Tadwadi – Morewadi
Piped Drinking Water Scheme
A Failure Analysis

CENTRE FOR TECHNOLOGY ALTERNATIVES FOR RURAL AREAS (CTARA)

INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

Reference

The scope of this work includes a failure analysis of the *Tadwadi-Morewadi* single village drinking water scheme from technical and social perspectives. The work also provides a list of pre-conditions that must be satisfied if the scheme has to be revived and sustained.

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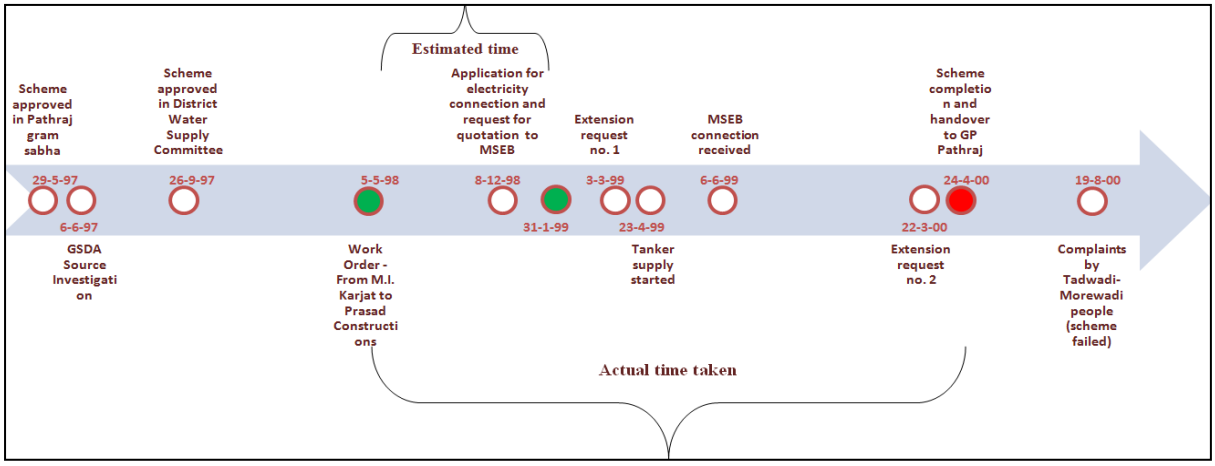
Executive Summary

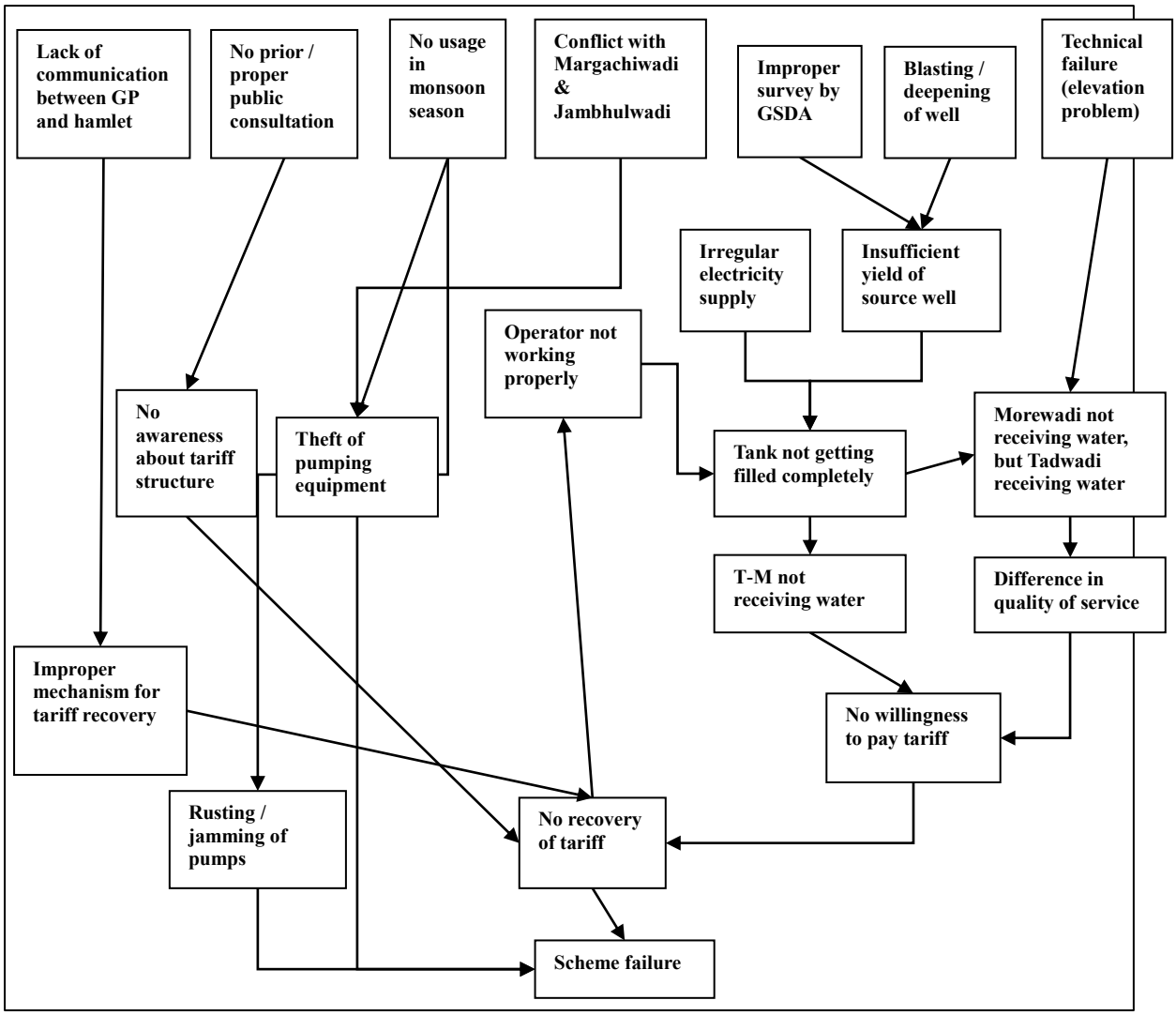
The goal of this study is to analyse a single village drinking water scheme and understand the reasons for its failure from technical and social perspectives. The focus of the study is a scheme proposed in the year 1997 covering two habitations, *Tadwadi* and *Morewadi* which are part of Group Gram Panchayat *Patharaj* of Karjat block in Raigad district, Maharashtra.

The scheme was implemented by the Minor Irrigation department, Karjat, in the year 2000 for a total cost of Rs. 14.7 lakhs. The source of the water supply is a well, 2 kms south of the target region. The following figure shows the scheme timeline with relevant milestones.



According to the villagers of both the hamlets, the scheme was successfully completed, but became non-operational soon after. In order to understand the history of events that led to the failure, numerous field trips were carried out, informal discussions were held with villagers from concerned hamlets and interviews were conducted with current engineers from the Minor Irrigation Department, Gram Sevak of *Patharaj* Gram Panchayat and activists of Disha Kendra, an NGO active in this region. Government documents related to the scheme were acquired from the Minor Irrigation department office and a technical analysis was performed as well.

Based on the analysis, the failure of the scheme may be attributed to a combination of reasons. There was a technical problem in the height of the ground storage reservoir which was not high enough to provide water to *Morewadi* by gravity alone. Insufficient yield of the source well was another reason that was cited by some of the villagers which should be confirmed through yield tests. One social issue was a conflict with a neighbouring habitation. People from *Margachiwadi* had objected to this scheme since it used water from the well that they considered to be their traditional source of drinking water. This objection was not addressed and the conflict remained unresolved. There were some institutional and handover related problems also identified. The following figure depicts various problems that may have contributed to the scheme failure.



Drinking water continues to be a concern in *Tadwadi* and *Morewadi*. However, before this scheme can be revived some concrete steps would need to be taken. A yield test must be performed on the source well to determine if it has enough yield for all habitations that currently use this well. Recently, the land around the source well has been purchased by a private developer who is digging a private well close to the public well for construction use. The impact of this new well on the public well must be analysed and appropriate action must be taken if a significant impact is found. A village water committee must be formed to lead and own this initiative.

