	Rajkot	Gondal	150	88.7
	Ghogha	153	81.7		Jasdan	279	100
	Mahuva	20	0		Jetpur	75	74.7
	Sihor	72	94.4		Kotda Sanga	11	72.7
	Talaja	46	34.8		Maliya	37	70.3
	Umrالا	66	100		Morbi	102	99
	Vallabhipur	200	95.5		Padaghari	67	1.5
Total		1058	86.5		Rajkot	4	100
					Tankara	62	61.3
				Total		787	82.1

Note: * = % of falias with opinion that the quality of local water sources is good

Annexure – 2.4

Problems Related to drinking Water in Narmada Project Villages

District	Taluka	Villages surveyed	% of villages ranked the following problem as the most critical problem (ie, Rank 1)								
			P1	P2	P3	P4	P5	P6	P7	P8	P9
Ahmedabad	Barwala	18	0	83.3	0	11.1	0	5.6	0	5.6	16.7
	Dhandhuka	58	1.7	72.4	0	1.7	0	1.7	0	3.4	20.7
	Dholka	25	0	4	0	4	0	0	48	0	60
	Ranpur	20	40	45	5	10	15	15	70	50	65
Amreli	Amreli	48	10.4	58.3	4.2	6.3	0	0	16.7	0	4.2
	Babara	58	34.5	63.8	12.1	20.7	3.4	0	5.2	50	63.8
	Kukavav	41	46.3	48.8	0	2.4	2.4	0	0	2.4	0
	Lathi	43	30.2	39.5	11.6	14	4.7	4.7	2.3	20.9	14
	Liliya	31	12.9	54.8	77.4	67.7	6.5	0	6.5	51.6	51.6
	Rajula	15	6.7	6.7	6.7	13.3	0	6.7	0	0	0
Bhavnagar	Bhavnagar	34	0	11.8	0	2.9	0	29.4	8.8	8.8	14.7
	Botad	46	21.7	28.3	0	0	2.2	0	30.4	0	6.5
	Gadhada	60	13.3	15	0	0	5	36.7	68.3	6.7	0
	Ghogha	33	21.2	21.2	9.1	12.1	9.1	9.1	6.1	3	9.1
	Mahuva	11	36.4	36.4	27.3	18.2	0	36.4	18.2	27.3	0
	Sihor	20	25	25	0	10	20	0	15	10	15
	Talaja	9	22.2	66.7	0	0	0	0	0	22.2	0
	Umralla	19	57.9	36.8	0	0	0	0	5.3	10.5	0
	Vallabhipur	49	53.1	20.4	8.2	0	0	2	10.2	4.1	6.1
Jamnagar	Dhrol	11	27.3	27.3	45.5	0	0	0	0	0	0
	Jodia	26	38.5	15.4	30.8	3.8	0	3.8	3.8	3.8	3.8
Junagadh	Bhesan	3	0	0	0	0	0	100	66.7	0	100
	Junagadh	5	0	0	0	0	0	100	80	20	80
	Keshod	3	0	100	0	0	0	100	100	0	100
	Maliya	5	0	40	0	0	0	100	100	20	100
	Manavadar	17	5.9	76.5	0	0	0	100	94.1	0	82.4
	Mangrol	9	0	22.2	0	0	0	100	100	0	88.9
	Mendarda	5	0	80	0	0	0	80	80	0	80
	Vanthali	15	6.7	60	0	0	6.7	66.7	100	0	100
Kachchh	Anjar	6	16.7	16.7	0	0	0	0	0	0	33.3
	Bhachau	26	3.8	7.7	3.8	0	15.4	11.5	30.8	7.7	15.4
	Bhuj	83	30.1	39.8	9.6	8.4	10.8	7.2	10.8	4.8	13.3
	Gandhidham	2	0	50	0	50	0	0	0	0	0
	Mandavi	17	17.6	29.4	17.6	17.6	11.8	17.6	5.9	5.9	11.8
	Mundra	3	0	66.7	33.3	0	0	0	0	0	0
	Rapar	22	4.5	22.7	4.5	4.5	36.4	36.4	63.6	27.3	40.9
Rajkot	Gondal	37	32.4	40.5	0	0	0	0	2.7	10.8	8.1
	Jasdan	101	5.9	74.3	2	0	0	1	0	4	14.9
	Jetpur	18	16.7	55.6	0	0	0	0	11.1	11.1	16.7
	Maliya	15	6.7	60	6.7	0	13.3	20	46.7	13.3	26.7
	Morbi	26	11.5	57.7	7.7	3.8	0	3.8	0	7.7	7.7
	Padaghari	14	21.4	21.4	42.9	0	0	0	0	7.1	7.1
	Sangani Kotada	2	50	0	0	0	0	0	0	50	0
	Tankara	13	30.8	15.4	0	0	0	15.4	0	30.8	7.7

Annexure – 2.5
Status of Local Sources of Drinking Water Supply in Narmada Project Villages

Dist	Taluka	Percentage of local sources in working condition						RRWHS
		Pond	Well	Bore well	Hand pump	Irrigation well	Tube well	
Ahmedabad	Barvala	100.0	100.0	100.0	100.0	100.0	0.00	100.0
	Dhandhuka	74.3	67.5	100.0	97.2	70.7	0.00	98.5
	Ranpur	9.1	17.2	100.0	51.1	67.9	0.00	0.0
Amreli	Amreli	48.1	79.4	78.3	60.3	100.0	0.00	0.00
	Babra	55.0	56.5	87.8	65.3	100.0	0.00	0.00
	Bagasara	40.0	69.2	45.5	44.4	0.0	0.00	0.00
	Kukavav	6.7	42.1	36.2	57.5	57.1	0.00	0.00
	Lathi	0.0	20.0	0.0	23.1	100.0	0.00	0.00
	LiLiya	0.0	25.0	0.00	23.1	0.00	0.00	0.00
	Rajula	33.3	45.6		62.5	0.0	0.00	100.0
Bhavnagar	Bhavnagar	79.6	38.5	42.9	40.0	20.0	0.0	99.2
	Botad	34.0	69.6	76.3	62.7	91.1	87.6	100.0
	Gadhada	76.9	85.3	79.4	64.9	91.6	0.00	100.0
	Ghogha	58.8	77.8	61.5	69.6	100.0	0.0	100.0
	Mahuva	100.0	0.0	100.0	33.3	88.4	0	0.00
	Shihor	68.2	50.0	71.4	75.0	82.4	0.00	69.7
	Umralla	70.8	77.8	79.1	72.0	61.1	0.00	83.9
	Vallabhipur	71.3	64.2	59.1	50.9	54.5	49.2	83.7
Junagadh	Bhesan	0.0	0.00	0.00	66.7	100.0	0.00	0.00
	Junagadh	0.0	100.0	100.0	54.5	100.0	0	0.00
	Keshod	0.0	0.00	0.00	52.0	100.0	0.00	0.00
	Manavdar	0.0	100.0	75.0	46.6	82.6	0.00	0.00
	Vanthali	6.7	66.7	0.00	45.3	60.0	0.00	0.00
Kachchh	Bhachau	79.2	82.8	79.2	0.00	100.0	0	92.3
	Bhuj	27.7	22.8	69.2	0.00	16.7	0	75.0
	Gandhidham	0.0	0.0	0.00	0.0	0.00	0.00	0.00
	Mandavi	41.7	60.0	47.8	0.00	0.00	0.00	0.00
	Mundra	0.0	0.0	0.00	100.0	40.0	0.00	0.00
	Rapar	88.6	87.8	50.0	33.3	100.0	0.00	100.0
Rajkot	Gondal	100.0	63.6	68.6	53.6	100.0	0	0.00
	Jasdan	88.0	65.1	57.8	53.3	71.4	0	13.8
	Morbi	48.3	38.5	85.7	45.0	81.8	0	97.9
	Padadhari	50.0	0.0	0.0	66.7	100.0	0.00	0.00
	Tankara	28.6	20.0	0.0	59.7	81.0	0.0	70.6

Annexure – 2.6
Can Local Water Sources Meet the Demand for Drinking Water?

DISTRICT	TALUKA	Narmada villages	If the local sources are developed, will it cater to the need of your village?		If the local sources are developed, will it cater to the need of your village?	
			No	Yes	% No	% Yes
Ahmedabad	Barvala	15	1	14	6.7	93.3
	Dhandhuka	44		44	0.0	100.0
	Ranpur	10	2	8	20.0	80.0
Amreli	Amreli	27	4	23	14.8	85.2
	Babra	20	7	13	35.0	65.0
	Bagasara	7		7	0.0	100.0
	Kukavav	29	12	17	41.4	58.6
	Lathi	3	3		100.0	0.0
	LiLiya	4	3	1	75.0	25.0
	Rajula	11	5	6	45.5	54.5
Bhavnagar	Bhavnagar	36	7	29	19.4	80.6
	Botad	35	26	9	74.3	25.7
	Gadhada	43	10	33	23.3	76.7
	Ghogha	10	5	5	50.0	50.0
	Mahuva	2		2	0.0	100.0
	Shihor	10	1	9	10.0	90.0
	Umralla	17		17	0.0	100.0
	Vallabhipur	45	1	44	2.2	97.8
Junagadh	Bhesan	2		2	0.0	100.0
	Junagadh	4	1	3	25.0	75.0
	Keshod	3		3	0.0	100.0
	Manavdar	20	3	17	15.0	85.0
	Vanthali	15	3	12	20.0	80.0
Kachchh	Bhachau	19	1	18	5.3	94.7
	Bhuj	39	15	24	38.5	61.5
	Gandhidham	1		1	0.0	100.0
	Mandavi	14	4	10	28.6	71.4
	Mundra	2		2	0.0	100.0
	Rapar	21	3	18	14.3	85.7
Rajkot	Gondal	3	1	2	33.3	66.7
	Jasdan	68	28	40	41.2	58.8
	Morbi	18	8	10	44.4	55.6
	Padadhari	1	1		100.0	0.0
	Tankara	8	3	5	37.5	62.5

Status of Narmada Water Supply

Reach of Narmada Water

The Narmada Pipeline Project was expected to cover all districts of Saurashtra and Kachchh, and parts of Ahmedabad, Mehsana, Banaskantha, Sabarkantha and Panchmahal by the end of 2006. However, the speed of the project implementation seems to be slow, as a result by the end of 2005 it has covered (Officially) only 2044 villages, as against the target of 9633 villages (as per revised master plan) from 5 districts of Saurashtra (Amreli, Bhavnagar, Jamnagar, Junagadh, and Rajkot) and parts of Ahmedabad and Kachchh. Official coverage in 2004 and 2005 is given in the table below.

Table 3.1
Coverage of Villages under Narmada Project in 2005

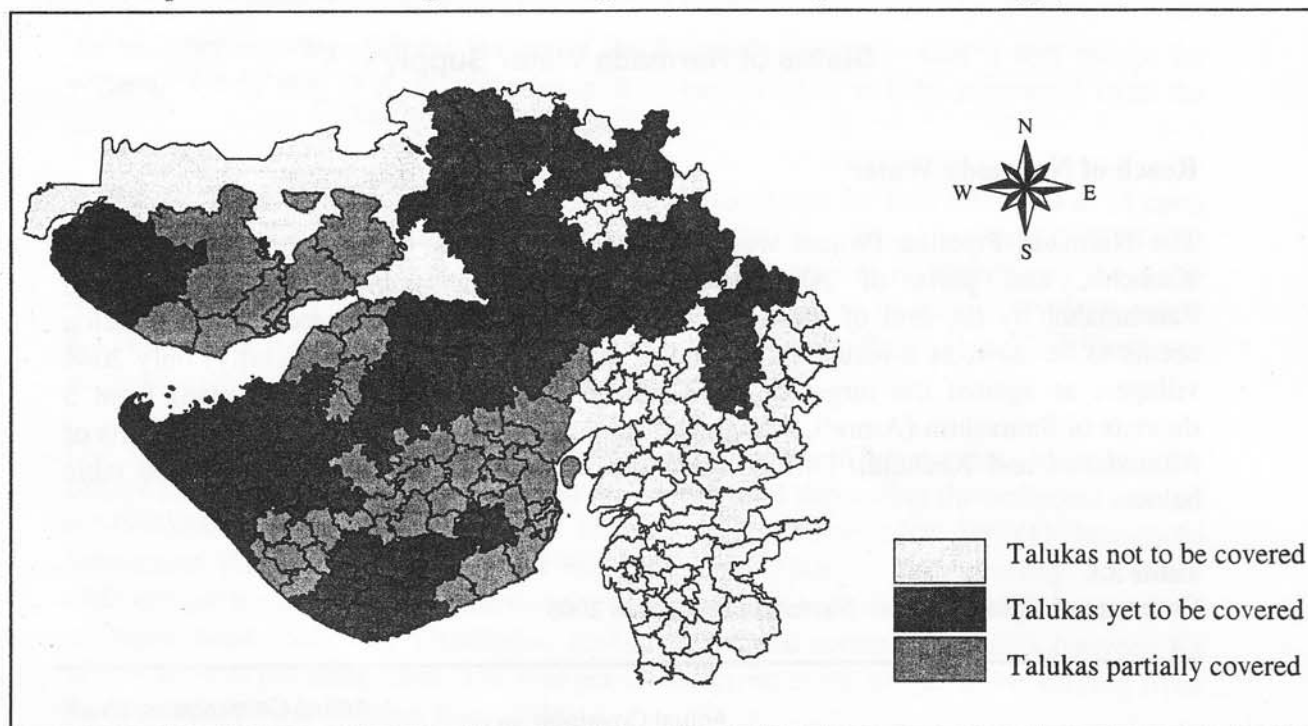
Districts	Revised Master Plan Coverage (No of villages)	Actual Coverage as on April 2004*		Actual Coverage as on December 2005**	
		No. of Villages	% of Villages	No. of Villages	% of Villages
Ahmedabad	170	121	71.2	170	100.0
Amreli	613	236	38.5	351	57.3
Bhavnagar	795	281	35.3	509	64.0
Jamnagar	751	37	4.9	100	13.3
Junagadh	1035	62	6.0	251	24.3
Kachchh	645	159	24.7	401	62.2
Rajkot	856	226	26.4	262	30.6
Total	4865	1122	23.1	2044	42.0

Source: *GWSSB, 2004

** GWSSB, 2005

When the listed villages (as on April 2004) were visited under this study, it was found that not all the villages covered officially are actually getting Narmada water. In first round survey of the study, which was conducted during May – July 2004, about 72 percent of the listed villages received Narmada water and at the end of about one year in i.e. during February – April 2005, an additional 10 percent were added in the actual coverage. The following table presents the district wise comparative actual coverage of Narmada water in terms of percentage of villages, which received Narmada Water at least once during the period.

Map 3.1 Actual and Proposed Coverage of Narmada Pipeline Water Supply Project



Source: Based on data from GWSSB

Table 3.2
Percentage of surveyed villages that received Narmada water at least once

Districts	Percentage of surveyed villages that received Narmada water at least once	
	May – July 2004	February – April 2005
Ahmedabad	74.4	86.5
Amreli	82.6	90.7
Bhavnagar	78.6	85
Jamnagar	27.5	53.8
Junagadh	91.5	32.8
Rajkot	61.6	81.4
Total	72.3	82

Source: Primary Survey 2004-05

One can see large variations in the actual coverage across the districts in both the rounds. During first round of survey Jamnagar had the lowest coverage (27.6 percent), which increased to 53.8 percent in the last round, while in the case of Junagadh district where actual coverage was highest (91.5 percent) during first round, became the lowest (32.8) in the last round. In the case of Jamnagar, the increase was due to the fact that the covered villages received water during the period between the first and the fourth round, while in the case of Junagadh, there was a big jump in the coverage during the period (because the pipelines were laid down), but water has not yet started. In the case of Kachchh, there is a marginal change in actual coverage from 63 percent in the second round to 62 percent in the last round.

The taluka wise breakup of the actual coverage during May – April 2005 shows that only in four talukas namely Mahua, Umralla and Ballavipur (Bhavnagar district) and Barwala (Ahmedabad district) all the covered villages received water. On the other hand in Maliya and Mangrol talukas of Junagadh district and Paddhari taluka of Rajkot district none of the listed villages received Narmada water during the period.

Regularity of Water Supply

According to the guidelines, a village, covered under the Narmada project, is expected to receive Narmada water *every day*, the quantum of water supply should be 70 lpcd and the hours of water supply should be regular and enough to ensure 70 lpcd water supply to all. Let us examine whether these norms are followed in practice.

In order to examine the regularity of Narmada Water Supply, a question was asked regarding the number of days the villages received Narmada water during the past three months. Table 3.3 presents data on regularity of water supply in last three months for the first and the last rounds. The percentage of village receiving daily water supply during the last three months is very small, 3.1 in the last round! One observes a decline in this percentage from 11.4 in the first round to 3.1 in the last round! This perhaps indicated increased leakages and breakages during the period. It is interesting to note that this percentage is much higher (20 percent) in Kachchh than in the rest of the districts. Jamnagar district, one of the most problematic districts, has no village that received daily supply of Narmada water during the last three months!

Less than 40 percent villages in both the rounds received water for 30 to 59 days, while 21 to 23 percent villages received water for less than 30 days in the last three months! About 30 to 34 percent villages received water for 60 to 89 days. In short, water supply was fairly irregular!