1 Introduction

This report presents the failure analysis of a failed drinking water scheme implemented in two villages, *Tadwadi* and *Morewadi* in *Patharaj* Gram Panchayat, Karjat Taluka, Raigad district of Maharashtra. Chapter 1 of the report introduces the target area of the project. The details of the scheme are discussed in Chapter 2. Findings of the failure analysis are presented in Chapter 3 followed by recommended next steps and future work in Chapter 4.

1.1 Geography

Hamlets *Tadwadi* and *Morewadi* are located in Karjat *taluka* of Raigad district at a distance of about 30 kms from Karjat town. They are situated on the Karjat – *Kashele* – *Khandas* road. The nearest railway station is *Neral* station. The two hamlets are well connected with each other via a road and are separated by a distance of less than one km. The hamlets fall within revenue boundary of *Patharaj* group gram panchayat (GP). *Patharaj* village is about 2-3 km. away from *Tadwadi* and *Morewadi*.

Habitation	Latitude	Longitude
Tadwadi	19.0695N	73.4432E
Morewadi	19.0705N	73.4505E

Figure 1: Map showing position of the target area

The region receives annual rainfall of about 3500 mm during monsoon season (June – September), but faces severe water scarcity in the months of April and May.

1.2 Hydrogeology

The entire region is covered by basaltic lava flows known as **Deccan traps**. Groundwater occurs in weathered mantle, fractures and joints in these traps. Depth of the wells in the region ranges between 3.5 m – 8.5 m below ground level. The yield of wells tapping in the region is poor to moderate. Majority of the wells go dry in summer season due to poor productive aquifer [1].

1.3 Demographics

According to the 1991 census data, based on which this scheme was designed; the total population of the target area was 637 souls (536 for *Tadwadi* and 101 for *Morewadi*). Both of the habitations are primarily tribal villages (thakar community). The population for *Tadwadi* and *Morewadi* according to 2001 census was 733 as shown in Figure 2.

Village Profile	
State: Maharastra	District: Raigarh
Sub-district: Karjat	Village: Tadwadi
Area details	
Area of village (in hectares)	399
Number of households	147
Population data based on 2001 census	
Total population - Persons	733
Total population - Males	364
Total population - Females	369
Scheduled castes population - Persons	0
Scheduled castes population - Males	0
Scheduled castes population - Females	0
Scheduled tribes population - Persons	726
Scheduled tribes population - Males	360
Scheduled tribes population - Females	366

Figure 2: Census 2001 data for Tadwadi

The major occupation here is agriculture. Primary crops are paddy and vegetables like brinjal during monsoon season. Due to acute scarcity of water apart from monsoon months, irrigation is impossible; hence farmers can only take one crop in a year. In dry months, some people work as daily wage labourers at nearby construction sites or MNREGA sites or have

small businesses. Majority of the houses are *kachcha*. Basic amenities like toilets have been made in the village through government schemes. Electricity is available in the village. *Anganwadi* and primary school education till class 4 are available in the villages. Secondary and high school education can be pursued at *Dongarpada, Kashele* or Karjat town.

1.4 Drinking water scenario in the region

There are two rivers in the region, *Shilar* and *Pej,* out of which *Shilar* is seasonal and *Pej* is perennial as it receives tail water from the Bhivpuri dam. *Gavandwadi* reservoir is one reservoir in this region.

Figure 3: Tadwadi region

The geology and geography of the region is such that groundwater here is not abundant in spite of receiving high rainfall during the monsoon season. Due to the typical nature of Deccan traps, the rainwater runs off instead of percolating into the ground. Hence groundwater is just found in the fractures and fissures of basaltic rocks. This results in low yields of the wells in the region.

In spite of all this, the main source of drinking water for the people in the region remains groundwater, most of which is available only till January or early February. This results in acute water scarcity for the rest of the dry season. There are few wells or some bunds which last till the beginning of monsoons. Such wells or bunds are generally far away from the village in which case the women of the village have to travel considerable amount of distance with 4-5 *kalshis* (vessels ranging from 10 to 20 litres in capacity) on their heads every day to fetch water. This distance can even be 2-3 km. in some cases. To resolve the issue some villages have started their own drinking water schemes with bore wells within the village boundaries. Drinking water sources for hamlets *Tadwadi*, *Morewadi* and nearby hamlets are shown in Table 1.

Table 1: Drinking Water Sources in the region

Hamlet	Water availability till Jan/Feb		Water availability from Feb-May	
	Water source	Dist. from village	Water source	Dist. from village
Tadwadi	Adachi well	500 m	Umranachi well	1.7 km
Morewadi	Tulshichi well	500 m	Gavandwadi bandhara	1.5 km
	Wangnachi well	500 m	Umranachi well	1.7 – 2 km
	Kamthachi well	500 m		
	Chadhnichi well	500 m		
Margachiwadi	Bore well scheme	-	Bore well	-
Jambhulwadi	Some nearby well	100-200 m	Data not available	-

1.5 Major Stakeholders

A. The villagers
- The primary stakeholders and beneficiaries of this scheme are villagers of *Tadwadi* and *Morewadi*.

- *Umranachi* well was traditionally used as a drinking water source by people from other nearby villages viz. *Margachiwadi*, *Jambhulwadi*. Also, the source well is located closer to *Margachiwadi* and *Jambhulwadi* than to *Tadwadi* and *Morewadi*. Hence even if people from Margachiwadi and Jambhulwadi are not direct beneficiaries of the scheme, they are important players in the functioning of the scheme.

B. Minor Irrigation department, Karjat
- The scheme is implemented by Minor Irrigation (MI) department, Karjat. It is located in Karjat town and is responsible for all Minor Irrigation schemes in Karjat tehsil.

- The Detailed Project Report (DPR) along with the cost estimation for the scheme was done by MI.

C. Contractor (Prasad Constructions)
- Tender for the scheme was awarded to Mr C. K. Rane of Shree Prasad Construction who is a registered contractor from Poshir in Karjat block.

D. Minor Irrigation department, Raigad Zilla Parishad (RZP), Alibag
- MI Karjat works directly under Executive Engineer, RZP, Alibag.

- The costing for the scheme is approved by Executive Engineer, MI, RZP, Alibag

- The funds for the scheme are allocated from the tribal sub plan to RZP Alibag, which are then transferred to MI Karjat and then to the contractor.

- Requests from the contractor such as project extensions are examined and approved by Executive Engineer, MI, RZP, Alibag

E. Disha Kendra
- Disha Kendra is an active NGO working in the Karjat block for many years.

- Nancy tai, Ashok bhau, Sushma tai, Leela tai are devoted activists of Disha Kendra who have in-depth knowledge about the problems faced by tribal people in the region.

- Disha Kendra has been in close contact with MI Karjat, BDO Karjat and Tehsildar Karjat regarding the drinking water problem of *Tadwadi* and *Morewadi*.

F. Maharashtra State Electricity Board
- The electric supply required for the scheme may demand extending electric supply to the pumping site, erection of electric poles and installation of meters. All these activities come under MSEB. The GP has to send an application to MSEB to carry out

all the above activities. The response time of MSEB becomes very crucial in such cases. The scheme work may get delayed due to lack of immediate response from MSEB

G. Block Development Officer, Karjat & Tehsildar, Karjat

- Both these officers are not directly involved in the scheme. But in absence of a transparent handover process, villagers often approach them with issues related to the scheme.

- GP may leverage BDO and Tehsildar to get answers from MI Karjat.

Following figure shows the interaction and flow of funds between various stakeholders in the working of *Tadwadi – Morewadi* scheme.