Table 3.3
Regularity in Water Supply During the Last Three Months (1st and 4th Rounds)

Districts	% of villages that received Narmada water During the Last Three Months (in Days)							
	May to July 2004				February – April 2005			
	1 to 29	30 to 59	60 to 89	90	1 to 29	30 to 59	60 to 89	90
Ahmedabad	15.9	21.4	51.4	11.4	9.4	40.6	45.8	4.2
Amreli	34.6	49.6	9.6	6.3	44.4	49.8	5.3	0.4
Bhavnagar	19.5	21.3	43	16.3	14.7	23.1	57.6	4.6
Jamnagar	0	64.3	35.7	0	0	14.3	85.7	0
Junagadh	4.7	46.5	25.6	23.3	0	55	35	10
Rajkot	18.4	54.1	19.6	8.1	17.7	48.1	31	3.2
Kachchh*	39.9	16.6	36.4	7.1	20	38.1	21.9	20
Total	21.3	38.4	29	11.4	23.1	39.5	34.3	3.1

Source: Primary Survey 2004-05

Taluka level analysis throws more light on this regularity / irregularity of water supply. It shows that 23 talukas (more than 60 percent talukas) have a single village that received daily water supply. (Appendix 1) Only in two talukas of Kachchh (Anjar and Gandhidham) water was available to all the villages (8 villages) everyday. One does not see any significant difference across the districts, except that talukas in Bhavnagar and Ahmedabad districts seem to be better placed as compared to others, as they have more talukas and villages receiving Narmada water for 60 to 90 days.

Table 3.4 presents some more information about the regularity/irregularity of Narmada water supply during the last month. The last round data indicate that during the month of April 2005, only 5 percent villages (6 villages in Bhuj and Gandhidham villages) received Narmada water daily, and 32 per cent villages have received it for more than 20 days. About 60 percent villages have received it for less than 20 days, of which one-third villages have received it for even less than 10 days. Many villages from Amreli, Bagasara, Kukavav, Lathi and Liliya talukas from Amreli received water for less than 10 days during the period. Situation is almost same in Mandavi taluka of Kachchh, Gondal taluka of Rajkot and Botad taluka of Bhavnagar. Highest number of villages receiving water on daily basis was from Kachchh (22 percent).

Table 3.4
Regularity in Water Supply During the Last Month, April, 2005

District	Percentage of villages got water for following number of days during April 2005				
	1 to 9	10 to 19	20 to 29	30	0
Ahmedabad	8.3	42.7	37.5	11.5	0
Amreli	50.2	43.6	4.9	0.9	0.4
Bhavnagar	13.9	21.8	56.7	7.1	0.4
Jamnagar	0	28.6	71.4	0	0
Junagarh	0	65	25	10	0
Kachchh	13.3	32.4	26.7	21.9	5.7
Rajkot	9.5	46.8	31	3.8	8.9
Total	22.7	37.6	32.4	5.1	2.2

Source: Primary Survey 2004-05

It may be argued that this irregularity is due to the fact that alternative sources of water are available during the days when Narmada water is not made available. However, this argument does not hold good when we see that Narmada water is given in a highly irregular manner (Table 3.5)

In the last three months, half the villages (51.2 percent) received water on alternative days. About 13.5 percent villages received it twice a week and 7.5 percent received it once in a week. About 2.3 percent villages received it once in 15 days while 5 percent villages receive it in a highly irregular manner. The data on regularity of water supply in all the four rounds indicate that about half of the villages received water on alternate day basis, whenever, they received water. During the last round of monitoring about sixty percent villages from Kachchh and 90 percent villages in Junagadh received water in the same manner, and about 5 percent villages were supplied water in a highly irregular manner.

The taluka level analysis provides some more details. All the talukas in Amreli district, Sihor taluka of Bhavnagar and almost all talukas of Junagadh district receive Narmada water on alternate days. Significant number of villages from Kukavav taluka (Amreli), Mandvi taluka (Kachchh) and Gondal and Jasdan talukas (Rajkot) receive irregular and intermittent supply.

Table 3.5
Days of Narmada Water Supply

District	% of villages with following regularity of Narmada water supply					
	Not Reported	Alternate day	Twice a week	Once in a week	Once in 15 days	Highly Irregular
Ahmedabad	34.4	46.9	9.4	5.2	0	4.2
Amreli	2.7	55.2	25.1	8.1	0.4	8.5
Bhavnagar	36.3	40.6	7.3	9.8	4.3	1.7
Jamnagar	0	100	0	0	0	0
Junagarh	10.5	89.5	0	0	0	0
Rajkot	15.8	57.2	11.2	5.9	3.9	5.9
Kachchh	13.6	59.1	14.8	5.7	6.8	0.0
Total	20.5	51.2	13.5	7.5	2.3	4.9

Source: Primary Survey 2004-05

According to the set rules under the project, when the water is released, every village is expected to receive water every day. This rule is clearly not fulfilled. Our discussion with the concerned officials revealed that it is possible some times that the GWSSB provides water to on alternate days, when a village has a large storing capacity in its tanks or sump. For example, if the demand in the village is 30,000 litres a day and the tanka has the capacity of storing 60,000 litres, they may decide to provide water on alternative days. However, in such cases households *are* expected to receive water every day. But the above data, which refer to households, clearly show that it is the households that receive water on alternate days!

Timing and Duration of Water Supply

How many hours does a village get water supply under the Narmada Project? The norms are clear on this: Each village is expected to get water at the rate of 70 liters per person per day (lpcd). Of these 15 lpcd is for cattle and 55 lpcd is for people. Water released in a village is therefore determined by the size of the population of the village. The number of persons to be covered is multiplied by 70 lpcd to determine the quantity of water to be supplied to the village. This water is released through Main Head Works. For example, if there are 15 villages to be covered under a Main Head Works, the total population of these villages is multiplied by 70 lpcd to determine the total supply of water to be provided through the Main Head Works. Once this supply is provided, the norms are said to be fulfilled.

The hours of water supply depends on the force/pressure of water supply. If the pressure is low, it may take more time to deliver the fixed quota and vice versa. The decision about hours of water supply is usually taken locally (by Panchayat or Pani Samiti) or by GWSSB. Where local organizations do not exist or do not manage water supply, the water is supplied for the period (hours) that is required to meet the norm of 70 lpcd for the village population.

The number of villages getting water once in a day has increased during the four rounds from 90 percent to 96 percent. This implies that even those villages, which receive water on, alternate days, twice in a week or once in a week receive water only once a day when they receive the water. There are very few villages, which received water for more than once a day. Surprisingly, in Dholaka taluka of Ahmedabad about 12 percent of the villages received water for 24 hours a day, may be due to their proximity of the pumping station.

Table 3.6
Frequency of Supply During a Day

Districts	% of Villages getting Narmada water in number of times per day							
	May – July 2004				February – April 2005			
	1	2	3	24 hours	1	2	3	24 hours
Ahmedabad	92.2	5.5	2.3	0	82.3	4.2	1	12.5
Amreli	86.3	10.2	3.6	0.0	99.6	0.4	0	0
Bhavnagar	90.8	8.5	0.8	0.0	95.7	4.3	0	0
Jamnagar	100.0	0.0	0.0	0.0	100	0	0	0
Junagarh	100.0	0.0	0.0	0.0	100	0	0	0
Rajkot	90.9	6.6	2.4	0.0	99.3	0	0.7	0
Kachchh*	81.9	14.5	3.6	0	73.1	24.7	0.0	2.2
Total	90.6	7.4	2	0.0	96	2	0.3	1.6

Source: Primary Survey 2004-05

* Note: First Round Monitoring data of Kachchh is for August – October 2004

As far as duration of water supply is concerned, only 30 percent of villages were observed to receive water for more than 2 hours a day during the first round. During the last round in February-April 2005, this percent increased to 65 percent. This rate is as high as 80 percent in Amreli and 85 percent in Kachchh. This is a positive development. However, there are talukas, where considerable number of villages receive water for less than 1 hour a day like in case of Dhandhuka taluka of Ahmedabad (18 percent villages), Botad taluka of Bhavnagar (14 percent villages) and Gondal taluka of Rajkot (60 percent villages).

It is not easy to make any judgment about the adequacy of water supply based on the timings, as there are no meters to estimate the quantity of water received by a village. However, based on the normal pressure of water in the pipelines, it has been estimated that for a village of 500 persons, water should be released for more than two hours to meet the needs of the village for a day. If water is not supplied everyday, the time of water supply need to be much longer. Again the availability of storage tank in this context, at the village level or at the household level is very critical. Considering all these factors, it seems that most villages are not getting adequate supply of water.

Table 3.7
Duration of Water Supply Per Day (when Water is Released)

District	% of villages getting water per day (Hours)ly				
	<0.5 Hr.	0.5 to 1 Hrs.	1 to 2 Hrs.	2 to 3 Hrs.	> 3 Hrs.
Ahmedabad	1	8.3	20.8	47.9	21.9
Amreli	0.4	0	13.9	73.5	12.1
Bhavnagar	3	0.4	51.7	43.6	1.3
Jamnagar	0	0	0	85.7	14.3
Junagarh	0	0	84.2	15.8	0
Rajkot	2	7.2	26.3	54.6	9.9
Kachchh	1.2	0.0	16.7	64.3	17.9
Total	1.6	2.7	31.2	55.3	9.2

Source: Primary Survey 2004-05

Adequacy of Water Supply

Since it is difficult to come to any conclusion about the adequacy of water supply, a question was asked to falias whether they considered the available water supply adequate. On an average, about 45 percent of falias reported that water supply was not adequate. The concept of adequacy is, however, subjective and it is related to expectation also.

Table 3.8
Perception About Adequacy of Narmada Water Supply

Districts	Percentage of falias with there opinion that water supply is adequate			
	May-July, 2005	August-October, 2005	November 04 – January 05	February 2005 – April 2005
Ahmedabad	46.7	40.2	48.7	44.1
Amreli	54.7	49.9	52.9	49.3
Bhavnagar	64.6	63.1	61.1	58.9
Jamnagar	44.2	60	60.4	90
Junagadh	67.6	76.9	92.6	100
Rajkot	50.9	51.6	58	50.9
Kachchh	NA	63.1	59.1	70.9
Total*	56.1	54.3	56.7	53.5

Source: Primary Survey 2004-05

The opinions on the adequacy show large variations, which are not strictly related to the regularity of water supply. In Ahmedabad District, almost 100 percent villages reported that water supply was adequate, whereas in Barvala taluka only 22 percent villages reported adequate supply during February – April 2005. Similarly in Amreli district, the percentage varies from 14.6 percent in Kukavav to 85 percent in Liliya. Again in Bhavnagar district it varies from 12.9 percent in Talaja to about 84 percent in Mahua taluka. Our field investigators too reported that a major complaint emerging from the villages was regarding the inadequacy of water supply.

Distribution of Narmada Water

Distribution of water within a village is the next crucial issue after availability. It is important that all families and households have an equal access to Narmada water.

Broadly, there are three ways in which Narmada water is distributed within a village: Through individual connections, through common stand posts and through a common sump (i.e. only one common place for collecting water).

Our investigation shows that number of households having individual connection for Narmada water was 61 percent in the first round of monitoring, which increased up to 67 percent in the last round of monitoring. There is also an increase in the number of households using common stand posts and common sumps, respectively from 35 percent to 52.5 percent, and 11 percent to 32 percent. The dependency on common stand posts and common sumps has increased considerably in Amreli and Jamnagar districts. This is perhaps because of declining dependability of individual connections, which perhaps provides less quantity of supply through the individual connections. It was observed in number of villages, including in case studies, that households having individual connections frequently do not receive adequate water supply, mainly in high lying areas due to less pressure of water in pipelines. Some time some well to do households were found using pumps, of course illegally, to pull water resulting in no or poor supply to the neighborhoods.

Table 3.9
Distribution of Narmada Water Within Villages

Districts	Percentage of HH getting Narmada water from							
	May to July 2004				February – April 2005			
	Individual Connection	Common Stand Post	Common Sump	NA	Individual Connection	Common Stand Post	Common Sump	NA
Ahmedabad	38.5	21.3	37.6	9	37.2	11.5	32.7	22
Amreli	55.7	22.4	14.9	15	83.2	80	74.8	3
Bhavnagar	58.7	35.3	8.1	14	62.1	42.4	12.6	2.1
Jamnagar	62.8	35.8	3.4	7	64.6	70.8	0	3
Junagadh	56.5	19.8	5.4	21	71.8	4.3	0	25
Rajkot	75	52.4	5.7	3	68.4	55.7	3.5	1.2
Total	61.3	35.6	11.3	13	67.3	52.5	32.1	6.8

Source: Primary Survey 2004-05

It is observed that families where lower castes live, do not have household connections, as many of them are poor and cannot afford to pay for individual connections. As a result many of them depend on stand posts or common sump or common outlets.

Table 3.10
Caste wise Sources of Narmada Water

Caste Composition	% of HH getting Narmada water from common stand post or Tanka		
	August-October, 2004	November 04 - January 05	February 05 - April 05
General	43.4	46.8	31.9
SC	48.8	58.3	55.3
ST	71.3	66.6	56.4
OBC	48.3	42.7	39.7

Source: Primary Survey 2004-05

It needs to be noted that the poorer areas of lower castes have frequently inadequate number stand posts and taps, and many times these are not maintained well. This is reflected in the distance the people travel to fetch water. The norms regarding distance to water are that (1) nobody should walk for more than 150 m. to collect water and (2) there should be one water tap per 100 persons. These norms, however, are not observed in many of the villages.

The table below presents data on the distance people travel to collect Narmada water. The table suggests that there are villages where households have to travel more than 500 meters for Narmada water, and the number of such households has increased during this period, from 1.3 percent to 3 percent. This increase is particularly significant in Ahmedabad and Amreli districts. In Bhavnagar also there is an increase in this percentage. In the Kachchh, however, there is a significant decline in this percentage. Again, the percentage of households getting water within 100 meters has declined from 72.8 percent in the first round to 66 percent in the last round. This decline is particularly high in Ahmedabad, from 86 percent to 39 percent during the period. However, the situation seems to have improved for Kachchh, Jamnagar and Junagadh districts, where the percentage has improved.

Table 3.11
Distance People Travel to Fetch Narmada Water

Districts	% of HH traveling following distance to get Narmada water							
	May – July 2004				February – April 2005			
	<=100 M	101-200 M	201-500 M	> 500	<=100 M	101-200 M	201-500 M	> 500
Ahmedabad	86.2	7.5	6.3	0	39.2	41.9	14.9	4.1
Amreli	88.5	5.2	4.8	1.5	65.6	9.9	18.9	5.6
Bhavnagar	71.1	19	9	0.8	71.7	15.9	11.2	1.2
Jamnagar	92.3	6.2	1.5	0	100	0	0	0
Junagarh	55.2	37.4	7.4	0	100	0	0	0
Rajkot	70.5	17.7	10.5	1.3	55.6	24.4	19.8	0.3
Kachchh*	47.4	16.3	28.7	7.6	73.7	12.8	11.2	2.3
Total	72.7	15.8	9.9	1.6	66	15.4	15.6	3

Source: Primary Survey 2004-05

*Note: First Round Monitoring data of Kachchh is for August – October 2004

In order to assess the observance of the norms at the household level, we have analyzed the data to find out how many households travel longer distance than what has been considered as norms, i.e. 100 meters. Data shows that about 73 percent of households using Narmada water is having access to water within 150 meters of distance, which is definitely a considerable number and a positive sign. However taluka level distribution of accessibility to Narmada water in the surveyed villages is highly fluctuating, As in case of Dhanduka Taluka of Ahmedabad only 17.6 percent villages received water within the standardized distance of 150 metres. Same is the case with Liliya taluka of Amreli and Mundra taluka of Kachchh. There are a lot of villages where more than 50 percent households have to walk more than 150 metres for Narmada water

It needs to be added that there is some improvement in the observance of the norms between the first and the last rounds.

Table 3.12
Distance Households Travel to Fetch Narmada Water

District	Responded Falias	Households traveling following distance to get Narmada water			
		Number of Household		Percentage of Household	
		<=150	>150	<=150	>150
Ahmedabad	73	47	26	64.4	35.6
Amreli	903	629	274	69.7	30.3
Bhavnagar	921	769	152	83.5	16.5
Jamnagar	43	43		100.0	0.0
Junagadh	4	4		100.0	0.0
Rajkot	375	248	127	66.1	33.9
Kachchh	266	154	112	57.9	42.1
Total	2319	1740	579	75.0	25.0

Source: Primary Survey 2004-05

Our investigation revealed that there are several reasons why people travel long distance to get Narmada water. Firstly, when the water is released into only one source, i.e. a sump or a storage tank by GWSSB, some of the households have to travel long distances to fetch the water. Secondly, when there are no stand posts set up in the different parts of the village either because (a) there is no Pani Samiti or Panchayat to do this, or (b) the local committees are not active enough to undertake this task, or (c) the GWSSB in the past has not put up such stand posts in different falias, some households have to travel long distances. Again, when there are breakages or leakages in the Narmada pipelines, (which is fairly frequent), which prevents water from reaching villages, people are forced to travel long distances to collect water. Some times the breakages are also. Pipelines also break when there are technical problems, for example, problems related to operation and maintenance of pipelines, such as lack of pressure, failure of pumping stations or of main head works, electricity failure etc., people have to go to distance sources to collect water. Since linemen frequently fail to repair the lines in time, people have no choice but to travel long distance for water.