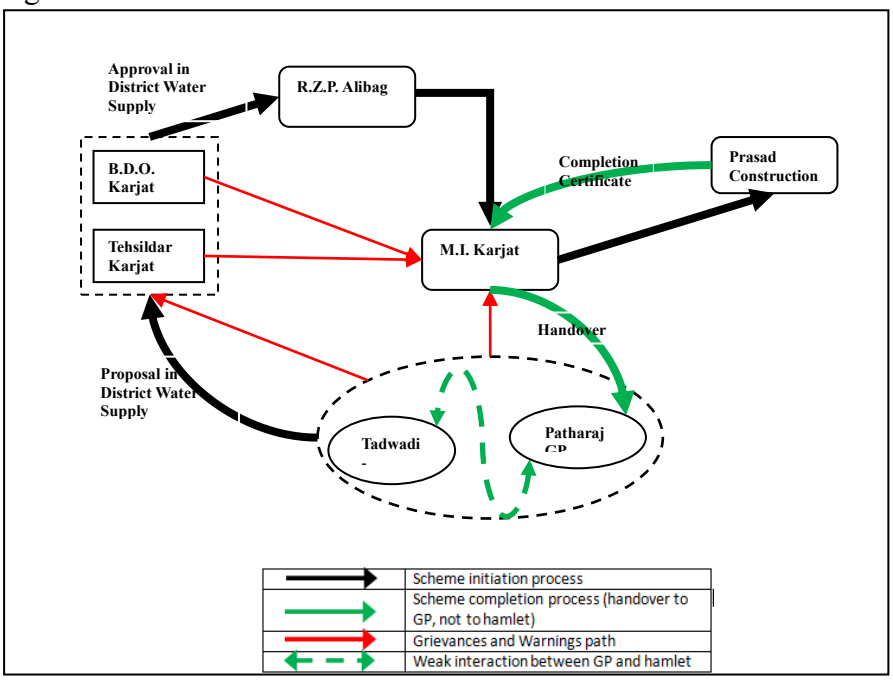


Figure 4: Interaction between stakeholders in Tadwadi – Morewadi Piped Water Supply Scheme

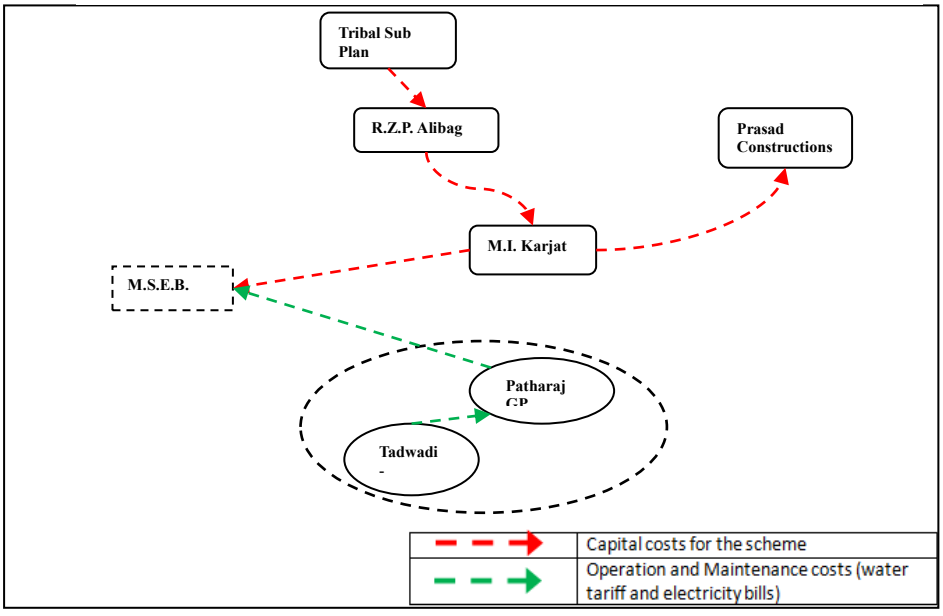


Figure 5: Funds flow in Tadwadi – Morewadi Piped Water Supply Scheme

Description of the scheme

This section describes the scheme as it was designed and implemented by the MI department [2].

2.1 Scheme Facts

- The scheme was proposed in the monthly Gram Sabha meeting of Gram Panchayat *Patharaj*, and was approved in the presence of Sarpanch, up-sarpanch and Gram Sabha members on 29th May 1997. The scheme was approved in District Water Supply Committee in Karjat on 26th September 1997.

- The scheme was designed to supply piped drinking water to hamlets *Tadwadi* and *Morewadi*. According to 1991 census, population of *Tadwadi* and *Morewadi* together was 637 souls (536 and 101 respectively). The scheme was designed for the year 2030 (ultimate stage) for a design population of 892 souls.

- The scheme was proposed to provide 55 litres per capita per day (lpcd) to the beneficiaries. For the year 2030, it translated to a daily requirement of 49,060 litres per day (lpd) (including losses).

- According to the investigation by Groundwater Survey and Development Agency (GSDA), the source for the scheme was identified to be an existing well, called *Umranachi well*, which is 1710 m from *Tadwadi* [3]. The certification letter from GSDA did not specify any measurements done or tests performed to establish the yield of the well.

- The tender for the scheme was awarded to Mr. C. K. Rane of Shree Prasad Construction, Poshir, Karjat. The scheme start date was decided to be 1st April 1998 and was to be completed on or before 31st January 1999.

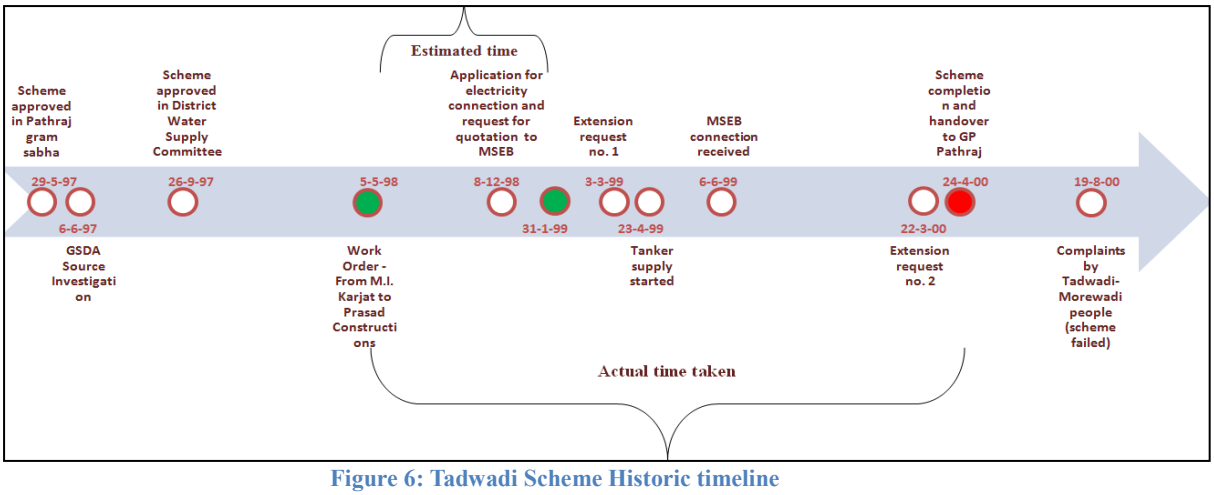


Figure 6: Tadwadi Scheme Historic timeline

- Old Scheme design:
  - The water from the well was to be pumped by means of 5 BHP submersible pump, with discharging capacity of 5000 litres per hour (lph) against 50 m

head, through 65 mm diameter pipe (1210 m long) to a cistern of 21000 litres capacity, located in *Tadwadi*.

- From *Tadwadi*, water was to be directed to *Morewadi* through 65 mm diameter pipe (500 m long) to a cistern of 10000 litres capacity. Both the cisterns were to have taps from where the villagers will fetch water.
- Nothing is mentioned about the flow of water from *Tadwadi* to *Morewadi* cistern. Looking at the elevation of *Tadwadi* and *Morewadi*, flow by gravity from GSR in *Tadwadi* to *Morewadi* seems impossible. But there is no mention of any pumping equipment in *Tadwadi*. [Appendix 1]
- The original cost estimated for the design was Rs. 11.5 lakhs based on 1996-97 schedule of rates.

- This design was modified after 8th December 1998 (i.e. just 2 months before the end date of the scheme). The design was modified after people of *Tadwadi* and *Morewadi* intervened. According to letter written by *Tadwadi – Morewadi* people to MI Karjat, they were not happy with two different cisterns in two hamlets. As per their view, due to irregular electric supply, they won't be able to control the water supply. They wanted a common cistern from which water will be distributed to both the hamlets. [Appendix 2]
- New scheme design:
  - The design was modified after the above intervention. According to the new design, the water from the well was to be pumped by means of the same 5BHP submersible pump by a rising main (65 mm in diameter) to a common Ground Storage Reservoir (GSR) of 25000 litres capacity, located between *Tadwadi* and *Morewadi*.
  - The GSR is 1710 m away from the source well, 272 m away from *Tadwadi* and 348 m away from *Morewadi*. Water was to be distributed to the hamlets through a distribution network consisting of three stand posts in *Tadwadi* and one stand post in *Morewadi*.
  - The revised estimate for the new design was Rs. 14.7 lakhs.

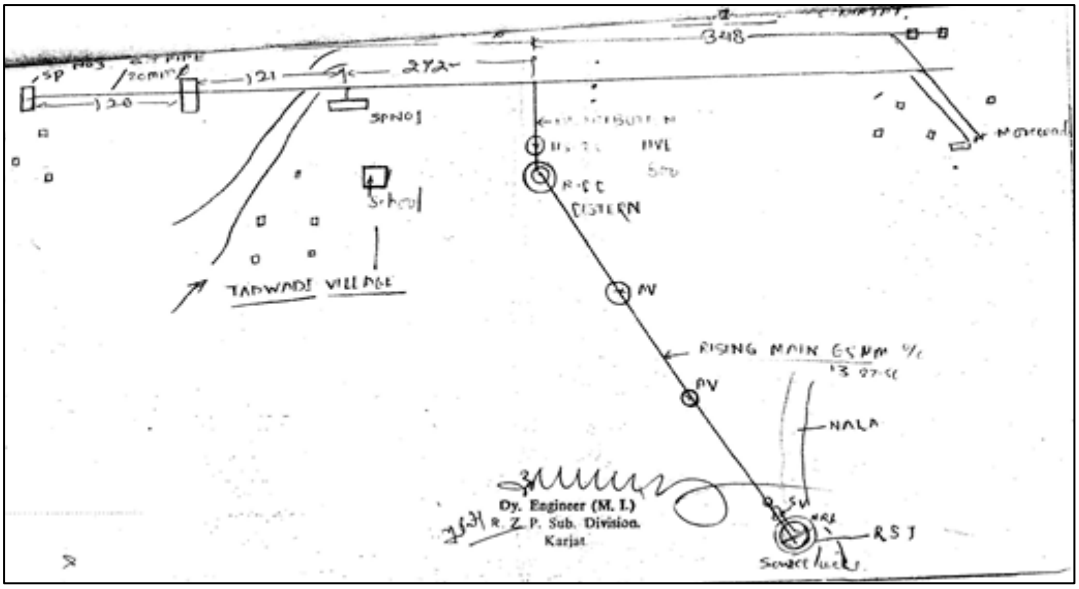


Figure 7: Modified scheme design

- The scheme could not be completed in stipulated time i.e. on 31st January 1999. The period was extended twice and was extended till 30th April 2000 [Appendix 3].
- Finally, the scheme was completed on 19th April 2000 and handed over to the *Patharaj* GP on 24th April 2000 [Appendix 4].

2.2 Components of the Scheme

A. Source well name – *Umranachi* well
   - Identified as a viable source for piped water supply scheme for *Tadwadi* and *Morewadi* in June 1997 by GSDA [3]
   - Dimensions of the well before the scheme: depth 3.048 m, diameter 3.048 m
   - Modifications proposed for the scheme (as per GSDA): depth 10 m, diameter 10 m

Figure 8: Source well

B. Pumping machinery
   - Duplicate set of 5.00 BHP submersible pumps (one in operation and one standby)
   - Discharging capacity – 5000 litres per hour (lph)
   - Daily 6 hours of pumping

C. Pump house
   - Length 2.5 m, breadth 2.5 m, height 2 m (B.B. Masonry walls)
   - Roof - A.C. Corrugated Asbestos Sheet

D. Ground Storage Reservoir (GSR)
   - 25000 litres capacity R.C.C. cistern

Figure 9: Ground Storage Reservoir (GSR)

E. Pipeline
   - G.I. class pipes
   - Rising main – 1330 m long; 65 mm diameter
   - Distribution network –
     1. 857 m long; 50 mm diameter
     2. 256 m long; 25 mm diameter

2.3 Current State of the Scheme

- Scheme has not functioned for last 12 years.
  - People of Tadwadi rely on *Adachi* well which is 500 m away from their hamlet. After January, they have to walk around 1.7 km to fetch water from *Umranachi* well, which lasts till end of dry season.
  - People of *Morewadi* rely on *Tulshichi* well and 3 other wells, all around 500 m from their hamlet. After January, they have to travel around 1.5 km to fetch water from *Gavandwadi* bund, which lasts till the end of dry season.
- Electric cables are not in place.
- Pumps may have been stolen (cannot be confirmed at this moment due to water in the well)
- Even if pumps are not stolen, they may not be in working condition due to jamming and rusting.
- Some sections of rising main and distribution network are not in place. Exact length of pipeline not in place can only be determined after excavation.
- RCC cistern is in good condition.
- Stand posts are in place.
- Land surrounding source well has been purchased by a private developer (Jagdish Bhavsar, Bhimashankar Hills)
- Due to fencing of the land, access route to the well has been blocked. *Tadwadi* villagers will not be able to access the source well during the coming dry season.
- A well is dug just 20 m upstream (in the *nala*) of *Umranachi well* by Bhimashankar Hills and is being used for providing water for construction activities.
- The new well may have negative impact on the source well in the coming dry season.

3 Failure Analysis

3.1 Methodology

This report is subsequent to the earlier work carried on by two students Rajesh Kumar Meena and Shashank Dangayach from IIT Bombay. The methodology adopted for the present analysis is as follows:

- Study of government documents (acquired from Minor Irrigation office)
- Study of previous report by Rajesh and Shashank [4]
- Meetings with stakeholders: People from *Tadwadi*, *Morewadi*, people from *Margachiwadi*, MI Karjat, Disha Kendra

Since the scheme was implemented 12 years ago, there were multiple views about the causes of scheme failure and very limited data available in the *Patharaj* GP office. Hence, this section is an attempt to piece the puzzle together to understand the failure of the scheme.

3.2 Causes of failure

Using the methodology mentioned above, technical, social and financial analysis of the scheme was carried out. The analysis brought out different aspects regarding the failure of the scheme. It is very difficult to attribute the failure of the scheme to any single reason. There were multiple reasons working in parallel which may have led to the failure.

3.2.1 Technical causes

The previous study [4] clearly pointed out that there was a serious technical fault in the design of the scheme. The GSR for the scheme, which was supposed to distribute water by gravity to *Tadwadi* and *Morewadi*, was found to be slightly lower in elevation than the *Morewadi* stand post.

According to the measurements done in the previous study, the *Morewadi* stand post was 70 cm higher than the GSR outlet, which meant that around 8500 litres of water out of available 25000 litres were not of any use to *Morewadi*. *Tadwadi* is downhill from the tank, so there would have been no problem of water flow in *Tadwadi*.

As per *Tadwadi* and *Morewadi* villagers, the tank was required to be more than half-filled for providing water to *Morewadi* with sufficient pressure. To overcome this issue, the operator was instructed to distribute water first to *Morewadi*, and then to *Tadwadi*, so that both the villages received water with sufficient pressure. This shows that there was a technical fault in the design of the scheme itself. Also, as per *Morewadi* people, the tank never got filled completely after the initial few days. So, only *Tadwadi* kept on receiving water before the scheme stopped entirely. Moreover, the tank was required to be filled twice a day from the well to meet the demand.

Thus, if the GSR was not getting filled completely, then the technical fault in GSR elevation could not be treated as the primary or only reason for scheme failure. The focus then needs to be shifted to GSR not getting filled. Following can be some reasons for this:

- Reduction in yield of source well

  As per the local people, the source well for the scheme, *Umranachi well* had sufficient yield before the scheme work started, as people from 5-6 nearby villages used to depend on it even during the dry season. But in 1998, blasting was done to deepen and widen the well, as a part of the scheme, as per the suggestion by GSDA. Sitaram Kevari and Mangal

Kevari from *Margachiwadi* are of the view that the yield has reduced after blasting. Also, there is no documented evidence of any yield test carried out by MI department or by Prasad Constructions after the blasting was done. So, if the yield had dropped to such a level, that there is not enough water to completely fill the tank every day, then this would have resulted in unequal supply of water to both the hamlets, which might have ultimately resulted in scheme failure.