In short, these are the failures of long distance pipeline systems that have been observed by a large number of studies in the State (Hirway and Patel 1994, Hirway and Lodhia 2004, Haskoning 1999, Sharma and Soni 2003, Danida 1996, Mahajan and Bharwada 1997, CAG 2001).

Summing up

To sum up, Narmada Pipeline Project *is* progressing in the state but at a slow pace. In April 2004, when we started our monitoring, the project had covered about 1224 villages as against the target of 8215 villages. As per the target of the project for Saurashtra is concerned, the project was expected to cover the entire Saurashtra by December 2004. However, Saurashtra is still not covered under the project (March 2006). Also, many of the “officially covered villages” have not yet received the water.

Water supply under the project is not always regular or dependable. One major finding of the monitoring in almost all villages is that the Narmada water supply is irregular and not dependable in terms of (1) frequency/periodicity of supply (2) timings of supply and (3) adequacy of water supply. There are problems regarding the working of the project between the villages as well as within the village.

The norms of water supply, i.e. one water tap per 100 persons and the access to water within the distance of 150 m are not observed in many villages for significant numbers of households. There are quite a few reasons for people to travel long distance to get water.

The survey has also thrown light on some of the built-in weaknesses of a long distance pipeline project. These weaknesses stem from the project concept and design on the one hand and the socio-cultural and administrative culture in the state on the other hand. It appears that it is difficult to prevent breakages and theft of water supply in a long distance pipeline project particularly in water-starved regions. No amount of policing is going to help on long distance pipelines.

Poor maintenance of long distance pipeline also is an issue for technical and administrative capabilities in the state. Maintaining the right pressure and right flow of water supply through out 2700 km of pipeline requires a very high level of technical competence and management. Irregular electricity supply also is a cause of irregular water supply.

Annexure 3.1
Taluka Level Actual Coverage of Narmada Water Supply

District	Taluka	Villages Surveyed	No. of villages received water at least once	% of villages received water at least once
Ahmedabad	Barwala	19	19	100
	Dhandhuka	56	50	89.3
	Dholka	15	13	86.7
	Ranpur	21	14	66.7
Amreli	Amreli	49	42	85.7
	Babra	55	49	89.1
	Bagasara	12	6	50.0
	Kukavav	42	41	97.6
	Lathi	46	45	97.8
	Liliyamota	29	28	96.6
	Rajula	15	14	93.3
Bhavnagar	Bhavnagar	35	33	94.3
	Botad	47	44	93.6
	Gadhada	58	46	79.3
	Ghogha	33	13	39.4
	Mahuva	10	10	100.0
	Shihor	20	18	90.0
	Talaji	9	6	66.7
	Umralla	19	19	100.0
Vallabhipur	49	49	100.0	
Jamnagar	Jodiya	13	7	53.8
Junagadh	Bhesan	2	1	50.0
	Junagadh	6	3	50.0
	Keshod	3	1	33.3
	Maliya	5		0.0
	Manavadar	16	5	31.3
	Mangrol	9		0.0
	Mendarda	5	3	60.0
	Vanthali	15	7	46.7
Rajkot	Gondal	7	5	71.4
	Jasdan	104	80	76.9
	Maliya	29	28	96.6
	Morbi	41	35	85.4
	Padaghari	1		0.0
	Tankara	12	10	83.3
Kachchh	Anjar	6	4	66.7
	Bhachau	36	26	72.2
	Bhuj	86	44	51.2
	Gandhidham	2	2	100.0
	Mandavi	17	13	76.5
	Mundra	3	2	66.7
	Rapar	17	14	82.4

Annexure 3.2

Taluka level record of Regularity of water supply during last round of monitoring

District	Taluka	Villages Surveyed	% of villages got water for following Number of days during last round			
			1 to 29	30 to 59	60 to 89	90
Ahmedabad	Barwala	19	0	63.2	36.8	0.0
	Dhandhuka	50	14	30.0	52.0	4.0
	Dholka	13	0	0.0	84.6	15.4
	Ranpur	14	14.3	85.7	0.0	0.0
	Total	96	9.4	40.6	45.8	4.2
Amreli	Amreli	42	57.1	42.9	0.0	0.0
	Babra	49	4.1	93.9	0.0	2.0
	Bagasara	6	50.0	33.3	16.7	0.0
	Kukavav	41	87.8	12.2	0.0	0.0
	Lathi	45	51.1	48.9	0.0	0.0
	Liliyamota	28	39.3	60.7	0.0	0.0
	Rajula	14	7.1	14.3	78.6	0.0
	Total	225	44.4	49.8	5.3	0.4
Bhavnagar	Bhavnagar	33	3.0	21.2	60.6	15.2
	Botad	44	61.4	13.6	22.7	2.3
	Gadhada	46	10.9	34.8	54.3	0.0
	Ghogha	13	0.0	23.1	76.9	0.0
	Mahuva	10	0.0	0.0	100.0	0.0
	Shihor	18	0.0	100.0	0.0	0.0
	Talaji	6	16.7	33.3	50.0	0.0
	Umralla	19	5.3	10.5	84.2	0.0
	Vallabhipur	49	0.0	2.0	87.8	10.2
	Total	238	14.7	23.1	57.6	4.6
Jamnagar	Jodiya	7	0.0	14.3	85.7	0.0
	Total	7	0.0	14.3	85.7	0.0
Junagadh	Bhesan	1	0.0	0.0	100.0	0.0
	Junagadh	3	0.0	33.3	33.3	33.3
	Keshod	1	0.0	0.0	100.0	0.0
	Manavadar	5	0.0	60.0	40.0	0.0
	Mendarda	3	0.0	66.7	33.3	0.0
	Vanthali	7	0.0	71.4	14.3	14.3
	Total	20	0.0	55.0	35.0	10.0
Rajkot	Gondal	5	20.0	60.0	20.0	0.0
	Jasdan	80	31.3	61.3	6.3	1.3
	Maliya	28	3.6	14.3	82.1	0.0
	Morbi	35	2.9	57.1	28.6	11.4
	Tankara	10	0.0	0.0	100.0	0.0
	Total	158	17.7	48.1	31.0	3.2
Kachchh	Anjar	4	0.0	0.0	0.0	100.0
	Bhachau	26	7.7	15.4	38.5	38.5
	Bhuj	44	11.4	65.9	22.7	0.0
	Gandhidham	2	0.0	0.0	0.0	100.0
	Mandavi	13	92.3	7.7	0.0	0.0
	Mundra	2	0.0	50.0	50.0	0.0
	Rapar	14	14.3	35.7	14.3	35.7
	Total	105	20.0	38.1	21.9	20.0

Annexure 3.3

Regularity in Water Supply During the Last Month, April, 2005

District	Taluka	Villages Surveyed	No. of villages got water for following number of days during last month				
			1 to 9	10 to 19	20 to 29	30	0
Ahmedabad	Barwala	19	0	68.4	31.6	0	0
	Dhandhuka	50	12	32.0	52.0	4	0
	Dholka	13	0	0.0	30.8	69.2	0
	Ranpur	14	14.3	85.7	0.0	0.0	0
Amreli	Amreli	42	57.1	42.9	0.0	0.0	0
	Babra	49	4.1	93.9	0.0	2.0	0
	Bagasara	6	50.0	33.3	16.7	0.0	0
	Kukavav	41	87.8	12.2	0.0	0.0	0
	Lathi	45	66.7	33.3	0.0	0.0	0
	Liliyamota	28	60.7	39.3	0.0	0.0	0
	Rajula	14	7.1	7.1	71.4	7.1	7.1
Bhavnagar	Bhavnagar	33	0.0	9.1	75.8	15.2	0.0
	Botad	44	59.1	20.5	13.6	6.8	0.0
	Gadhada	46	10.9	41.3	45.7	2.2	0.0
	Ghogha	13	0.0	0.0	92.3	0.0	7.7
	Mahuva	10	0.0	0.0	100.0	0.0	0.0
	Shihor	18	0.0	77.8	22.2	0.0	0.0
	Talaji	6	16.7	83.3	0.0	0.0	0.0
	Umralla	19	5.3	10.5	78.9	5.3	0.0
	Vallabhipur	49	0.0	0.0	85.7	14.3	0.0
Jamnagar	Jodiya	7	0.0	28.6	71.4	0.0	0.0
Junagadh	Bhesan	1	0.0	100.0	0.0	0.0	0.0
	Junagadh	3	0.0	66.7	0.0	33.3	0.0
	Keshod	1	0.0	0.0	100.0	0.0	0.0
	Manavadar	5	0.0	60.0	40.0	0.0	0.0
	Mendarda	3	0.0	66.7	33.3	0.0	0.0
	Vanthali	7	0.0	71.4	14.3	14.3	0.0
Rajkot	Gondal	5	40.0	40.0	0.0	20.0	0.0
	Jasdan	80	13.8	62.5	5.0	1.3	17.5
	Maliya	28	3.6	14.3	82.1	0.0	0.0
	Morbi	35	2.9	40.0	45.7	11.4	0.0
	Tankara	10	0.0	40.0	60.0	0.0	0.0
Kachchh	Anjar	4	0.0	0.0	0.0	100.0	0.0
	Bhachau	26	3.8	15.4	34.6	46.2	0.0
	Bhuj	44	11.4	50.0	38.6	0.0	0.0
	Gandhidham	2	0.0	0.0	0.0	100.0	0.0
	Mandavi	13	61.5	0.0	0.0	0.0	38.5
	Mundra	2	0.0	100.0	0.0	0.0	0.0
	Rapar	14	0.0	42.9	14.3	35.7	7.1

Annexure 3.4

Days of Narmada Water Supply

District	Taluka	Villages Surveyed	No. of villages receiving Narmada Water					
			Not Reported	Alternate day	Twice a week	Once in a week	Once in FourtNight	Highly Irregular
Ahmedabad	Barvala	19	15.8	78.9	0.0	0.0	0.0	5.3
	Dhandhuka	49	34.7	36.7	12.2	10.2	0.0	6.1
	Dholka	13	100.0	0.0	0.0	0.0	0.0	0.0
	Ranpur	14	0.0	78.6	21.4	0.0	0.0	0.0
Amreli	Amreli	42	0.0	100.0	0.0	0.0	0.0	0.0
	Babra	48	2.1	91.7	6.3	0.0	0.0	0.0
	Bagasara	6	0.0	66.7	33.3	0.0	0.0	0.0
	Kukavav	40	0.0	2.5	7.5	42.5	0.0	47.5
	Lathi	45	0.0	51.1	48.9	0.0	0.0	0.0
	Liliya	28	0.0	7.1	92.9	0.0	0.0	0.0
	Rajula	14	35.7	50.0	0.0	7.1	7.1	0.0
Bhavnagar	Bhavnagar	33	36.4	54.5	6.1	3.0	0.0	0.0
	Botad	43	11.6	9.3	14.0	41.9	18.6	4.7
	Gadhada	46	26.1	47.8	8.7	8.7	4.3	4.3
	Ghogha	12	100.0	0.0	0.0	0.0	0.0	0.0
	Mahuva	10	100.0	0.0	0.0	0.0	0.0	0.0
	Sihor	17	0.0	100.0	0.0	0.0	0.0	0.0
	Talaja	5	0.0	60.0	40.0	0.0	0.0	0.0
	Umrala	18	11.1	77.8	11.1	0.0	0.0	0.0
	Vallabhipur	50	64.0	34.0	2.0	0.0	0.0	0.0
Jamnagar	Jodiya	7	0.0	100.0	0.0	0.0	0.0	0.0
Junagadh	Bhesan	1	0.0	100.0	0.0	0.0	0.0	0.0
	Junagadh	3	33.3	66.7	0.0	0.0	0.0	0.0
	Keshod	1	0.0	100.0	0.0	0.0	0.0	0.0
	Manavadar	4	0.0	100.0	0.0	0.0	0.0	0.0
	Mendarda	3	0.0	100.0	0.0	0.0	0.0	0.0
	Vanthali	7	14.3	85.7	0.0	0.0	0.0	0.0
Kachchh	Anjar	1	100.0	0.0	0.0	0.0	0.0	0.0
	Bhachau	23	26.1	56.5	17.4	0.0	0.0	0.0
	Bhuj	38	0.0	84.2	15.8	0.0	0.0	0.0
	Gandhidham	1	100.0	0.0	0.0	0.0	0.0	0.0
	Mandavi	8	0.0	0.0	0.0	37.5	62.5	0.0
	Mundra	2	50.0	50.0	0.0	0.0	0.0	0.0
	Rapar	15	20.0	40.0	20.0	13.3	6.7	0.0
Rajkot	Gondal	5	20.0	40.0	0.0	0.0	40.0	0.0
	Jasdan	75	6.7	48.0	17.3	10.7	5.3	12.0
	Maliya	28	21.4	75.0	3.6	0.0	0.0	0.0
	Morbi	35	17.1	77.1	2.9	2.9	0.0	0.0
	Tankara	9	66.7	11.1	22.2	0.0	0.0	0.0

Annexure 3.5

Duration of Water Supply Per Day (when Water is Released)

District	Taluka	Villages Surveyed	% of villages getting water per day (Hours)				
			<0.5 Hr.	0.5 to 1 Hrs.	1 to 2 Hrs.	2 to 3 Hrs.	> 3 Hrs.
Ahmedabad	Barvala	19	0	0	0	84.2	15.8
	Dhandhuka	49	2.0	16.3	28.6	44.9	8.2
	Dholka	13	0.0	0.0	0.0	7.7	92.3
	Ranpur	14	0.0	0.0	35.7	50.0	14.3
Amreli	Amreli	42	0.0	0.0	4.8	95.2	0.0
	Babra	48	2.1	0.0	0.0	54.2	43.8
	Bagasara	6	0.0	0.0	0.0	100.0	0.0
	Kukavav	40	0.0	0.0	0.0	100.0	0.0
	Lathi	45	0.0	0.0	15.6	84.4	0.0
	Liliya	28	0.0	0.0	75.0	25.0	0.0
	Rajula	14	0.0	0.0	7.1	50.0	42.9
Bhavnagar	Bhavnagar	33	0.0	0.0	90.9	9.1	0.0
	Botad	43	14.0	0.0	48.8	37.2	0.0
	Gadhada	46	2.2	2.2	30.4	65.2	0.0
	Ghogha	12	0.0	0.0	8.3	91.7	0.0
	Mahuva	10	0.0	0.0	10.0	90.0	0.0
	Sihor	17	0.0	0.0	100.0	0.0	0.0
	Talaja	5	0.0	0.0	20.0	20.0	60.0
	Umralla	18	0.0	0.0	22.2	77.8	0.0
	Vallabhipur	50	0.0	0.0	64.0	36.0	0.0
Jamnagar	Jodiya	7	0.0	0.0	0.0	85.7	14.3
Junagadh	Bhesan	1	0.0	0.0	100.0	0.0	0.0
	Junagadh	3	0.0	0.0	100.0	0.0	0.0
	Keshod	1	0.0	0.0	0.0	100.0	0.0
	Manavadar	4	0.0	0.0	75.0	25.0	0.0
	Mendarda	3	0.0	0.0	100.0	0.0	0.0
	Vanthali	7	0.0	0.0	85.7	14.3	0.0
Kachchh	Anjar	1	0.0	0.0	0.0	0.0	100.0
	Bhachau	21	0.0	0.0	19.0	52.4	28.6
	Bhuj	38	2.6	0.0	21.1	76.3	0.0
	Gandhidham	1	0.0	0.0	0.0	0.0	100.0
	Mandavi	6	0.0	0.0	0.0	50.0	50.0
	Mundra	2	0.0	0.0	0.0	50.0	50.0
	Rapar	15	0.0	0.0	13.3	66.7	20.0
Rajkot	Gondal	5	20.0	40.0	20.0	0.0	20.0
	Jasdan	75	2.7	8.0	21.3	53.3	14.7
	Maliya	28	0.0	0.0	35.7	57.1	7.1
	Morbi	35	0.0	5.7	20.0	71.4	2.9
	Tankara	9	0.0	11.1	66.7	22.2	0.0

Annexure 3.6

Adequacy of supply at Taluka Level during February – April 2005

DIST	Taluka	Responded Falias	No. of falias with there opinion that water supply is adequate	% of falias with there opinion that water supply is adequate
Ahmedabad	Barvala	113	25	22.1
	Dhandhuka	336	125	37.2
	Dholka	57	57	100.0
	Ranpur	87	54	62.1
	Total	594	262	44.1
Amreli	Amreli	196	102	52.0
	Babra	264	112	42.4
	Bagasara	21	21	100.0
	Kukavav	178	26	14.6
	Lathi	193	118	61.1
	Liliya	107	91	85.0
	Rajula	78	41	52.6
	Total	1037	511	49.3
Bhavnagar	Bhavnagar	153	78	51.0
	Botad	233	111	47.6
	Gadhada	261	166	63.6
	Ghogha	78	60	76.9
	Mahuva	57	48	84.2
	Sihor	89	30	33.7
	Talaja	31	4	12.9
	Umrالا	84	55	65.5
	Vallabhipur	222	160	72.1
	Total	1208	712	58.9
Jamnagar	Jodiya	30	27	90.0
	Total	30	27	90.0
Junagadh	Bhesan	4	4	100.0
	Junagadh	12	12	100.0
	Keshod	6	6	100.0
	Manavadar	22	22	100.0
	Mendarda	16	16	100.0
	Vanthali	24	24	100.0
	Total	84	84	100.0
Rajkot	Gondal	25	4	16.0
	Jasdan	303	119	39.3
	Maliya	122	69	56.6
	Morbi	153	109	71.2
	Tankara	45	29	64.4
	Total	648	330	50.9
Kachchh	Anjar	2	2	100.0
	Bhachau	123	119	96.7
	Bhuj	137	56	40.9
	Gandhidham	7	7	100.0
	Mandavi	41	31	75.6
	Mundra	15	15	100.0
	Rapar	73	52	71.2
	Total	398	282	70.9