- Irregular electric supply

  Tadwadi and *Morewadi* are situated in a region where there is heavy load-shedding during summer months. At times, electric supply is cut for 10 to 12 hours. Also, during load-shedding, the electric supply is not continuous and regular.
  As per the scheme design 6 hours of pumping is required every day. So if there is no continuous electric supply for 6 hours, the operator will be required to visit the pump house multiple times every day. Also, if the power is cut during day hours, operator may get 6 hours at a stretch only during night hours.
  But the pump house is far away from the hamlets. Hence going to pump house multiple times or during night is not easy. This can result in the tank not getting filled completely every day.

- Irregularity of the operator

  Even during non-load-shedding days, the scheme's success depends on the regularity and sincerity of the operator. The operator is required to see that the pump is operated for 6 hours every day and the tank gets filled completely each time. At the same time, he must see to it that water is distributed to both the hamlets proportionately. Any neglect or oversight in any of the above may cause conflicts between two hamlets and may ultimately lead to scheme failure. Moreover, the operator for this scheme, Kaluram from *Tadwadi,* complained that he did not receive his salary for the services he rendered when the scheme was operational. This could have been a disincentive which may have resulted in poor operation of the scheme. The operator did not maintain daily log book of pump operation. Hence the daily pumping hours data was not available.

Any or all of the above reasons may have contributed to the tank not being completely filled during the scheme operation.

3.2.2 Social / Cultural reasons

This section describes some of the social reasons that may have attributed to the scheme failure:

- Conflict with neighbouring hamlets

  After studying the government documents, we found one letter written by people of *Margachiwadi* to MI department regarding concerns over the use of *Umranachi well* as a source for the scheme [Appendix 5]. The source well is closer to *Margachiwadi* and *Jambhulwadi* than to *Tadwadi* and *Morewadi*, and was used by these villagers prior to the scheme. Hence the people from these hamlets objected to their well being made a source for a scheme for *Tadwadi* and *Morewadi*.
  According to people of *Tadwadi*, the scheme operated properly without any problems for a month or so, and then suddenly stopped functioning, the alleged reason being a cable

theft by the people of *Margachiwadi*. The operator claimed that he had lodged a complaint to Gram Panchayat *Patharaj* immediately after the theft, but no such records could be obtained.

- Non-usage of the scheme during monsoons

  According to senior engineer Mr. Jambukar from MI department, tribal people prefer fresh water directly available in wells over stored or piped water. Moreover, according to deputy engineer Mr. Gangurde, the source well and the pump house is surrounded with water during monsoons making access to pump house difficult during this time.
  Hence, when water is available in the nearby wells people rely on them rather than using the scheme. These nearby wells usually last till January. Thus if the scheme remains untouched for 8 consecutive months (June to January), there are more chances of pumps and other machinery getting rusted and jammed. This may lead to scheme failure.

3.2.3 Financial / Organizational reasons

- Lack of proper institutional mechanism

  The scheme got its completion certificate on 19th April 2000 [Appendix 3] and was handed over to the *Patharaj* gram panchayat on 24th April 2000. The handover document [Appendix 4] is signed by the Gram Sarpanch, *Patharaj*, MI Engineer, Karjat and Gram Vikas Adhikari, *Patharaj* but no one from *Tadwadi* or *Morewadi* was a signatory. As mentioned in the certificate, the operation and maintenance of the scheme was to be handled by *Patharaj* GP. Along with this, activities like structuring tariff for the scheme, tariff recovery from *Tadwadi* and *Morewadi*, giving salary to the operator, paying electricity bills etc. were called out as responsibilities of the *Patharaj* GP. But *Patharaj* village is around 2-3 km away from hamlets and is not a direct beneficiary of the scheme. *Tadwadi* and *Morewadi* are only two of the habitations of an otherwise large GP and hence may not have much say in the GP. In an ideal scenario, handover of any such scheme would be done to a water committee comprising of the direct users of the scheme. But there was no such committee in this case to voice the concerns of the beneficiary habitations when the scheme had problems. According to present Gram Sevak, Mr. Rathod, no record of the scheme can be found in the GP office. Also, as per his information, no tariff was collected for the scheme, no salary was paid to the operator and no electric bills were paid to MSEB.

- Lack of trial period for the scheme

  According to MI Deputy Engineer, Mr. Gangurde, all the new schemes should have a trial period before the scheme is handed over to the GP. The contractor has to prove that scheme is working properly during the trial period. This period is generally of six months. If the scheme works as per expectations in the trial period, then only it should be transferred to the GP. No such trial period existed for the *Tadwadi – Morewadi* scheme.

- Lack of awareness about the tariff structure and about the ownership of the scheme

  After conducting interviews with *Tadwadi* and *Morewadi* people, it was found that they were not fully educated about the tariff structure. This shows that there was no public consultation i.e. gram sabha meeting for discussing about the tariff structure for the

scheme. Also, after the scheme stopped functioning, *Tadwadi* and *Morewadi* villagers went to the BDO, Karjat for complaining about the scheme [2]. This shows that they were unaware about the ownership of the scheme and the fact that all the problems arising after handover had to be resolved at the GP level.

There is a prominent view that piped water schemes often fail because people are not willing to pay regular tariff. We found that there are deeper technical and social issues such as improper scheme design resulting in poor quality of service, lack of source yield data, poor institutional structure and poor handover that may result in dissatisfaction among people and eventually cause a failure of the scheme.