Annexure 3.7

Distance Households Travel to Fetch Narmada Water

District	Taluka	Responded Falias	No. of Households traveling following distance to get Narmada water		% of Households traveling following distance to get Narmada water	
			<=150 M	>150 M	<=150 M	>150 M
Ahmedabad	Dhandhuka	17	3	14	17.6	82.4
	Dholka	32	31	1	96.9	3.1
	Ranpur	24	13	11	54.2	45.8
Ahmedabad Total		73	47	26	64.4	35.6
Amreli	Amreli	166	165	1	99.4	0.6
	Babra	188	98	90	52.1	47.9
	Bagasara	23	21	2	91.3	8.7
	Kukavav	176	175	1	99.4	0.6
	Lathi	178	117	61	65.7	34.3
	Liliya	103	18	85	17.5	82.5
	Rajula	69	35	34	50.7	49.3
Amreli Total		903	629	274	69.7	30.3
Bhavnagar	Bhavnagar	94	39	55	41.5	58.5
	Botad	146	134	12	91.8	8.2
	Gadhada	227	172	55	75.8	24.2
	Ghogha	96	96		100.0	0.0
	Mahuva	56	54	2	96.4	3.6
	Sihor	1		1	0.0	100.0
	Talaja	33	6	27	18.2	81.8
	Umrالا	74	74		100.0	0.0
	Vallabhipur	194	194		100.0	0.0
Bhavnagar Total		921	769	152	83.5	16.5
Jamnagar	Jodiya	43	43	0	100.0	0.0
Junagadh	Vanthali	4	4		100.0	0.0
Kachchh	Bhachau	85	56	29	65.9	34.1
	Bhuj	103	49	54	47.6	52.4
	Mandavi	26	26		100.0	0.0
	Mundra	15	4	11	26.7	73.3
	Rapar	37	19	18	51.4	48.6
Kachchh Total		266	154	112	57.9	42.1
Rajkot	Gondal	29	23	6	79.3	20.7
	Jasdan	279	178	101	63.8	36.2
	Maliya	3	3		100.0	0.0
	Morbi	24	20	4	83.3	16.7
	Padaghari	5	5		100.0	0.0
	Tankara	35	19	16	54.3	45.7
Rajkot Total		375	248	127	66.1	33.9
Grand Total		2585	1894	691	73.3	26.7

Management of Narmada Water At the Village Level

The Narmada Pipeline Project is better designed than the other regional water supply schemes. There are certain important features of this Project that make it superior to other projects are:

- There will be volumetric control of water supply, which will ensure that all get at least 70 lpcd water supply.
- The water will be managed at the village level by Pani Samiti, which will also represent women and weaker sections,
- Water will be distributed equitably within the village among different areas and different socio economic groups
- The project will be financially viable, as O & M cost of the project will come from water charges that people will pay
- One major advantage of the project is that it will provide potable water to people. That is, the project will ensure quality of drinking water.

This chapter examines the local management of the Narmada Project in the content of the above-mentioned features of the project.

Pani Samiti

Pani Samiti on Water Committee is a key village level organization that is expected to manage water and sanitation at the village level. According to the GR (Government Rule) on Pani Samiti, (October 2002) each village is expected to set up a Pani Samiti to manage drinking water and Sanitation locally. The setting up a Pani Samiti is particularly mandatory for villages when they are covered by any scheme or programme of GWSSB.

The major functions of a Pani Samiti, according to the Government Notification, include (1) test local sources of water supply and develop potable sources, (2) access help of GWSSB and other government organizations in developing water resources, (3) take complete care of operation and maintenance of the water system in the village, (4) fix water charges to meet the costs, in consultation with Gram Sabha, and recover the charges, also revise the charges as and when necessary, (5) maintain cleanliness of water sources to ensure clean and potable water to all, (6) ensure adequate and potable water supply to weaker sections and (7) maintain sanitation and public hygiene in the village.

Role of Pani Samiti is important for Narmada Project also, as it will ensure equitable distribution of water in the village, take care of operation and maintenance of water supply, impose and collect water charges to make the project viable and as it will be responsible for disposal of used water to maintain cleanliness and sanitation in the village.

Table 4.1
Pani Samitis in Narmada Project Villages

Districts	Villages Surveyed	Reported villages with Pani Samiti		Total Members	Female members	
		Nos. of villages	% of villages	(Nos.)	(Nos.)	(%)
Ahmedabad	121	9	7.4	61	19	31.15
Amreli	236	90	38.1	634	146	23.03
Bhavnagar	281	92	32.7	848	217	25.59
Jamnagar	37	14	37.8	114	39	34.21
Junagadh	62	12	19.4	49	12	24.49
Kachchh	159	59	37.1	608	136	22.37
Rajkot	226	64	28.3	484	115	23.76
Total	1122	340	30.3	2798	684	24.45

Source: Primary Survey 2004-05

The above table shows that Pani Samiti are set up only in 340 villages out of the total of 1122 (30 percent). This is indeed a very poor coverage! The coverage is highly uneven across the different districts. Bhavnagar, Amreli and Kachchh districts are relatively better covered by Pani samitis, while Ahmedabad, Junagadh and Rajkot are poorly covered. The taluka level details show even more uneven spread of Pani Samitis. Ghogha has Pani Samitis in more than 80 percent villages, thanks to the Ghogha project promoted by WASMO (Appendix 5.1) In Umralla and several talukas of Junagadh, however, there are no Pani Samitis. The other talukas with a relatively high proportion of villages under Pani Samiti are Amreli, and Lathi talukas (Amreli district), and Talaja and Sihor Talukas (Bhavnagar district.)

Since it is mandatory to have minimum 3 women members in a Pani Samiti, they should constitute, on an average, 30 percent of the total membership. The field level data, however, show that they constitute less than one-fourth of the total membership. It is surprising that in spite of the mandatory provision, a few talukas do not have any women as members of Pani Samiti.

Not at all these Pani Samitis are active. In our first round (May-July 2004) 17 percent villages with Pani Samiti reported that their Samitis had not met even once in the last three months. That is, these Samitis were only on paper. The share of these defunct Samitis increased to 45 percent in the fourth round (February – April 2005). Only 30 percent Pani Samitis met once in a month during the first round, and this percentage declined to 7 percent in the fourth round. It is clear that Pani Samiti is not emerging as an active organization willing or able to manage local water supply.

Table 4.2
Meetings of Pani Samiti During Monitoring Period

Districts	% of Pani Samiti had meeting following number of times in last three months							
	May – July 2004				February – April 2005			
	0	1	2	3	0	1	2	3
Ahmedabad	11.3	46.3	16.3	26.3	0	16.7	16.7	66.7
Amreli	31.5	38.6	4.3	25.8	76.9	17.9	5.1	0
Bhavnagar	8.5	47.1	16.4	28.3	27.2	47.8	18.5	6.5
Junagarh	11.2	27.8	5.6	55.6	100	0	0	0
Rajkot	19.1	33.2	13.4	34.6	60	27.5	7.5	5
Kachchh*	21.95	46.35	19.55	12.15	2.6	50.0	21.1	26.3
Total	17.2	40.3	11.8	30.7	45.3	35.2	12.8	6.7

Source: Primary Survey 2004-05

* Note: First monitoring in Kachchh was done during August – October 2005

A careful look at the taluka wise data indicates that the meetings of Pani Samiti are relatively more regular in the talukas where NGOs are active and where WASMO has promoted Pani Samitis in collaboration with NGOs. For example, the frequency of the meetings is high in Talala (50 percent Pani Samitis met once in a month), Ghogha (40 percent Pani Samitis met twice in the last three months) and the Bhavnagar taluka (40 percent Pani Samitis met at least twice in the last three months) of Bhavnagar district. Also, in Dhandhuka and Dholka most Pani Samitis met once in a month and in Bhuj and Rapar half of them met at least two times in the last three months.

The issues discussed in Pani Samitis are mostly related to payment of water charges and distribution of water within the village.

Table 4.3
Issues Discussed in Pani Samiti Meetings

Districts	Reported Narmada villages having pani samiti	No of reported villages discussing following Issues in Pani Samiti			
		Water tax	Water supply management	Development of local water resources	Mechanical problems in water supply
Ahmedabad	9	3	7	6	9
Amreli	90	24	26	14	7
Bhavnagar	92	25	57	16	43
Jamnagar	14	0	0	0	1
Junagadh	12	2	12	2	0
Kachchh	59	20	39	49	24
Rajkot	64	12	31	1	31
Total	340	66	134	39	91

Source: Primary Survey 2004-05

The major issues discussed in Pani Samiti meetings are related to water supply management (about 50 percent villages with Pani Samiti discussed this issue), water tax and development of local sources.

In short, Pani Samitis have limited spread and are not active enough to manage water supply locally. Though a good beginning has been made in some ways, they have a long way to go. If internal distribution of water, operation and maintenance of water supply, fixing and collecting water charges and ensuring good quality of water supply are to be undertaken by village Pani Samiti, a lot is still to be done.

Water Testing and Quality of Water Supply

One advantage of Narmada Project, as claimed by authorities, is that it will provide potable water to people. The system organized for the purpose includes setting up of 101 treatment plants at different levels to treat Narmada water before it is transported to villages in the pipeline networks. Treatment is also to be given at the village level depending on the need for the treatment. The valveman / lineman will be responsible for this.

Water testing and monitoring the quality of water supply will be an important component of ensuring potable quality of the water supply. Water testing is usually done by GWSSB in water-testing laboratories. Each regional office of GWSSB has a water testing laboratory to conduct testing regularly. Sometimes Village Panchayats also organize water testing.

According to our field survey, only 18 percent villages reported that drinking water was tested in their village. In 25 talukas out of the total 38 talukas water testing is not reported. This does not necessarily mean that water tests are not conducted in these villages. It only means that Sarpanch and Pani Samiti members are not aware of the water testing done. The villages reporting water testing are from Kachchh (all the talukas of Kachchh except Mundra taluka), Bhavnagar and Botad taluka of Bhavnagar district, and Lathi, Liliya and Amreli talukas of Amreli district reported water testing..

Table 4.4
Water Quality Testing in Narmada Project

District	Reported villages	Villages where water quality was tested	
		Nos.	%
Ahmedabad	96	0	0
Amreli	225	25	11.1
Bhavnagar	238	7	2.9
Jamnagar	7	0	0
Junagadh	20	0	0
Rajkot	158	0	0
Kachchh	167	30	18
Total	911	62	6.8

Source: Primary Survey 2004-05

It appears that the villages do not really know that parameters for which the water is tested, as the tests are mainly conducted by GWSSB laboratories, and results are not conveyed to Pani Samiti or Panchayats. Only three Village Panchayats of Bhavnagar district reported that they also conduct water tests to know the quality of their water.

The test results are neither reported back to the Pani Samiti nor to the Village Panchayat, nor are they displayed any where in the village. This does not rule out the possibility that the authorities take some action to improve the water supply. But none of these steps is known to villages. Only five village panchayats out of the total 62 village panchayats (that reported water testing) said that the results are displayed in the village. In short, water testing and dissemination of the results of water testing are not at all common in these villages.

The results of water testing by source of water supply are not available to common people easily. We could get only some scanty information from one source (WASMO, Bhavnagar), which indicates that water from Narmada Pipeline Project is not always potable.

In order to ensure potable supply of water it is necessary that (1) water is treated in a treatment plant before it is put into the pipelines and (2) water is also tested and treated at the village level, as water is likely to get contaminated in the pipeline also.

As far as water treatment is concerned, only three plants have started working so far. Many villages therefore receive raw Narmada water. Again, treatment of water at the village level is the responsibility of the valveman / lineman. However, it is observed that he rarely performs this duty, as he neither has time nor the required equipments and material to do this work. He does not even have an access to information on quality of water. He installs chlorination plant and uses chlorine or any such material only when he is instructed to do so, which is very rare.

Common people, however, are happy with the quality of Narmada water. This is because they consider water potable if it looks clear, does not stink and tastes good. More than 90 percent falias therefore reported that Narmada water is of good quality. The 'improvement' in the quality of water from the first to the last round seems to be due to the fact that with the passage of time the stink of new pipelines in the water declined.

Table 4.5
Quality of Water according to Falias / Settlements

Districts	Percentage of falias with there opinion about quality of Water							
	May-July, 2004		August-October, 2004		November 04 - January 05		Feb. 05 - Apr. 05	
	Good	Bad	Good	Bad	Good	Bad	Good	Bad
Ahmedabad	89.4	10.6	89.5	10.5	93	7	93.2	6.8
Amreli	93.7	6.3	97.1	2.9	98.5	1.5	98.7	1.3
Bhavnagar	96	4	99.5	0.5	97.2	2.8	99.5	0.5
Jamnagar	92.6	7.4	93.9	6.1	75	25	83.3	16.7
Junagarh	92.6	7.4	83.3	16.7	100	0	100	0
Rajkot	74.8	25.2	81.6	18.4	89	11	90.5	9.5
Kachchh	NA	NA	79.7	20.3	83	17	61.4	38.6
Total	89.9	10.1	91.3	8.7	94.1	5.9	96.5	3.5

Source: Primary Survey 2004-05

Water Charges, Recovery and Financial Viability

As seen before, an important feature of the Narmada Project is that it will charge for water in a way that O & M costs (as well as capital cost) will be recovered from the users.

A village covered under the Narmada Project has to charge for two sets of O & M costs (and also capital costs to make the project fully financially viable), namely O & M cost of bringing Narmada water to the village and the O & M cost of distributing the water within the village. The charges for the former cost will have to be paid to GWSSB, while the charges for the latter costs will have to be retained by the Panchayat (Pani Samiti) to manage distribution of water within the village.

Our investigation revealed that different villages charge different rates. Most villages charge Rs 14/- per person per year, with the objective of depositing the collected amount to GWSSB. In addition, they also charge village households for (1) household connection (fixed cost) and (2) for recurring cost. Charges for recurring costs are different for households with individual connection and households that get water from common stand posts. The installation cost of household connection varies between Rs 100 to Rs 250 per household. The charges of recurring costs appear to be varying from Rs 100 to Rs 25 per year per household.

Since the recovery of water charges is poor, most villages are reluctant to give any amount to GWSSB, unless they are forced to do so. The villages without any intra village distribution system also are reluctant to pay the collected amount to GWSSB on the ground that "water should be free to all".

The status of recovery of water charges is presented in the adjoining table. The table indicates that the overall scene is not very positive.

To start, with the recovery of charges by GWSSB is very poor. It is the lowest in Kachchh (10.7 percent) and the highest recovery comes from Junagadh district (71.4 percent) followed by Bhavnagar (44.5 percent). A look at the taluka level data indicates that the recovery is zero in villages of Mandavi taluka. This seems to be due to the fact that most of the recovery is used locally in taking care of the distribution of water within the villages. GWSSB gets good recovery from the talukas like Ghogha (89.6 percent), Mahuva (85.7 percent) and Keshod (83.3 percent), while it gets poor recovery from Bhuj taluka (1.4 percent), Mandavi (0), Amreli (28.6 percent), Botad (27.3 percent) and Junagadh taluka (29.0 percent).

This status of recovery should be viewed in the light of the fact that the actual O & M cost of Narmada water is about Rs 80- Rs 90 per person per year as against the present charges of Rs 14 per person per year. This implies that (1) even with full recovery of the present charges the project will not be meet O & M costs and (2) it will be necessary to raise the charges at least six times to make the project viable in terms of meeting O & M costs (and not capital costs). With cross subsidization, it may be possible to raise the charges by a smaller amount. However, villagers will also have to pay for the O & M charges of the distribution system of Narmada water within the village.

Table 4.6
Recovery of Water Charges Under Narmada Project

District	Amount charged, collected and paid by reported villages during 2004-05 (in Rs.)				
	Charged by GWSSB	Panchayat collected from villagers	Panchayat paid to GWSSB	Percentage Collection by Panchayat	Percentage Payment to GWSSB
Amreli	1611090	770590	552090	47.8	34.3
Bhavnagar	4025664	1913300	1790400	47.5	44.5
Junagadh	518137	370137	370137	71.4	71.4
Kachchh	589899	228490	63230	38.7	10.7
Rajkot	529700	136000	136000	25.7	25.7
Total	7274490	3418517	2911857	47.0	40.0

Source: Primary Survey 2004-05

The table also shows that Village Panchayats are not willing to pay for GWSSB charges even when they recover enough amount from people. This is because of two reasons: firstly, there is an overall thinking that “water should be made available free”. This thinking is largely promoted by political leadership in the state. And secondly, the collected amount is either used up in managing local distribution system or is needed for undertaking other Panchayat activities. Village Panchayats in Gujarat, as in many other states, are not in good financial condition and are always in need for funds to carry out their activities.