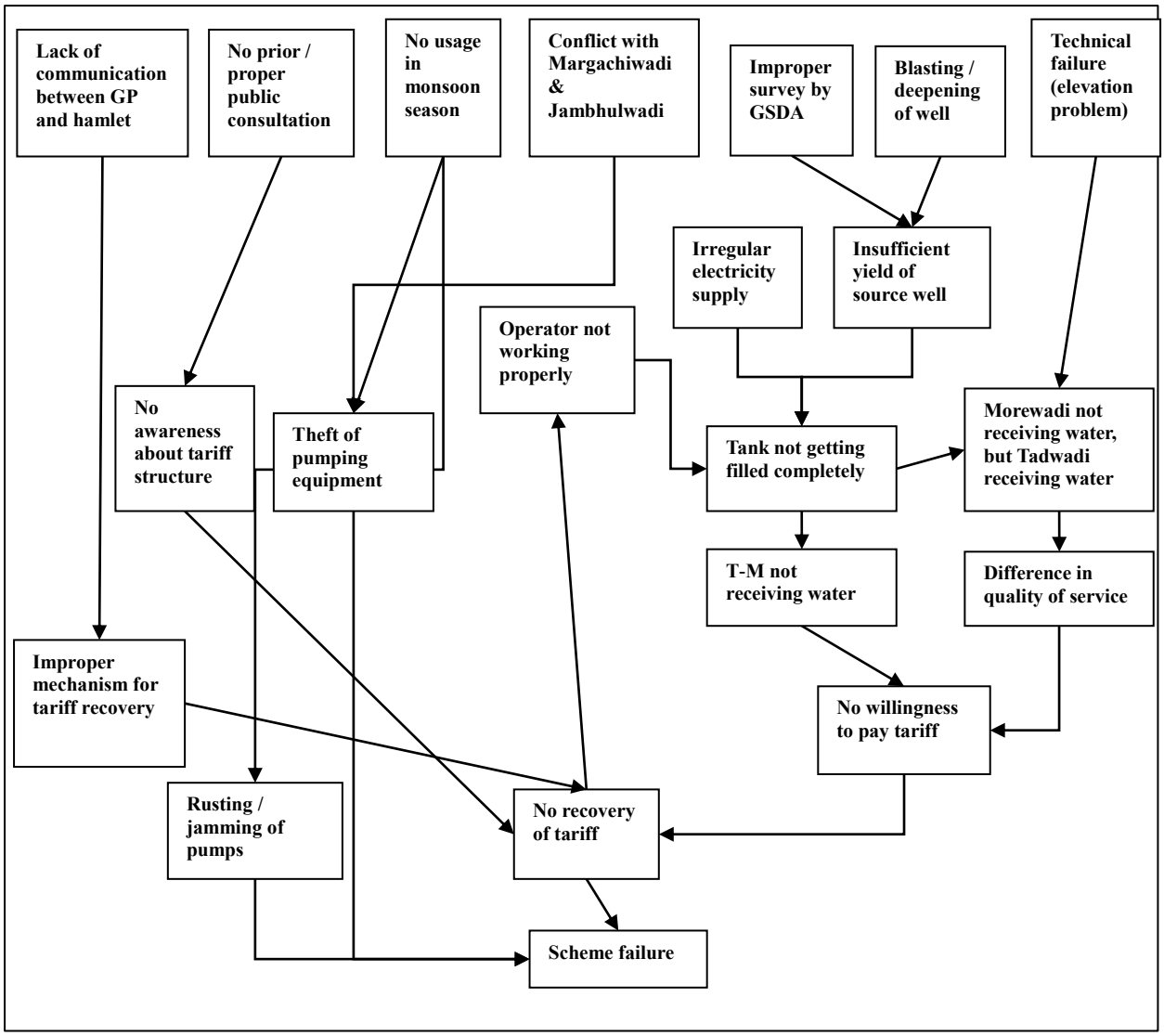


Figure 10: Failure Analysis of Tadwadi Scheme

4 Recommendations and Future Work

The *Tadwadi-Morewadi* scheme stopped functioning in the year 2000. 12 years after that, the scheme continues to be in the same state and the drinking water problem of *Tadwadi* and *Morewadi* remains unresolved. The people of *Tadwadi* and *Morewadi* want to revive this scheme with support from the NGO Disha Kendra. In such a scenario, following are some of the actions that would need to be taken before the scheme can be physically revived.

- Yield test of the source well needs to be carried out by a ZP geologist to check whether the yield is sufficient enough to provide required water to *Tadwadi – Morewadi*.

- Certificates of 'No objection' must be taken from the people of *Margachiwadi* and *Jambhulwadi*. It was found that *Margachiwadi* now has a separate drinking water scheme for their hamlet. Hence they may not have any problem with *Umranachi* well being used for the scheme. In a meeting with *Jambhulwadi* residents, it was claimed that they no longer have any objection with the scheme. But this agreement should be formally done on paper.

- The land surrounding the source well has been purchased by a private developer, Jagdish Bhavsar of Bhimashankar Hills, who is developing multiple bungalow plots on his land. To meet water demand for the construction activity, he has dug a well very close to the source well. In the future, this new well may be used to supply water to the residents of the bungalow scheme. Depending on the depth of this new well, there may be a strong negative impact on the yield of the source well. This needs to be studied carefully before going ahead with the revival of the scheme.

- Also, according Section 3 of the Groundwater Act [5], no new non-irrigation and non-drinking well may be dug within 500 m radius of a public drinking water source if they are in the same watershed. Thus, the legitimacy of the new well must be verified and challenged.

- The access path to the source well is fenced by the builder. Thus, fetching water in the absence of the scheme will become impossible for the people of *Tadwadi*. The fence needs to be removed and it must be ensured that the access path to the source well does not get blocked in the future.

- It needs to be checked if the pump house and the source well come under the land purchased by the builder. If they do, then appropriate actions must be taken to protect the equipment and ensure accessibility and availability of the well to the people.

- Height of GSR needs to be increased so that the outlet is higher than stand posts at both *Tadwadi* and *Morewadi*. Fresh elevation measurements should be done for this activity.

- *Tadwadi – Morewadi* people must be made aware of the revival of the scheme through a gram sabha meeting. During the meeting, estimated cost of revival, things done

during revival, estimated electricity bills per month, estimated tariff per month per household etc. must be well communicated to the people. Their recommendations should be taken into consideration and next step must be taken only after their consent.

- A water committee comprising of people from *Tadwadi* and *Morewadi* and Gram Vikas Adhikari, *Patharaj* GP must be formed. The scheme must be handed over to this committee. The committee will maintain bank account for *Tadwadi – Morewadi* scheme, a separate account for the salary of the operator, a log book of daily pumping hours with timings, record of electricity bills paid and receipts of tariff recovery.

- People must be made aware about the effects of not using the scheme during monsoons and come up with an alternative way.

4.1 Future Work

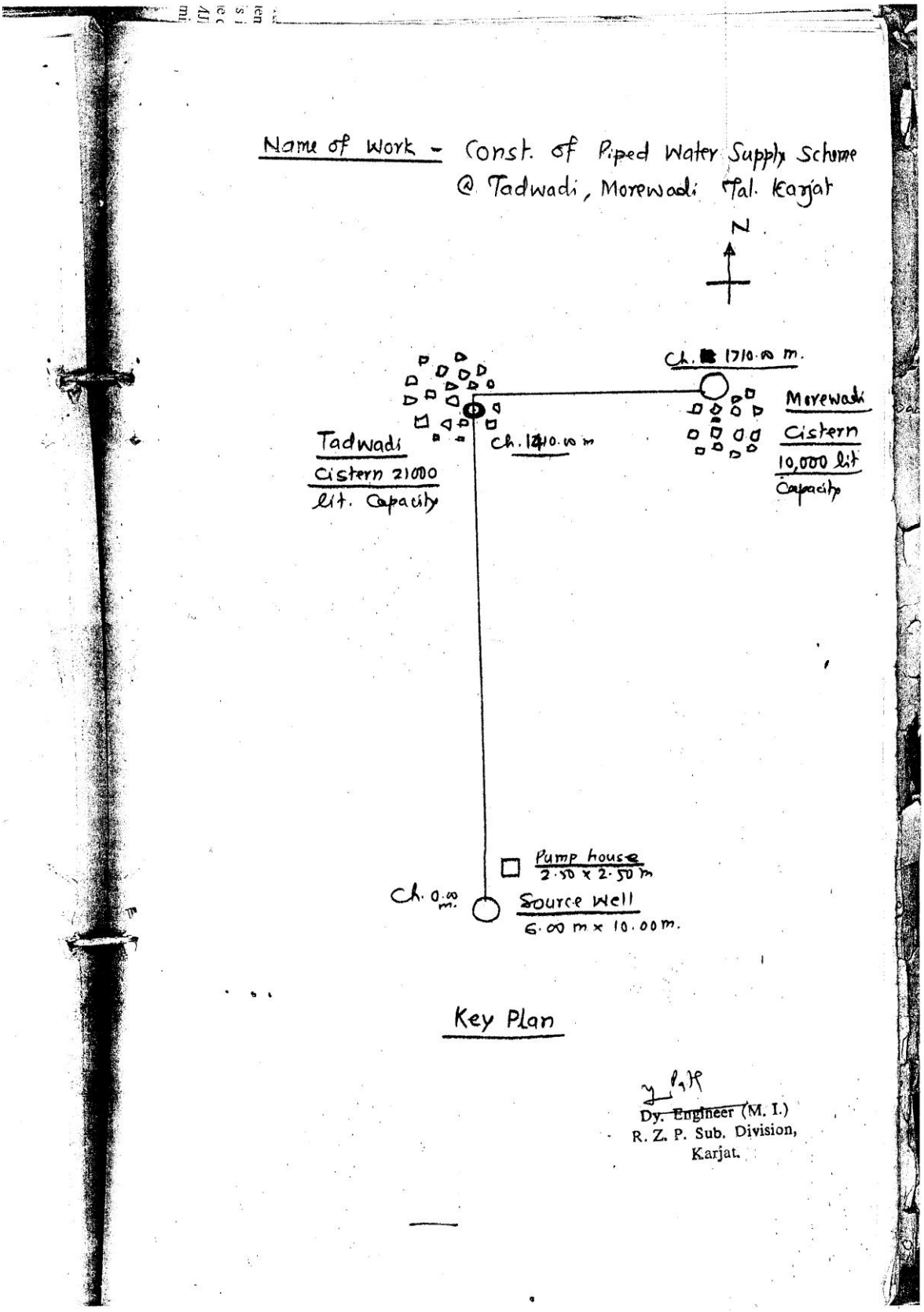
Karjat tehsil is becoming increasingly popular for second homes and farm house development. At many places, agricultural land of tribal people is being made non-agricultural for making them commercial. Many bungalow plots, farm houses, resorts etc. are being developed on this land. This is happening even though such conversion is not allowed if the land is owned by tribal people without an intervention from the collector [6]. In fact, tribals are not even allowed to sell their lands to non-tribals [7] but developers from Mumbai find different workarounds for doing this and the GPs exercise little power to stop it.

The region is already facing acute water scarcity during dry seasons. There are not enough water sources in the region to provide water to existing population. If new farm houses, bungalow plots are brought in, then there will be extra population to serve water. Plus, huge amount of water will be required for construction activities. To draw attention to this problem, it is important to perform a technical analysis of water demand and supply of the region and to take into account future water requirements and water budgeting when A-NA conversions are approved. Results of such an analysis should be made available to the Collector or CEO of the district, who has the final authority to give permissions for A-NA conversions.

References

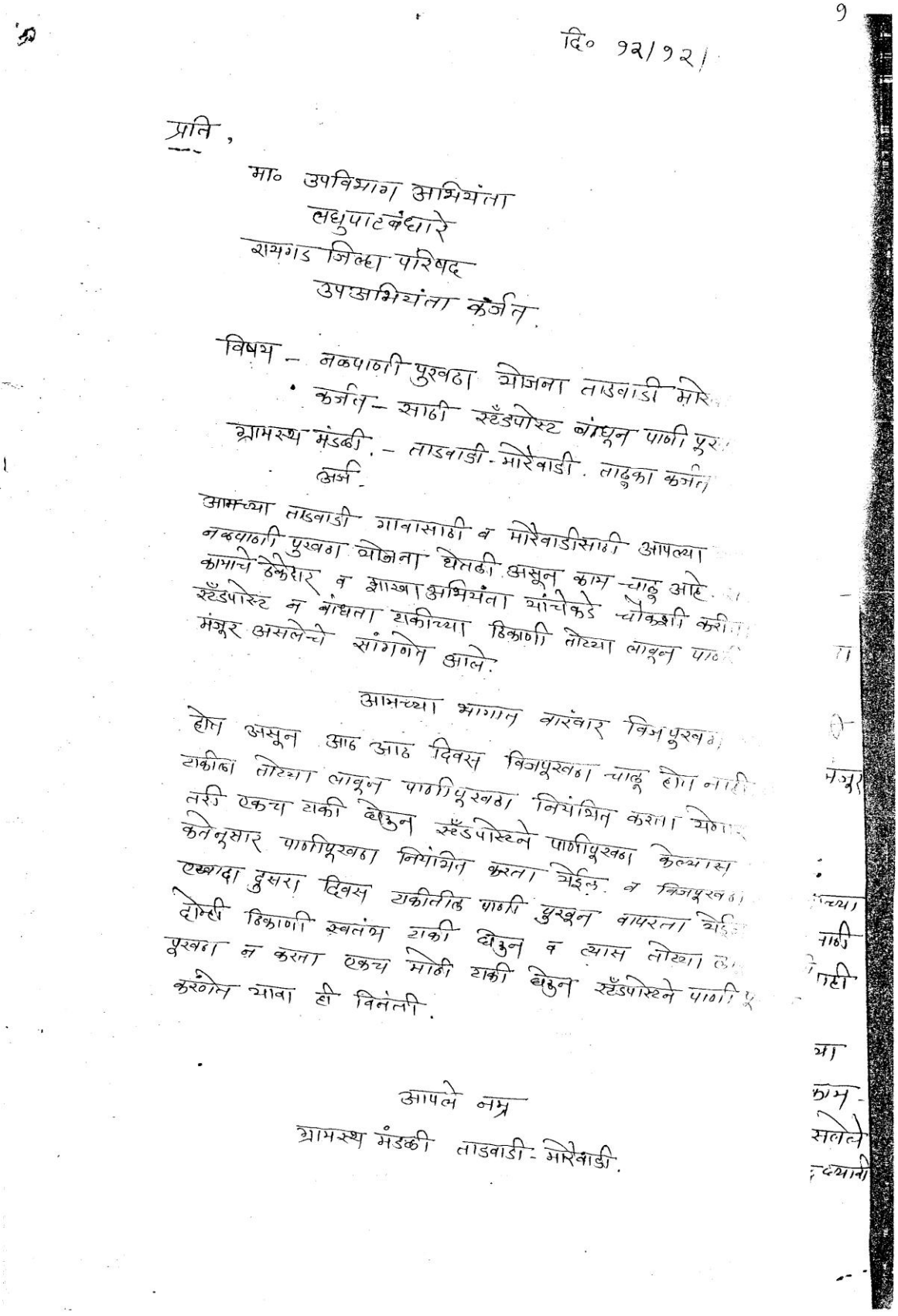
1. www.mahagsda.org
2. MI file for *Tadwadi-Morewadi* scheme obtained from the MI Karjat office
3. GSDA letter in the MI file for *Tadwadi-Morewadi* scheme
4. Tadwadi Report by Rajesh Kumar Meena and Shashank Dangayach
5. The Maharashtra Groundwater (Regulation for Drinking Water Purposes) Act, 1993 – (ielrc.org/content/e9301.pdf)
6. Section 63 of Bombay Tenancy and Agricultural Lands Act, 1948
7. Section 36 of Maharashtra Land Revenue Code and Tenancy Laws Act, (Amendment), 1974

Appendix 1: Original scheme design



Appendix 2: Letter requesting change in design

Dated 12th Dec 1998



दि० १२/१२/

प्रति,

मा० उपविभाग अभियंता
लघुपाटबंधारे
रायगड जिल्हा परिषद
उपअभियंता कर्जत.

विषय - नळपाणी पुरवठा योजना ताडवाडी मोरे
कर्जत - साठी स्टँडपोस्ट बांधून पाणी पुर
ग्रामस्थ मंडळी. - ताडवाडी-मोरेवाडी. ता/का कर्जत
अर्ज.

आमच्या ताडवाडी गावासाठी व मोरेवाडीसाठी आपल्या
नळपाणी पुरवठा योजना येतळी असून काम चालू आहे.
कामाचे ठेकेदार व आपला अभियंता यांचेकडे चौकशी करी
स्टँडपोस्ट न बांधता टाकीच्या ठिकाणी तेथिल लादून पा
मंजूर असलेचे सांगणेत आले.

आमच्या भागात वारंवार विजपुरवठा
होत असून आठ आठ दिवस विजपुरवठा चालू होत नाही
टाकीतील तोट्या लावून पाणीपुरवठा नियंत्रित करता येत
तरी एकच टाकी ठेवून स्टँडपोस्टने पाणीपुरवठा केल्यास
कोणसार पाणीपुरवठा नियंत्रित करता येईल व विजपुरवठा
एखादा दुसरा दिवस टाकीतील पाणी पुरवून वापरता येई
दोन्ही ठिकाणी स्वतंत्र टाकी ठेवून व त्यास तोट्या ला
पुरवठा न करता एकच मोठी टाकी ठेवून स्टँडपोस्टने पाणी पु
करणेत यावा ही विनंती.

आपले नम्र
ग्रामस्थ मंडळी ताडवाडी-मोरेवाडी.

(१) हासु महादू केवारी — हासमहदु केवारी
(२) रावजी पादु केवारी —
(३) लक्ष्मण पांडू केवारी — लक्ष्मण पांडु केवारी
(४) बाळू कमळू आगिवले — बाळु कमळु आगिवले
(५) मंगळ पांडू केवारी — मंगळ पांडू केवारी
(६) महादू हरि पादिर — म.ह. पादीर
(७) मधुकर रामा पादिर — मधुकर रामा पादिर
(८) अनंता भिका गावंडा — अनंता भिका गावंडा
आनंता भिका गावंडा
(९) विठ्ठल वामन सराई — विठ्ठल वामन सराई
(१०) विमळ गोविंद आगिवले (सदस्य) विमळगोविंदआगिवले
(११) विवीक अनंता गावंडा — विभिक आनंता गावंडा
(१२) भास्कर काशिनाथ आगिवले — भास्कर काशिनाथ अ
(१३) नारायण रामचंद्र डोंगरे — (उपसरपंच) — [signature]
(१४) कृष्णा रावजी पादिर — [signature]

Appendix 3: Scheme Completion Certificate

Dated 19th April 2000

36

(Form-65)

(See Rule 190)

- COMPLETION CERTIFICATE OR ORIGINAL WORK -

Name of work:- Construction of piped water Supply Scheme at Tadwadi Mosewadi Taluka Karjat

Authority:- Agreement No B1-18 of 1998-99

Agency:- Shri Prasad Construction Poshir.