The table shows that Village Panchayats, on an average, give only 40 percent of their collection of water charges to pay GWSSB bills. This percentage is the highest in Junagadh district (71.4 percent), followed by Bhavnagar and Amreli districts, (about 47 percent). Rajkot and Kachchh districts pay less than 40 percent of collected water charges to GWSSB. The percentage is the lowest in Bhuj and Mandavi (6.8 percent and zero) and in Jasdan taluka (25.7 percent) of Rajkot district.

In short, financial viability of Narmada project is still a distant dream!

Volumetric Water Distribution Under Narmada Project

Another important feature of the Narmada Project is that the quantity of water supply is to be ensured through fixing water meters at the village level. It is argued that each village will have a water meter, which will assure that adequate water supply (at the rate of 70 lpcd) is provided to the village.

The progress of fixing water meters, however, is quite disappointing. In the first round, (May- July 2004) only 13 percent villages had water meters. Most of the meters were in the villages of Rajkot and Bhavnagar districts. In Rajkot about 27 percent villages had water meter, while in Bhavnagar, about 21 percent villages had water meters. This coverage, has declined in the subsequent rounds and in the fourth round only 6 percent villages had water meter (most of them are from Rajkot district, and mainly in Jasdan

taluka). It was observed that none of the meters was really used (or was working) to measure quantity of water delivered to the village. Almost all meters were defunct.

One reason for the slow progress is that the earlier mechanical meters were not working well (easily manipulated or damaged by people) and therefore it was decided to replace them by new electronic meters, which are very costly.

It appears that the views on the meter are perhaps revised, as the number of meters has declined rather than increased during the reference year. Whatever are the views, what is important to observe is that the each village receives the required quantity of water. It is not enough to put this quantity from the pumping station. It is also important to see the village receives this quantity regularly at the village level.

In our discussion with some local GWSSB offices, we were told that fixing hours of water supply can take care of the quantity. However, these hours will vary according to the pressure / flow of water and it will be important to measure pressure before deciding about the period of water supply.

Table 4.7
Water Meters in Narmada Project Villages

Districts	% of villages with water meter			
	May-July, 2004	August- October, 2004	November 04 - January 05	February 05 - April 05
Ahmedabad	1.1	0	0.9	0
Amreli	2.2	9.3	0	0
Bhavnagar	20.8	3.3	4.1	2.9
Jamnagar	0	0	0	0
Junagarh	0	0	0	0
Rajkot	27.3	17.4	31.3	24.7
Kachchh	NA	1.2	1.5	0
Total	13.5	8.1	7.2	6.2

Source: Primary Survey 2004-05

During our visit to the GWSSB at the Botad taluka, we were told that according to their experiment at a stand post, they observed that 50 liters of water supply flows from one tap in one minute. This means that one stand post, with 6 taps provides 18, 000 liters of water per hour and 36000 liters of water per two hours. This water will be enough for a village with 510 persons (70 lpcd) and for 900 persons (40 lpcd). By these standards many of the villages which receive water even for two hours every day (as seen earlier, the number of such villages is not large) do not get adequate water supply! And this is under the assumption that water supply is provided every day and regularly for two hours a day!

It seems to us that the issue of adequacy of water supply cannot be resolved without metering, given the fluctuating nature of the pressure of water supply.

To sum up, this chapter has shown that the Narmada Project is not managed well at the village level. There are serious problems about (1) the quality of water, (2) adequacy of

water, (3) equitable distribution of water, (4) financial viability of the project and (5) good management of water supply at the local level. There is a good scope for improvement in these areas.

Narmada project at the village level is typically a top down project. It is managed by GWSSB up to the point of the entry of water supply in to the village. The operation of the water supply is managed by the lineman, who is responsible for opening and closing the valve. The GWSSB provides the sump or an open tank (havada) for animals. In some cases the village also has an overhead tank or a surface tank, which is constructed by the GWSSB. In other words, the GWSSB and the lineman manage most of the show. Sarpanch (or Pani Samiti) has a marginal role to play, of minor supervision.

Panchayat plays a bigger role only when pipelines are laid down in the village and household connections are provided. And her there is a lot scope for improvement.

Annexure 4.1
Pani Samitis in Narmada Project Villages

District	Taluka	Villages Surveyed	Reported villages with Pani Samiti		Total Members (Nos.)	Female members	
			Nos. of Villages	% of Villages		(Nos.)	(%)
Ahmedabad	Barwala	18	1	5.6	5	3	60
	Dhandhuka	58	4	6.9	23	9	39.1
	Dholka	25	1	4.0	7	2	28.6
	Ranpur	20	3	15.0	26	5	19.2
Amreli	Amreli	48	25	52.1	174	30	17.2
	Babara	58	19	32.8	121	33	27.3
	Kukavav	41	3	7.3	25	5	20.0
	Lathi	43	24	55.8	174	39	22.4
	Liliya	31	18	58.1	135	37	27.4
	Rajula	15	1	6.7	5	2	40.0
Bhavnagar	Bhavnagar	34	17	50.0	200	48	24.0
	Botad	46	8	17.4	46	13	28.3
	Gadhada	60	11	18.3	77	12	15.6
	Ghogha	33	27	81.8	303	70	23.1
	Mahuva	11	2	18.2	12	4	33.3
	Sihor	20	19	95.0	138	52	37.7
	Talaja	9	6	66.7	48	13	27.1
	Umrala	19	0	0.0	0	0	
	Vallabhipur	49	2	4.1	24	5	20.8
Jamnagar	Dhrol	11	3	27.3	24	8	33.3
	Jodia	26	11	42.3	90	31	34.4
Junagadh	Bhesan	3	0	0.0	0	0	
	Junagadh	5	0	0.0	0	0	
	Keshod	3	0	0.0	0	0	
	Maliya	5	0	0.0	0	0	
	Manavadar	17	7	41.2	28	8	28.6
	Mangrol	9	0	0.0	0	0	
	Mendarda	5	2	40.0	8	0	0
	Vanthali	15	3	20.0	13	4	30.8
Kachchh	Anjar	6	5	83.3	57	21	36.8
	Bhachau	26	7	26.9	58	8	13.8
	Bhuj	83	31	37.3	300	57	19
	Gandhidham	2	0	0.0	0	0	
	Mandavi	17	8	47.1	107	24	22.4
	Mundra	3	2	66.7	18	10	55.6
	Rapar	22	6	27.3	68	16	23.5
Rajkot	Gondal	37	9	24.3	67	18	26.9
	Jasdan	101	35	34.7	242	49	20.2
	Jetpur	18	2	11.1	15	5	33.3
	Maliya	15	3	20.0	15	6	40
	Morbi	26	8	30.8	61	14	23.0
	Padaghari	14	3	21.4	31	9	29.0
	Sangani Kotada	2	1	50.0	16	6	37.5
	Tankara	13	3	23.1	37	8	21.6

Annexure 4.2
Water Quality Testing in Narmada Project

District	Taluka	Responded villages	No. of villages where water quality was tested	% of villages where water quality was tested
Ahmedabad	Barwala	19	0	0
	Dhandhuka	50	0	0
	Dholka	13	0	0
	Ranpur	14	0	0
Amreli	Amreli	42	7	16.7
	Babra	49	0	0
	Bagasara	6	0	0
	Kukavav	41	0	0
	Lathi	45	3	6.7
	Liliyamota	28	15	53.6
	Rajula	14	0	0
Bhavnagar	Bhavnagar	33	6	18.2
	Botad	44	1	2.3
	Gadhada	46	0	0
	Ghogha	13	0	0
	Mahuva	10	0	0
	Shihor	18	0	0
	Talaji	6	0	0
	Umralla	19	0	0
	Vallabhipur	49	0	0
Jamnagar	Jodiya	7	0	0
Junagadh	Bhesan	1	0	0
	Junagadh	3	0	0
	Keshod	1	0	0
	Manavadar	5	0	0
	Mendarda	3	0	0
	Vanthali	7	0	0
Rajkot	Gondal	5	0	0
	Jasdan	80	0	0
	Maliya	28	0	0
	Morbi	35	0	0
	Tankara	10	0	0
Kachchh	Anjar	6	2	33.3
	Bhachau	36	5	13.9
	Bhuj	86	16	18.6
	Gandhidham	2	2	100
	Mandavi	17	4	23.5
	Mundra	3	0	0
	Rapar	17	1	5.9

Annexure 4.3
Recovery of Water Charges Under Narmada Project

District	Taluka	Amount charged, collected and paid by reported villages during 2004-05 (in Rs.)				
		Charged by GWSSB	Panchayat collected from villagers	Panchayat Paid to GWSSB	Percentage Collection by Panchayat	Percentage Payment to GWSSB
Amreli	Amreli	1283000	579000	370000	45.1	28.8
	Babra	173090	97590	88090	56.4	50.9
	Kukavav	155000	94000	94000	60.6	60.6
	Total	1611090	770590	552090	47.8	34.3
Bhavnagar	Bhavnagar	424000	144700	144700	34.1	34.1
	Botad	1511842	468900	412500	31	27.3
	Gadhada	601100	384000	360500	63.9	60
	Ghogha	83000	74400	74400	89.6	89.6
	Mahuva	35000	30000	30000	85.7	85.7
	Shihor	55654	28300	23300	50.8	41.9
	Umralla	406260	231000	196000	56.9	48.2
	Vallabhipur	908808	552000	549000	60.7	60.4
	Total	4025664	1913300	1790400	47.5	44.5
Junagadh	Bhesan	24500	21000	21000	85.7	85.7
	Junagadh	53500	15500	15500	29	29
	Keshod	72000	60000	60000	83.3	83.3
	Manavdar	183637	126637	126637	69	69
	Vanthali	184500	147000	147000	79.7	79.7
	Total	518137	370137	370137	71.4	71.4
Kachchh	Bhachau	129354	86230	60230	66.7	46.6
	Bhuj	220000	15000	3000	6.8	1.4
	Mandavi	240545	127260	0	52.9	0
	Total	589899	228490	63230	38.7	10.7
Rajkot	Jasdan	529700	136000	136000	25.7	25.7
	Total	529700	136000	136000	25.7	25.7
Grand Total		7274490	3418517	2911857	47.0	40.0

Insights Emerging From Case Studies Of Selected Villages

Case Study Approach

Case study approach is essentially an empirical inquiry that investigates a ground level situation in its real life context. It simplifies and explains the dynamics of a complex situation and enriches field investigation in the process..

Case studies have several advantages, when conducted systematically. Firstly, case studies bring out details, which could be hidden in general investigations and surveys. That is, case studies describe the details, which are not collected of the situations observed under general investigations. Secondly, case studies explain complex phenomena by answering questions like “why” and “how”. They throw light on the factors that determine the observed situations. Thirdly, case studies provide information from multiple sources that enriches the level of information, allows cross checking and helps in providing a comprehensive as well as balanced picture of reality. And fourthly, case studies provide qualitative details that are missed out by general investigations.

It was decided therefore to conduct selected case studies of care fully selected villages that have received Narmada water under the Narmada Project. The major tools used by us were field visits, physical checking of ground level realities, interviews and discussions with persons from different socio-economic groups, small group meetings and special meetings with women, household belonging to the scheduled castes, scheduled tribes and other backward castes and poor households.

Semi-structured schedules, which high lighted the major issues related to drinking water in general and Narmada water in particular, were designed though the investigation was not limited to these issues only. Some relevant persons and institutions, such as Sarpanch, Pani Samiti members, Village Panchayat members, particularly women members and Dalit members, valveman or lineman etc were contacted for interviews and discussions to access their role in the implementation of the Narmada Project. In addition, we also visited nearby (1) pumping station, (2) treatment plant and (3) GWSSB office. These visits provided details of the role of these institutions in ensuring / not ensuring Narmada water to the village.

One major weakness of the case study method is that each case study refers to a specific situation, and the findings of one case study cannot be applied to other situations. In other words, one cannot generalize the observations emerging from one case study for the entire population. This problem was resolved by selecting a set of case studies of villages that represented the major typologies of villages with respect to Narmada water. These case studies therefore could throw light on the major problem situations of the project. The major typologies and the selected villages are listed below. These typologies were determined on the basis of the investigation carried out during the monitoring.

Village with “regular” supply of Narmada water, located near to a pumping station with a large number of households having individual connections but no Pani Samiti. The village selected is ***Loliya***, Taluka: Dholka, District: Ahmedabad

Village located in the middle of a pipeline (neither close to the pumping station nor a tail end village) with households using water mainly from stand posts. The selected village is ***Babarkot***, Taluka: Botad, District: Bhavnagar

Tail end village in a pipeline with No local sources of water supply. The selected village is receiving irregular and highly unreliable water supply. The selected village is ***Nani Paliad***: Taluka: Botad, District: Bhavnagar

Village located in the middle of a pipeline with irregular water supply but with local sources available. The selected village is ***Mevasa***. Taluka: Jetpur, District: Rajkot.

Village covered under WASMO, with a Water Committee (Pani Samiti) with local sources of water supply: The selected village is ***Dudhai***. Taluka: Jodia, District: Jamnagar

Tail end village of a pipeline, with highly irregular and unreliable water supply from the Narmada Project but with Local Source of Water Supply. The selected village is ***Khambhala***, Taluka: Babra, District: Amreli.

Village without any local source of water supply, solely depending on N P Project: The selected village is ***Kunjisar***, Taluka: Bhachau, District: Kachchh

WASMO village with full infrastructure related to water supply, without any local sources: The selected village is ***Amarsar –Ner*** (twin village), Taluka: Bhachau, District: Kachchh

We discuss below the major insights emerging from these case studies.

Profile of the Villages

Loliya village of Dholka taluka, is located on the sea coast, about 25 Km away from the coast. The ground water is affected by salinity ingress. There are two rivers, Omkar and Bhogavo, each side of the village, flowing in to the sea.

The village has about 2800 population, with about 12 percent population belonging to the scheduled castes. The main occupation of the village is farming, followed by animal husbandry, other labour and other occupations like diamond cutting and polishing, government and private services etc.

Babarkot village of Botad taluka (Bhavnagar) has about 1500 population, with 80 percent population belonging to the scheduled castes and other backward castes. The others are Darbars and some Brahmins. The main occupation is of the village is agriculture, followed by diamond cutting & polishing in which a large number of young boys are engaged, mostly outside the village in Botad. The village is not a poor village in terms of employment and incomes.

Nani Paliad of Botad taluka (Bhavnagar) is a relatively large village with more than 3500 population. The village is divided in to three parts, namely Kah area, Nava Gam and Juna Gam. Narmada water is given to each part one day, with the result that each part gets water once in three days. The village is on the height and water comes through Kumbhara village, which is located on the pipeline just before Nani Paliad. Since the pressure of water is low and Kumbhara village does not close the valve, water does not reach Nani Paliad. Juna Gam, with its population of 1500, is the worst hit area as it is on a height.

The main occupation of the village is agriculture, followed by rural labour, services and household industries / rural artisan work. About 38-40 percent land is under irrigation through a canal near by. Farmers with irrigation take two crops Kharif and Rabi. A few farmers (more than 10 percent) also grow crops in the summer when water is available. Most farmers live on farms, though some small and marginal farmers do live in the village.

The village suffers from acute shortage of water as there are no well-maintained local sources and as water from Narmada pipeline is most unreliable due to the height of the village.

Khambhala village of Babra taluka (Amreli district) is a large village with more than 5000 population. The main occupation of the village is agriculture, followed by diamond cutting and polishing, animal husbandry, trade and services. About one third of cultivated land is irrigated, mainly by wells and tube wells. Farmers grow crops in two seasons, Kharif and Rabi, depending on the season and the availability of water.

The village is a relatively prosperous village, with a variety of economic activities. A large number of farmers live on farms.

Mevasa village of Jetpur taluka (Rajkot) has more than 3500 population, with the predominant population of Patels. The others are Bharvad, Koli and Khat. The village is divided in to four major falias, the most prosperous falia being of Patels who have constructed modern houses for themselves.

The main occupations in the village are agriculture, diamond cutting and polishing (many young men go up to Surat for this work), trade and services. The main sources of irrigation are wells and tanks, and more than one third farmers grow 2 to 3 crops in a year. Patel farmers grow value crops like Jeera, ground nut, castor garlic etc. In short, this is a relatively prosperous village with multiple occupations.

Dudhai village of Jodiya taluka (Jamnagar district) has about 1700 population. This village was badly affected by the earthquake in 2001, with the result that a lot of investment has been made in the village for reconstruction. A new locality, Navagam, has been constructed near to the village and many prosperous households live in independent houses here.

The Narmada pipeline has come to the village under the reconstruction programme. WASMO has set up a Pani Samiti in the village and constructed water related infrastructure.

The village has good agriculture, with many farmers growing two crops in a year. About 50 boys in the village are engaged in diamond cutting and polishing earning on an average Rs 6000-7000 per month. The village looks prosperous and not very poor.

Kunjisar village of Bhachau taluka (Kachchh) is a relatively small village with less than 1000 population. The village was badly affected by the earthquake in 2001, and has received considerable help under the programmes for rehabilitation and reconstruction. The Narmada water also has come as a part of these programs. The main occupation of the village is agriculture, followed by animal husbandry and rural labour. The other occupations are services and rural artisan work.

Amarsar – Ner are twin villages located in Bhachau taluka (Kachchh). The total population of the village is more than 2500, of which about 25 percent belong to the scheduled castes and scheduled tribes. Ner is an “adopted” village after the earthquake, while Amarsar is the original village. These earthquake affected villages have received Narmada water after the earthquake.

The village is covered under the WASMO project and therefore has a Pani Samiti and drinking water related infrastructure.

Narmada Water Supply

Though all these eight villages are covered under the Narmada project, there are large variations in their access to Narmada water.

Loliya, a medium size village of Dholka taluka of Ahmedabad district is located near the Fedra pumping station and is the first village to receive water from the pumping station on the Pipli –Dhandhuka line. The village therefore receives plenty of water, usually for 6-8 hours a day, sometimes, reaching 24 hours a day! The water comes to the village sump, and also goes to the different parts of the village through a pipeline. Many households have individual connection for water supply.

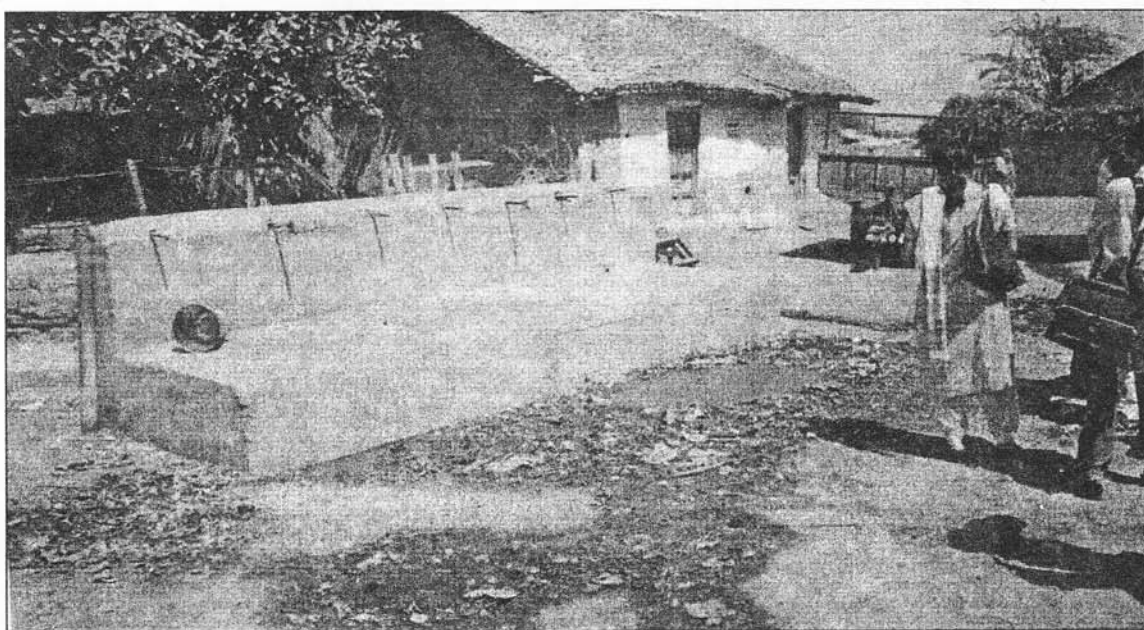
The day we visited the village, the water had come at 4.00 in the morning after a gap of three days (due to a breakage in the pipeline outside the village). Since the village was sleeping with their taps open, the entire village was full of puddles and mud when we entered. Water was poured into the leaking sump from 4.00 AM to 1.00 PM and the leaked out water was going to leaking “havada” (small open tank for animals) flooding the entire roadside that was visible!

The village gets more than necessary water, resulting into huge wastages. Apart from the leaking common sump and the leaking Havada, water also flows from taps, particularly from common stand posts, as they remain open through out. Also, the makeshift household level water connections with no proper taps (some times a piece of cloth or a flimsy tap is used) leaks out water resulting in huge wastage! It seems that there are no standards about the quality of household taps, with the result households use any thing

that is available for the purpose. Since the water rates do not depend on the quantity of water used, they do not worry about the leakages!

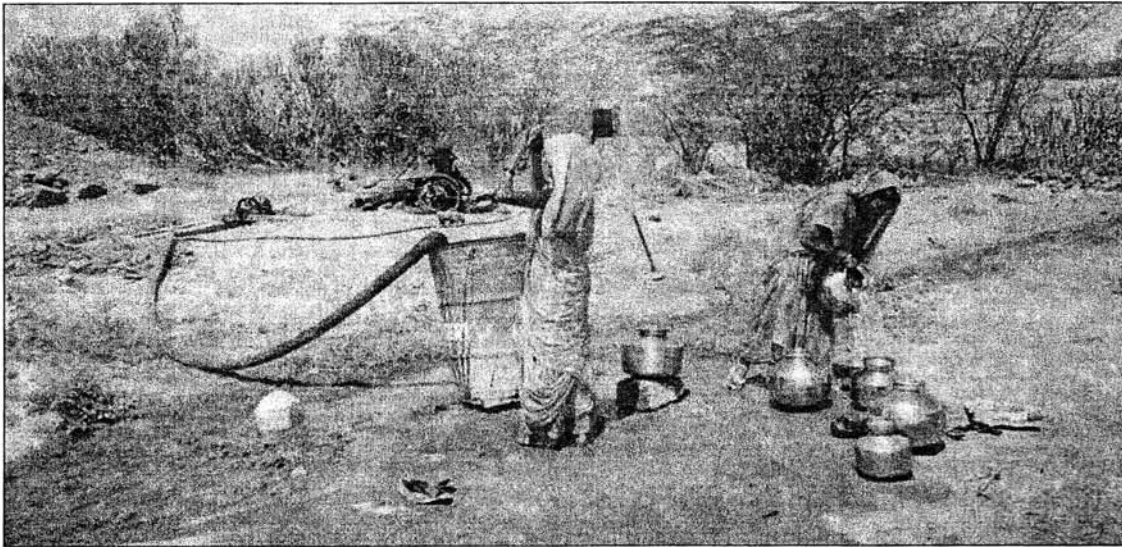
This ample water supply, however, is highly irregular in two senses: (1) there are no fixed timings of the water supply, the timings depending on the availability of electricity (sometimes water comes during night hours only) and (2) there are breakages in water supply due to the poor maintenance of the inter village pipelines, about once or twice in a month.

Babarkot village of Botad taluka of Bhavnagar district, is another village that receives Narmada water every day. This medium size village is located away from its pumping station, though it is not a tail end village. It receives Narmada water every day, but in a most irregular manner: the timings are not fixed, the period is not fixed and the quantity is also not fixed. This is because of the breakages in the inter village pipeline on the one hand and irregular supply of electricity on the other hand. Since the pressure of water is low and fluctuates and since some areas of the village are on a height, water does not reach to all the localities of the village. There are at least 10 percent households, who have taken connection to Narmada water, but do not get any water due to the height. This village depends on Narmada water as well as on local ground water, which is in plenty! In fact, about 300 women from the nearby Paliad village come to this village everyday to fetch water from a local bore well.



Picture 5.1 Wastage of Narmada water in Babarkot Village due to absence of Tap

In *Khambhala* (Babra taluka of Amreli district), *Mevasa* village (Jetpur taluka of Rajkot district) and in *Dudhai* (Jodia taluka of Jamnagar district) there are good local sources available. Khambhala is situated on the bank of Ghelo river, with a dam on the river near by that irrigates around 500 farmers in the village. Mevasa is also situated on Chhapparvali river over which two dams are constructed near to the village, These dams provide water for irrigation to village farmers. Dudhai has good supply of good quality ground water which is used for drinking as well as for irrigation.



Picture 5.2 Irrigation well of Babarkot village supplying water to Women of Paliad village

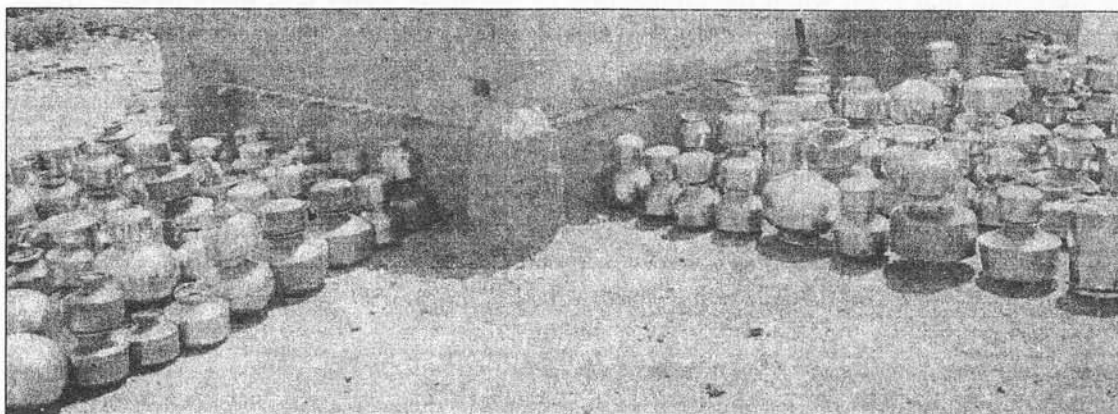
The problem with Khambhala and Mevasa is that the farmers use up the available water for irrigation without ensuring adequate supply of drinking water to the villages. The irregular and fluctuating supply of Narmada water therefore creates shortage of potable water supply in these villages. In the case of Dudhai, the local and Narmada water together is more than enough to meet the needs of local people. In fact, people consider the quality of both water as potable and use them interchangeably.

All the three villages, however, suffer from irregular supply of Narmada water. The irregularity emanates from (1) irregular supply of electricity, (2) poor maintenance of the pipeline between villages and (3) breakages and theft of water by farmers, cowherds and others.

The case of *Nani-Paliad* (Botad Taluka of Bhavnagar district) and Kunjisar (Bhachau taluka of Kachchh district) is different, because both these villages do not have any reliable local source of water. Nani- Paliad is a tail end village, which is deprived of Narmada water very badly. The village receives Narmada water highly irregularly, once in 2-3 days, mainly because it is located on a height and the nearby village at a lower level does not allow water to reach this village.

Nani Paliad has only one stand post (with 6-8 taps) for the entire village. About 400-500 pots are always queuing up for water, which comes very irregularly for one or two hours with a low pressure. Half of the pots in the queue remain empty even when water comes! People take bath once in 8-10 days! As women themselves put it, “we behave very badly at the stand post”. The acuteness of the problem is revealed from the fact that a crowd of 100 women gathered around us immediately after the news spread that some persons have come to know about the status of water supply in the village!

The lineman, who is responsible to see that the village gets its regular water supply, has instructed women to use only metal pots at the stand post, as mud pots are not safe there. In fact, he himself broke a number of mud pots at the stand post when he discovered that his instructions were not followed!



Picture 5.3 The face of irregular water supply in Nani Paliyad

The alternative is to go to near by farms (2-3 Km away) to fetch water, and many women are forced to do so. As women of the village put it, “Our life is spent on water, as we have take at least three rounds is a day to fetch water”. The village had a drinking water well, which has become useless due to neglect.

The shocking part, however, is that at the taluka level GWSSB office, we discovered that “Nani Paliad received 13500 liters of water every day between 10.00 – 12.00 AM.” This statement was made for all the 31 days of January 2005 and was signed by the lineman and the Sarpanch of the village! The Sarpanch is Labhuben, a woman, whose husband manages the show on her behalf and the lineman, Kanubhai, is his partner!

In Mevasa, Narmada water comes every alternate day, ant time during the day (or night) with one or two breaks in a month. The pipeline carrying water to this village from the Gondal pumping station is not maintained well, with the result that it does not assure regular and reliable water supply.

Kunjisar village does not have any local source of water supply, as the only local pond available dries up in the summer. This pond is totally neglected and the village depends on the pipeline water from a bore well in Bhachau. Though the village is officially covered under the Narmada project, it has not yet received the water. Tankers are the main source of water supply in the summer months in the village. Women of this village travel long distances to fetch water.

Khambhala, a tail end village, is again a water-starved village. The PVC pipeline that bought Narmada water to the village broke down two months before we visited the village. It was not repaired and nobody knows why! The village women therefore walk to the river or to the wells of farmers 2 Km away to fetch water. The MP’s grants have been used for constructing 5-6 stand posts with water taps. But all these stand posts are now damaged and taps are broken, as there is no Narmada water supplied to the village! The women of the village are totally frustrated and feel helpless! They made angry presentation to us, and when they came to know that we are not from the government, they became angrier!

Water from distant farms is not reliable, as its availability depends on the sweet will of farmers! Frequently farmers do not allow women to draw more than a few pots of water.

We were told that even when the connection to Narmada water was there in the village, the water supply was highly irregular and inadequate!

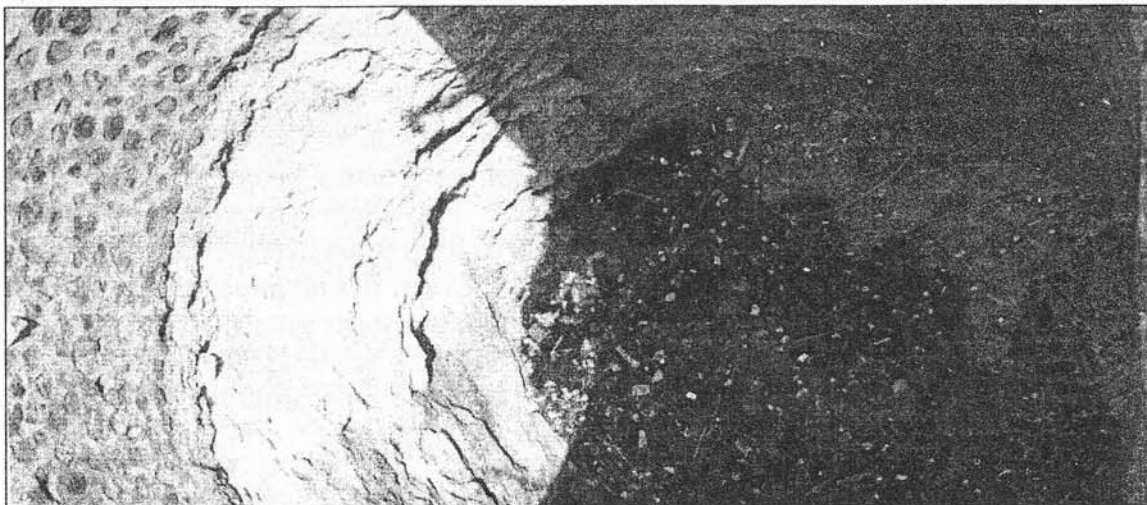
In *Amarsar & Ner* villages Narmada water comes once in a week. These villages are earthquake affected villages of Bhachau taluka of Kachchh district. Amarsar is the original village, while Ner is “adopted village”. Since the twin villages are under the WASMO project, they have full infrastructure related to drinking water, such as an overhead tank, household connections etc. The Narmada water has not yet reached the village. Women walk up to 1-3 Km to fetch water from nearby farms.

To sum up, it has not been possible for authorities to provide Narmada water to villages covered under the Narmada project in a way that water supply is adequate, regular and dependable. On the one hand, there are problems relating to electricity supply and maintaining timings of water supply, while on the other hand, there are problems relating to maintaining pressure and flow of water supply and preventing breakages and leakages of the pipeline. Consequently, regular and reliable water supply is neither available to the villages located near to pumping stations nor to the tail end villages.

Discouragement to local Sources of water supply

An important insight emerging from the case studies is that local sources of water supply are neglected badly under the Narmada Project.

It is interesting to note that each of the case study villages has good local sources. *Loliya*, the village flooded with Narmada water, is located between two rivers, namely, Omkar and Bhogavo. The rivers have sweet water during the monsoon, though it becomes saline after the monsoon. The village also has two huge ponds with three wells sunk in the tanks. The well has water for about 9-10 during the year. At present, the local water sources are badly neglected (in fact, the freely available Narmada water flows in to the tanks many times!), as Narmada water is available. However, as was mentioned by a local expert, the village can definitely collect adequate potable water for itself by constructing check dams and other rain water harvesting structures.



Picture 5.4 Open well of Babarkot has become solid waste dumping point

Babarkot has good ground water, which is used for drinking not only by the local population but also by a large number of households from Paliad. There are good chances of developing local sources to meet the local needs. *Mevasa* is situated on the bank of the river Chhaparvali, with two dams located nearby. The river has water for about 8 months in a year, and with two well-designed check dams, the village can surely collect water for drinking and domestic use. *Khambhala* is again spread on both the sides of the river Ghelo, which has water for about 8 months in a year. About 500 farmers of the village irrigate their crops with the water from the dams constructed on the river. The village can easily collect adequate water for its drinking and domestic use. *Dudhai and Amarsar* villages of Kachchh are given Narmada water under the earthquake reconstruction project. Both these villages have excellent local sources, which can easily take care of the local demand for drinking and domestic water.

Nani Paliad and Kunjisar are described as villages without local sources of water supply. However, a careful look at the village level situation showed that farms near to Nani Paliad do provide water to the villages and that Kunjisar has a local tank that is badly neglected. Developing local water sources to meet the local domestic needs may not be very easy, but there are possibilities. These possibilities are however ignored in the wake of the Narmada project.

In short, the local water sources of water supply are neglected under the Narmada Project. This is mainly because no serious attempts are made to take care of local sources or to augment local sources for drinking water after the village is connected to the Narmada project. There is neither any provision nor any incentive given to development of local sources under the Narmada project. This neglect of local water resources is indeed a big loss to the State. There is definitely a need to encourage their augmentation even if they are considered to be inadequate to meet the total local demand.

Distribution of Narmada Water within the Village

Another glaring weak point of the Narmada project is that the water is highly unevenly distributed within the villages.

As seen earlier, under the Narmada Project, the GWSSB is responsible for taking water to the village. In some cases GWSSB puts up one or two stand posts to enable people to collect water. However, it is the Pani Samiti or the Village Panchayat that is responsible for distribution of this water to the different parts of the village. Distribution of water within a village is done by putting up pipelines, along with valves at different locations in a way that high and low lying areas receive water regularly. Water is then provided through household connections or by putting up stand posts with water taps in each locality.

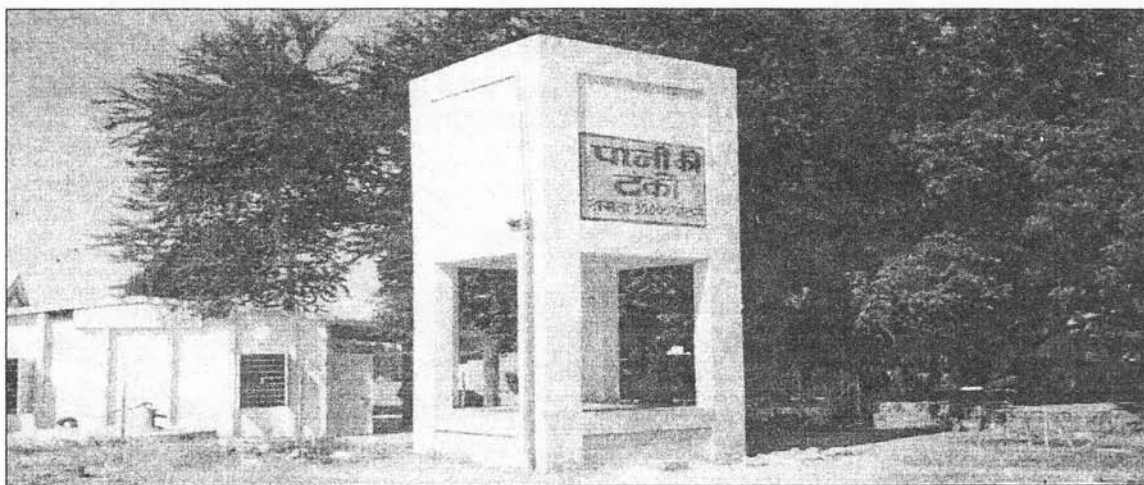
Our case studies show that these arrangements are not satisfactory in Loliya, Mevasa and Babarkot, where household connections are common. The gravity-based distribution frequently deprives high lying areas of adequate water supply. Though valves are supposed to be there to ensure equitable distribution of water, they are not used either because they are not in place, or because they are out of order or not operated efficiently. Secondly, the poorer areas that cannot afford household connections are not given

adequate number of stand posts or these stand posts are not maintained well. Thirdly, household water taps are many times makeshift arrangements, frequently have plastic tubes and flimsy taps. The breakages and leakages of these connections results in wastage of water on the one hand and deprivation of poorer households on the other hand.

An important aspect of the distribution of water within the village is the use of non-durable non standard material. Most households use plastic tubes or low quality rubber tubes, which break very easily. For water taps, most people use a non durable plastic tap or a flimsy tap. The joints are usually weak and leaking. Water taps on the stand posts frequently do not have taps that can be closed. There are frequently broken or stolen. The *havada* for animals are leaking and invariably dirty, located near the outlet of Narmada water. These places are frequently stinking.

In Nani Paliad and Khambhala there is only one stand post with people fighting to get access to the water. In Dudhai village, where the Pani Samiti under WASMO has organized distribution of water to different parts of the village has a problem of unequal access because Narmada water comes on alternate days and those who lack enough facility for storing water, find it difficult to manage.

The problem of inadequate storage facilities with poor households is a common problem, particularly when water supply is not regular.

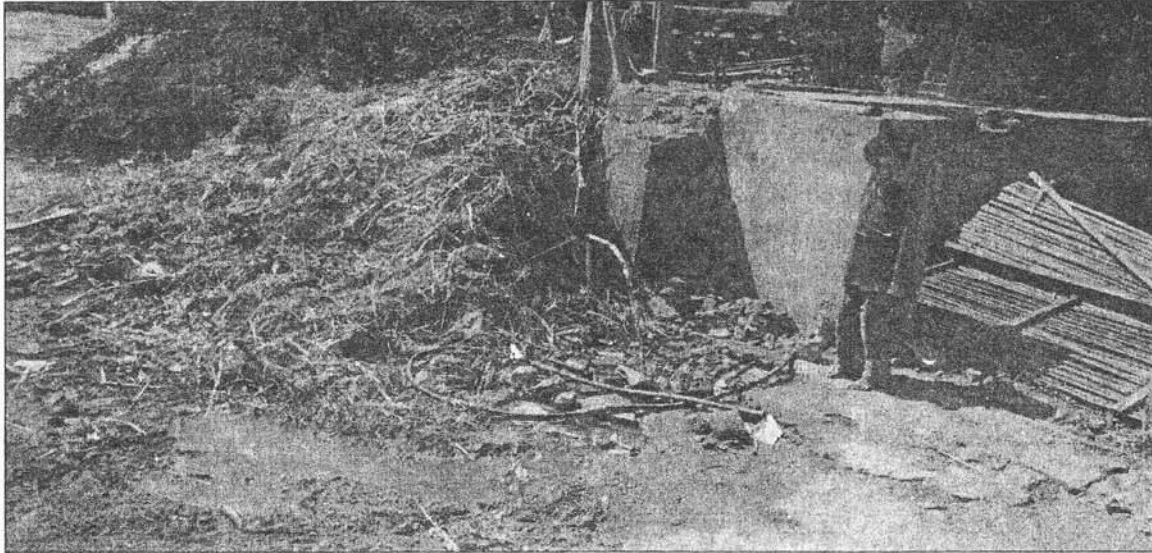


Picture 4.5 Unused Elevated Storage Reservoir in Amarsar Village

However in case Amarsar village, after earth quake an Elevated Storage Reservoir (ESR) of 30,000 litre capacity was constructed and about 60 households were connected to the same. But today Narmada water in the village is directly connected to the common stand post and the *Havada*, and the ESR is standing unused. It shows the lack of village level capacity of water distribution and management.

On the other hand, big and medium farmers, who have good irrigation facilities, frequently take away the lion's share of the total water supply. Though conceptually speaking, ground water belongs to the entire village, those with access to wells and tube wells corner a highly disproportionate share of water supply. They do not have to worry

about the status of the Narmada water. For example, Khambala's connecting pipeline broke two months ago, but farmers did not take any interest, with the result that the majority of the population is left at the mercy of the farmers with wells / tubewells. These farmers are also not interested in developing local sources for drinking and domestic use. Thus they are also responsible for unequal access of people to drinking and domestic water supply.



Picture 4.6 Location of Common Stand Post in Ner Village of Kachchh

Some time the location of the common stand post is not at a hygienic or convenient place. In some of the villages we observed that the common stand post is located near common waste dumping site as shown in the picture below. It is a matter of concern as it may cause contamination in the water supply as well as causes poor aesthetics.

The distribution of water within the village is indeed a serious matter! It results in loss of water, contamination of water and consequent diseases.

Quality of Narmada Water

Generally people do not seem to worry about the quality of water! The only thing they worry about is the odour, colour and taste of water.

In Mevasa and Khambala, raw water is provided. (In Khambhala Narmada water has stopped due to the breakage in the pipeline). In Dudhai, Kunjisar, Amarsar-Ner and Loliya no testing is done, and people do not consider it necessary. In Dudhai a member of the Pani Samiti told us that there is no need to test Narmada water, as it is always good.

If any testing is done in these villages, people are not aware of it. In Loliya, there was a complaint made by some people that Narmada water is muddy sometimes. The solution of the villagers is to allow such water to flow away for some time and wait for "good" water that follows.

Though the local lineman is expected to treat the water locally when “if necessary”, no lineman was doing it, at least in these villages. This is because “there are no complaints about the quality” or “the quality is good” or “we have no access to quality data”. We visited several pumping stations and water treatment plants near to the selected villages. Our experience with the pumping station was that though the water was covered, direct lifting was allowed to those who came to get water. Ordinary buckets or vessels and rope were used to take water from the tank / sump at the pumping station. This was clearly not desirable for maintaining the quality of water supply. Sumps are expected to be cleared once in 3-4 months, but without regular supervision from authorities.

The treatment plants are operated by private companies. However, there was no readily available data on the quality of treated water and there was no display of the quality data also. We were told that the duty of the companies, as per the contract, is to treat the water, test the water and display the results. Data on quality of water was not available at the local GWSSB offices.

In short, there is an overall indifference towards quality of water. This indifference is observed on the part of people, Pani Samiti members as well as on the part of authorities.

Pani Samitis (Water Committee)

Since setting up of a Pani Samiti is mandatory, it is very common for a Sarpanch to state that there is a Pani Samiti in the village. In Mevasa and Khambhala, the husband of the woman Sarpanch manages the show on her behalf. Both the men reported that there was a Pani Samiti in the village though their wives were not sure of this. Our investigations revealed that there was no Pani Samiti in these villages. In Loliya, the man Sarpanch reported that there is a Pani Samiti in the village, others in the village did not agree with this claim. In Nani Paliad and Kunjisar also there is no Pani Samiti.

In Amarsav-Ner and Dudhai (both WASMO village) Pani Samiti is very much there, though it is not active in Amarsav-Ner. In fact, it was only in Dudhai that Pani Samiti is found to be very active. We met the members of the Pani Samiti (the Pani Samiti has 14 members, three of them women) and were told that they meet every month. A women member of the Pani Samiti (appeared to be very active) told us that the Samiti is aware about the problem of disposal of used water and that they were planning a facility for disposal of used water in the village.

Even in Dudhai, however, the Pani Samiti has not been able to recover water charges. We were told that only 50% households pay water charges. The Pani Samiti also has not been able to develop local water sources, which are in plenty in the village.

The overall situation is thus not highly satisfactory. This raises a basic question: How feasible is the expectation that Pani Samitis will be able to shoulder the total responsibility of managing water supply locally, and what kind of inputs are needed to make Pani Samitis vibrant? We will discuss these questions at a later stage.

Financial Charges and Recovery

An important feature of the Narmada Project is that the water charges will recover the O & M costs of the project. This requires that (1) water charges are fixed according to the O & M costs and (2) these are recovered from village households.

It needs to be underlined that there are two kinds of O & M costs in a village: O & M cost of bringing Narmada water to the village and O & M cost of distribution of water within the village. The former cost is incurred by the GWSSB and is to be paid by the village to GWSSB, while the latter cost is incurred by the village Panchayat and is to be paid by households to the Pani Samiti or to the Panchayat. Households thus have to pay for both the O & M costs.

The present rate charged by GWSSB to a village is Rs 14/- per person per year. In Kunjisar and Nani Paliad nobody collects any water charges, because water supply is so irregular and inadequate that no household will ever pay it. In other villages also the collection of these charges is poor.

In Dudhai households are expected to pay at the rate of Rs 14/- per person per year if they do not take Narmada water connection. In Khambhala and Amarsar – Ner also the charges are Rs 14/ per person per year. The recovery is very poor in all the three villages. It is 50% in Dudhai, 60% in Khambhala and 40% in Amarsavr– Ner.

In Loliya, Babarkot and Dudhai they charge higher rates for Narmada water connection and Narmada water supply. These villages charge between Rs 200-250 for household connection, and Rs 30 to Rs 100 as annual charges per household for providing water in individual connections. Those who do not take individual connection have to pay between Rs 25 to Rs 100 per household for using Narmada water. The recovery is between 50-60 percent. However, these Panchayats refuse to pay any water charges to GWSSB, as the amount collected is required for meeting O & M costs in the village.

It was argued by these villages that Narmada water should be provided free to them. However, bills are being sent by GWSSB to these villages and each of them has huge over dues, running in to thousands of rupees.

Operation and Maintenance of Narmada Project

All the villages covered under the case studies are observed to be receiving irregular water supply, emanating from breakages in the inter village pipelines, with the result that not a single village received un-interrupted flow of water.

The reasons for breakages were (1) poor maintenance of the pipelines and (2) deliberate breakages for siphoning off water. It was observed that fluctuating pressure of water supply, natural causes like floods and the usual wear and tear of open to sky pipelines need efficient maintenance. An additional reason for the high maintenance requirement is the quality of pipelines and quality of joints. Though it has been decided to do away with AC pipelines and asbestos pipelines, these are used in non-mainlines. The new technology of joints also is limited to a few mainlines. In addition, deliberate breaking of pipelines by farmers, cowherds and others in the water starved regions is very common. There are innumerable newspaper reports on these.

The breakages and leakages result in to (1) frequent interruptions in water supply (2) loss of expensive Narmada water, (3) contamination of water supply and (4) increasing cost of O & M of the pipeline. It is indeed a Herculean task to police a long distance pipeline, which is going to be more than 3000 Km in length!

The O & M work has been entrusted to private contractors who appoint linemen to do the job. The duties of a lineman is (1) to open and close the valve (2) maintain the pipeline, clean the tank periodically (3) report breakages / leakages and manage its repair (4) observe the quality of water (get the data on water testings) and (5) apply chlorine or any such material if water is found to be contaminated and (6) support the Pani Samiti / Village Panchayat in managing the Narmada water supply. However, contractors are always keen to reduce their costs by (1) understaffing (the lineman of Babarkot is in charge of 8 villages!), (2) spending minimum amount on regular O & M, (3) using inferior parts and (4) delaying repairs. Our discussion with a number of linemen revealed that they are encouraged to reduce O & M costs of the pipeline.

There is no adequate supervision of the contractors by GWSSB and of linemen by contractors. (It is interesting that the contractors we met were all relatives of the GWSSB staff in the local office!) It is also difficult to protect a long pipeline like this from farmers, from livestock owners and from general public when there is an overall shortage of water in the region. It is indeed on Herculean task!

The unholy alliance of the lineman and the contractor with the GWSSB local offices has resulted in manipulation of data on the availability of drinking water. In fact, we consider this unholy alliance a big threat to proper reporting of local situation to GWSSB. For example, at the GWSSB office at Botad taluka we saw that Nani Paliad, which suffers from acute shortage of drinking water, was reported as "receiving 135000 liters of water every day from 10.00 Am to 12.00 noon without a single break!" when we questioned the concerned officers about this, he said he had no idea how it happened!

It appears to us that within the given organization of the O & M of the pipelines, it is difficult to ensure good maintenance of the pipelines.

Disposal of Used Water

Disposal of used water does not appear as a component of the project. However, it is an important requirement to be managed within the village. Systematic disposal of used water has many advantages: (1) the used water can be used for backyard vegetables or for growing vegetables on common land, if it is treated, (2) this water can also be used, along with a latrine facility, for producing manure, (3) proper disposal can reduce the incidence of disease like malaria (as Loliya villagers put it, " Narmada has brought malaria to Loliya) and (4) it can also reduce contamination in drinking water by disposing off used water systematically.

In none of the case studies we found systematic arrangements for disposal of used (Narmada) water. Though one observed some arrangements made in better off localities of the villages, the over all management was not adequate in any village.

Dudhai Pani Samiti was the only Pani Samiti, thanks to the WASMO approach, that it is planning a village level disposal system. We were told that other WASMO villages may consider it at a later stage. The rest of the villages however lack this approach. In short, disposal of used water has not received enough attention of policy makers so far.

To sum up, the case studies have given very good insight in to what is happening behind the data collected through the schedules. The case studies have shown that bringing Narmada water to villages in an uninterrupted manner is not an easy task. Even after huge capital investments made on setting up pumping stations, treatment plants and long pipelines, and appointing a network of contractors to maintain the pipelines, the task of providing potable water to people regularly and in adequate quantity and quality is not an easy task.

The major challenges seem to come from the following problems:

- Maintenance of long distance pipelines, ensuring the pressure & flow of water supply as well protection from breakages and leakages is a big challenge.
- Ensuring potable quality of water supply at all the levels, including at the village level is another important challenge.
- Providing equitable distribution of water to the different section of the population within a village is again a challenging task
- Ensuring financial viability even for O & M costs is not an easy task, and
- Organizing systematic disposal of used water is also a task that deserves attention.

What kind of capacity building is necessary to enable Pani Samitis to manage their tasks is an important question that needs to be replied carefully.

Concluding Observations and Inferences For Interventions

Government of Gujarat has taken a landmark step by launching the largest drinking water project in the world! The project covers 9633 villages out of the total of 18114 villages and 131 urban centers out of the total of 145 urban centers in the State.

The project is seen as a solution to the drinking water problem in the state, particularly in the water starved regions of Kachchh, Saurashtra and North Gujarat. This pipeline based project was designed in the context of the massive drought of 2001, which covered almost the entire state creating severe shortage of drinking water in many regions. The project is a flag ship project, frequently presented as an outstanding achievement of the State.

There are several unique features of this project that distinguish it from other regional pipeline schemes or multi village schemes. These features are relating to technical design, quantity and quality monitoring, innovative institutions, financial viability etc. The project is thus designed to do much better than the other regional pipeline schemes.

Limited Outcomes of the Project: In spite of all these positive features, the project does not seem to be doing very well! To start with, it is not able to ensure adequate water supply in a regular and dependable manner in all the regions covered under the project. Secondly, the goal of financial viability, of meeting at least O & M costs by water charges, is also not yet achieved. Thirdly, the institutions set up under the project, including Pani Panchayats and private companies for water treatment and private contractors for operation and maintenance of the project do not appear to be doing well. And lastly, the project has not been able to ensure equitable distribution of water to different areas and different socioeconomic groups within the village.

In short, this flagship project of the State is likely to give the expected results only if its working is improved in many ways.

Factors Responsible for Limited Success: Our study has indicated that there are several reasons for this limited success. The first major reason is the limited capability of the administration (and for that matter any administration) to manage such a huge project. The administration has to maintain and use these long pipelines running in to hundreds of kilometers on the surface; it has to maintain even pressure of water to prevent breakages & leakages; undertake regular maintenance audit even when the pipelines are not broken; protect the pipelines from breakages and leakages by farmers, livestock owners and powerful groups; and organize quick repairs in the event of breakages. These are indeed very challenging tasks, which are difficult to accomplish. The State government has appointed private companies / contractors for support, but unless strict supervision is organized, private agencies are not likely to deliver the goods.

The second major reason is relating to certain technical issues. For example, it is not easy to stick to the timings and quantity of water supply when electricity is not available regularly. Our discussions with several regional offices of GWSSB revealed that it is not

possible for them to ensure a fixed quantity of water supply during fixed period, when they have no control over the regularity of supply of electricity. Again the tree configuration of distribution of water results in deprivation of a large number of villages if something goes wrong in the beginning of a pipeline system. A star configuration is better, but is more expensive and has been rejected by the authorities. The tail end villages therefore invariably suffer from lack of continuous flow of water supply in most cases.

Though it has been decided to use better quality pipelines and 'stronger joints', it is not always possible to replace old pipelines by better ones or lay down expensive pipelines for want of enough funds. It is also necessary to use good quality pipelines (and not flimsy rubber or plastic pipes) and standard water taps within a village for distributing Narmada water. The use of sub standard material results in loss of water as well as contamination of water supply. In fact, there is a need to fix norms regarding the quality of pipelines and taps used within a village.

The third major factor responsible for the limited achievements of the project is the inability of the administration to charge and recover at least O & M costs to make the project financially viable. This non-viability has made the project a big drain on the state economy. It seems that the political climate in the state makes it difficult to raise water charges substantially. Since the money spent on the project is not recovered (even O & M costs), the progress of the project has slowed down. The target of completing the project by the end of the Tenth Five Year Plan (by 2007) is not likely to be achieved.

The rising financial burden is also due to the neglect of local sources, which are relatively cheap and also reliable if managed well. Our study has shown that there is a clear shift to bulk transfer of water as a source of drinking water in the State at the cost of tanks & ponds, wells & borewells and local rain water harvesting structures. If the costly water of the project is not affordable to people, there is a need to shift to cheaper local options. This will reduce the financial burden as well as administrative burden.

The fourth important factor responsible for the poor success is the weak institutional set up at the village level. Village level institutions – Pani Samiti, Village Panchayat or similar agency – can play an important role in the successful implementation of the project by (1) ensuring equitable distribution of water supply to different areas and to different socio economic groups (2) by organizing efficient system for disposal of used water (3) managing water supply by ensuring good operation and maintenance, (4) by attending to complaints and problems suitably, (5) by imposing and collecting appropriate water charges to manage the water system and to pay to GWSSB and (6) by promoting democratic decision making through adopting the right rules and regulation. In fact, the Government circular on Pani Samiti aims exactly at these goals. Somehow it has not been possible to organize strong institutions at the village level under the project. Pani Samitis are not equipped yet to take on the responsibilities mentioned above and Panchayats are not strong enough to manage the system well. As a result intra village working of the project has remained quite weak.

WASMO, an innovative institutions set up by the government of Gujarat for the purpose of promoting community based water and sanitation management, has contributed considerably in this area by taking up villages covered under the Narmada Project for setting up strong local institutions. A large number of NGOs have also set up strong

community organizations in these villages to manage village level working of the project. However, as seen earlier a lot is still to be done to strengthen this critical aspect of the Narmada Project.

And lastly, increasing dependence on regional schemes in General, including Narmada water has resulted in the neglect of local water resources. The local sources have either disappeared or degraded or neglected in most villages covered under the Narmada Project. This has created the following problems:

- The unit price of water used in the village has gone up as outside water, and particularly Narmada water is expensive. The O & M cost of this water is much more than the water charges prevalent today. It is likely that many households are either not able or not willing to pay these charges. The management of financial viability therefore has become a difficult problem.
- The neglect of local sources has also resulted in the neglect of local systems/conventions that took care of maintenance and repair of local sources. The neglect has brought in a culture of dependence, dependence on outsiders for a basic necessity like water.
- Loss of local sources has reduced the control of local population on drinking water resources. The availability of water supply is now left to outside arrangements that protect or break inter village pipelines. Any theft or any damage to the long distance pipeline running across villages can interrupt water supply to the village.
- Development of local resources through rainwater harvesting has several additional benefits for the village. The regeneration of land and water resources in a village is likely to regenerate the ecology as well as the economy of the village. By neglecting regeneration of the local sources, the project has impacted adversely on the village ecology and the village economy.

A Way Forward

Before we make any recommendations for the future, it is important to note that the project has so far covered only 2044 villages out of the total of 9633 villages to be covered finally. That is only one fifth of the villages have been covered so far. In the case of urban areas 58 out of the total 131 have been covered, implying 44 percent coverage so far. An important implication of this is that it is feasible to introduce mid course corrections in the project. In fact, making mid course corrections is one of the major objectives of this concurrent monitoring.

It will be useful to discuss some critical questions in this context to define and design the areas of mid course corrections and recommend measures that help in ensuring adequate, potable and dependable drinking water to all at an affordable price.

Is Narmada Project A Back Up or a Main Stay of Drinking Water Policy?

It is argued in the policy documents of Government of Gujarat that the Narmada project is a back up project, in the sense that it provides water when local sources are not available. However, there are several interpretations of this “back up” role of the project:

- Narmada water should be provided only during the summer months, i.e. for 3-4 months, as most villages do have local sources for the rest of the year.
- Narmada water should stop during the four monsoon months when rain water is available and when wells and tanks are recharged
- Narmada project should provide 40 lpcd (or 70 lpcd) to all through out the year. If a village wants to consume more water, it should augment its own resources.

It is not clear which of these interpretations is accepted officially. However, our study has shown that Narmada water is “available” to covered villages through out the year and there are no clear demarcations in terms of months. The study shows that once the water starts coming, it stops when the pipelines can be fed through the sources of smaller regional schemes. But one cannot discern any clear policy or programme on this. This is one of the reasons why one observes a significant decline in the use of local sources of water supply. In other words, the ‘back up’ role of the project in practice is to provide Narmada water as and when demanded.

Need for a Coordinated Approach: We, however, interpret the concept of ‘back up’ slightly. According to us, if Narmada water is to be used as ‘back up’ it is necessary that Narmada water and local water sources are used in a coordinated manner under which local sources are not subjected to clear neglect. We therefore recommend the following approach of bringing about coordination between local sources and Narmada water.

A village should be covered under the Narmada project (now onwards) only on a condition that it develops its local resources. A small investigation should be organized through a local engineer to identify and determine the potential of local sources. Narmada water should enter the village after or along with the approval of the plan of action of development of local resources. Financial incentives, such as capital loan and subsidy, or grants should be organized for villages that develop and use their own resources. The higher the share of local water sources, the higher should be the financial incentives.

Villages should be provided technical and financial assistance for developing local water resources. Villages are already getting such assistance under Swajaldhara project. It will help if Swajaldhara is linked with Narmada project. Again, Narmada water should be provided at the price that covers its O & M costs. The higher charges also will act as an incentive for developing local cheap resources.

In short, Narmada water, which is expensive, should be treated as a back up, i.e. should be used only when the less expensive alternatives are not available.

This raises an important question: Is it necessary to invest Rs 8000 crores (or more at the current prices today) on pipelines, pumping stations, treatment plants etc in setting up the

Narmada Project if its water is to be used 3-4 months a year? Also, will it be technically feasible to maintain empty pipelines for 6-8-10 months a year? Will they break or be damaged due to the lack of pressure of water? The answer to this question calls for technical expertise.

Again, it is to be recognized that development of local water resources contributes to drinking water only if (1) water augmentation is carried out on a large scale, and at suitable locations and (2) it is carried out for a number of years, say 3 to 7 years. The capability of providing assured water supply by local sources improves with time and scale both. Our investigation has also shown that there are villages where a large number of farmers are irrigating their crops, some times for two or more seasons, but the villagers suffer from shortage of drinking water. There is therefore a need to augment water resources within the village (and not far away on farms) and manage its use locally. It will not be practicable to depend on outside agencies for management of local drinking water resources. Also, there is a need to reserve the required quantity of augmented local water supply for drinking purpose. If we assume that a village with an annual average rainfall of 500 mm and more is capable of augmenting dependable drinking water supply in 5 to 7 years, it may not be desirable to make huge investments under the Narmada project. There is a need to consider this possibility seriously.

To sum up, there is a need to develop a coordinated approach systematically keeping in mind pros and cons of both the sides. It is possible that we may decide reducing the coverage of Narmada project by removing some villages – the villages which have or which can have adequate local sources to meet the demand for drinking and domestic water - from its coverage.

Improving Performance of the Narmada Project

It is clear from our study that there is a need to improve the working of the Narmada Project to ensure adequate, regular and dependable water supply to people covered under the project. This improvement is required to ensure regular and adequate supply to the village as well as to ensure equitable distribution of water within the village.

The first objective requires that the performance of the project is improved radically to the point till the water comes to the village. We make three sets of recommendations here: recommendations to improve the technological component of the project, better organization of water storage to ensure continuous flow of water and institutional / administrative changes to ensure improved performance of administration.

Technology: The project needs to be strengthened technologically – even if it comes to increasing the cost of the project. There is no point in economizing on the cost at the risk of depriving people of water. The following changes are recommended in this context:

Discarding tree configuration of pipelines design for star configuration will help in maintaining even pressure in the pipeline and in removing the problems of tail end villages. One breakage in a pipeline system will not disturb the entire pipeline.

Use of improved quality of pipelines by substituting improved quality of pipelines for asbestos and AC Cement pipelines will reduce breakages to a considerable extent. These

pipelines will not break easily during floods or during fluctuations in the pressure of water supply. All old pipelines of poor quality should be replaced by better quality pipelines.

O & M should be organized on a routine basis and systematic maintenance audit should be a part and parcel of the O & M system. A well-designed O & M system will improve the working of pipelines considerably.

Storage facilities should be developed in order to maintain regularity of water supply, in a way that irregular electricity does not upset the timings of water supply. If possible arrangements should be made with the GEB for regular supply of electricity (under Jyotigram Yohana?)

High standards / norms should be set up for O & M operation, under the project.

Institutional Improvements: On the institutional side, several changes are needed.

Capacity building of GWSSB staff at all levels to equip them to carry out a huge project like the Narmada Project. This training should be technical, managerial as well as motivational.

Capacity building of Panchayat members and Pani Samiti will go a long way in improving operation and management of the project at the local level.

Development of performance indicators for the working of pumping station, treatment plants and O & M function, and organizing systematic monitoring based on these indicators.

Adopting transparent methods for selection of contractors and private companies for undertaking the responsibility of treatment plant, pumping station and O & M tasks.

Introducing punishment clauses for failure of providing an interrupted water supply and implementing these clauses strictly.

Making linemen accountable to the Panchayat will be useful if the signature of the Sarpanch is made mandatory before the lineman is paid his salary.

Strengthening Village Level Institutions: Poor management of Narmada water within the village is one of the weakest points of the project. There is a need to take steps to bring about quantum jump in the efficiency of working of Pani Samiti supported by Village Panchayat. The major areas that need focussed attention are:

Setting up standard quality pipelines with standard quality taps by making rules and by organizing strict supervision

Organizing valves as well as distribution of water in a way that low lying and high lying areas can access adequate waters.

Fixing up required number of stand posts with quality of taps keeping in mind the needs of poorer areas

Organizing systematic operation and maintenance of the entire distribution system

Organizing proper system of disposal of used water along with provision of sanitation facilities.

Fixing proper water charges in a way that the local O & M costs are taken care of as well as the O & M charges are paid to GWSSB, and

Supervise the working of lineman to make him accountable to the Panchayat.

Appoint and involve women members in the Pani Samiti and in the management of the local water system, and

Pani Samiti should monitor the supply of Narmada water reaching to the village in an active and systematic manner.

In order that Pani Samiti, supported by the Village Panchayat is able to undertake these tasks, it will be necessary to equip and empower Pani Samitis. This will require (1) changes in the rules regarding the Pani Samiti to expand its role and responsibility, (2) financial and technical assistance to Pani Samiti, (3) capacity building of its members and (4) strict monitoring of Pani Samiti by a body consisting of higher Panchayats and GWSSB.

We also see an important role for NGOs and civil society organizations in this exercise. In addition, help of professional bodies can also be taken for strengthening of local management of drinking water. In short, this is an area where Panchayat bodies, NGOs, professional bodies, (training institutes and expert organizations) and government can work together in a coordinated manner.

Ensuring Potable Quality of Water

Quality of water is another major neglected area of the Narmada Project. There is a need to focus on the quality dimension of the water. In this context, we recommend the following:

Distribution of raw water should be minimized by expediting construction of treatment plants, as included in the Narmada Project. A date should be fixed, beyond which no raw water should be distributed to villages.

Water testing for a minimum number of parameters should be organized at all the levels – treatment plant, pumping station and at the village level – in a way that adequate information is available on the quality of water supply

Results of all testing should be displayed at all the levels for general public to know. The results of the tests should not be treated as secrets, but should be treated as a right to information for people. In each village such test results should be displayed at prominent places.

Each Village Panchayat / Pani Samiti should be provided a test – kit to enable them to test water at least once in a month. Pani Samiti should be assisted in treating non-potable water by the required support, such as a chlorination plant.

Awareness should be generated among people about the importance of quality of drinking water. Involving community organizations / NGOs in this task will be useful.

Outcomes of Involving Civil Society Organizations

This monitoring was a collaborative effort of organizations like CFDA, the ITP and PRAVAH. The PRAVAH Secretariat, PRAVAH members as well as a large number of civil society organizations participated in this study, particularly in collection of data from various secondary sources (at the village level) and in canvassing the two schedules. This involvement, which can be termed as a civic monitoring, has given several positive results.

To start with, the study has contributed to capacity building of NGOs / CBOs in data collection from different sources and in conducting field surveys with care for details. This will enable them to conduct such small studies when necessary.

Secondly, the study has empowered NGOs / CBOs and other people by improving their understanding of the dimensions of drinking water problem at the ground level. It has also improved their understanding about how Pani Samiti and Panchayat function in the water sector.

Thirdly, this has created an enabling condition for PRAVAH to carry on its policy advocacy function with the aware NGOs and CBOs. The study has also provided scientific inputs to PRAVAH for policy monitoring.

It needs to be noted, however, that CFDA faced some difficulties due to the involvement of NGOs / CBOs in the field investigation: To start with, we had to devote a lot of time in training & capacity building in the beginning as well as in follow up training workshops to be sure that we get the right kind of data. Frequently we sent the schedules back to be refilled when the right kind of information was not collected. This resulted in delays in data entry and analysis, sometimes upsetting the schedules of work. In some cases, there was a large turn over of workers, with the result that we had to organize additional training as well as follow up of the investigation. This again was time consuming.

Summing Up

While summing up the study, we would like to observe that there is a good scope for improving the performance of the Narmada Project as well as for improving the drinking water related approach of the Gujarat Government. That is, the inferences following from the study are not only for improving the working of the Narmada Project, they are also for reorienting the state policy for drinking water.

As far as the Narmada Project is concerned, there are three sets of suggestions. To start with, there is a need to implement the guidelines and rules already set up for the project. The study has observed a significant gap between the rules and their implementation at the field level. For example, there is a need to follow the norms regarding the quantity of water, regularity and dependability of water supply, distance that a person has to travel to fetch water, number of water taps / stand posts per population size etc. These norms need to be implemented strictly.

Secondly, the project has neglected quite a few areas, which are critical for the success of the project. Some of these areas are installation of water meter for ensuring adequacy of water supply, quality testing and monitoring for ensuring potability of water supply, disposal of used water, financial viability, distribution of water within the village, Pani Samiti etc. These areas need a focused attention of policy makers

And lastly, the study has thrown up some basic questions regarding the working of the project. Reply to these questions call for major modifications in the project. For example, use of star configuration rather than three configurations of pipelines, organizing O & M in a scientific and systematic basis, organizing regular electricity supply or constructing adequate storage capacities etc will improve the efficiency of the NPP.

The final issue, however, is to see beyond the pipeline project to solve the problem of drinking water in the state. The neglect of a major source or a set of source of water supply, namely, local sources is a neglect that cannot be afforded by a state like ours. Considering the fact that this source is and can contribute a huge supply of water, implies that there is a need to develop a coordinated approach using both the source where the local source is the main source and the distance source is the supplementary source. There is thus a need to reorient the existing policy for a sustainable, affordable and feasible approach to drinking water. Since the Narmada project has covered less than 25 percent of villages so far, it is feasible to introduce mid course corrections based on this concurrent monitoring.

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