Certified that the work mentioned above was completed on 19-4/2000 ~~199~~ and that there have been no material-deviati-ons from the sanctioned plan and specifications other that those sanctioned by competent authority.

Dy. Engineer (M. I.)
Z. P. Sub. Division,
Karjat.

Deputy Engineer

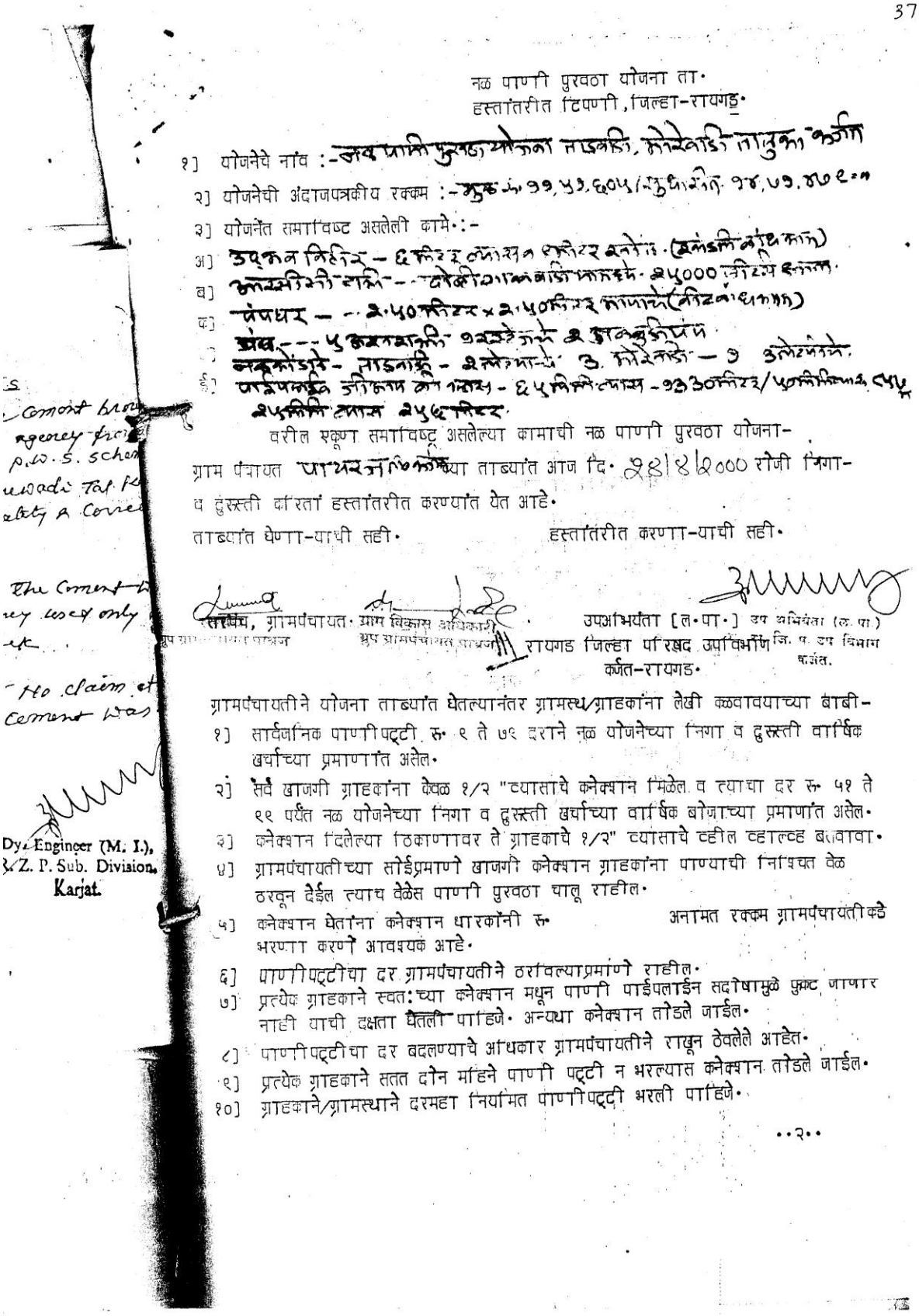
Z.P./P.S. ....

Executive Engineer,

Zilla Parishad ....

Appendix 4: Handover document

Dated 24th April 2000



37

नळ पाणी पुरवठा योजना ता·
हस्तांतरीत टिपणी, जिल्हा-रायगड·

१] योजनेचे नांव :-

२] योजनेची अंदाजपत्रकीय रक्कम :-

३] योजनेंत समाविष्ट असलेली कामे·:-

अ]

ब]

क]

ड]

इ]

वरील स्कूण समाविष्ट असलेल्या कामाची नळ पाणी पुरवठा योजना-
ग्राम पंचायत ताब्यांत आज दि· २४/४/२००० रोजी निगा-
व दुरुस्ती करितां हस्तांतरीत करण्यांत येत आहे·

ताब्यांत घेणा-याची सही·

हस्तांतरीत करणा-याची सही·

सरपंच, ग्रामपंचायत·

ग्राम विकास अधिकारी
ग्रुप ग्रामपंचायत पाभरेज

उपअभियंता [ल·पा·]
रायगड जिल्हा परिषद

उप अभियंता (ल. पा.)
जि. प. उप विभाग
कर्जत.

ग्रामपंचायतीने योजना ताब्यांत घेतल्यानंतर ग्रामस्थ/ग्राहकांना लेखी कळवावयाच्या बाबी-

१] सार्वजनिक पाणीपट्टी रू· ९ ते ७९ दराने नळ योजनेच्या निगा व दुरुस्ती वार्षिक खर्चाच्या प्रमाणांत असेल·

२] सर्व खाजगी ग्राहकांना केवळ १/२ "व्यासाचे कनेक्शन मिळेल व त्याचा दर रू· ५१ ते ९९ पर्यंत नळ योजनेच्या निगा व दुरुस्ती खर्चाच्या वार्षिक बोजाच्या प्रमाणांत असेल·

३] कनेक्शन दिलेल्या ठिकाणावर ते ग्राहकाचे १/२" व्यासाचे व्हील व्हाल्व्ह बसवावा·

४] ग्रामपंचायतीच्या सोईप्रमाणे खाजगी कनेक्शन ग्राहकांना पाण्याची निश्चित वेळ ठरवून देईल त्याच वेळेस पाणी पुरवठा चालू राहील·

५] कनेक्शन घेतांना कनेक्शन धारकांनी रू· अनामत रक्कम ग्रामपंचायतीकडे भरणा करणे आवश्यक आहे·

६] पाणीपट्टीचा दर ग्रामपंचायतीने ठरविल्याप्रमाणे राहील·

७] प्रत्येक ग्राहकाने स्वत:च्या कनेक्शन मधून पाणी पाईपलाईन सदोषामुळे फुकट जाणार नाही याची दक्षता घेतली पाहिजे· अन्यथा कनेक्शन तोडले जाईल·

८] पाणीपट्टीचा दर बदलण्याचे अधिकार ग्रामपंचायतीने राखून ठेवलेले आहेत·

९] प्रत्येक ग्राहकाने सतत दोन महिने पाणी पट्टी न भरल्यास कनेक्शन तोडले जाईल·

१०] ग्राहकाने/ग्रामस्थाने दरमहा नियमित पाणीपट्टी भरली पाहिजे·

··२··

Dy. Engineer (M. I.),
K.Z. P. Sub. Division,
Karjat.

ज्या ग्राहकाने दिलेले कनेक्शन तोडावयाचे असेल तर त्याची एक महिना आगाऊ तसे ग्रामपंचायतीस कळविले पाहिजे. त्यानंतर ग्राहकाकडे काही रक्कम येणे असल्यास ती कापून घेऊन अनामत रक्कम परत केली जाईल.

१२] खाजगी पाणी पट्टी शिवाय प्रत्येक ग्राहकांस दरडोई रु. प्रत्येक वर्षात सार्वजनिक पाणीपट्टी भरणे आवश्यक आहे.

१३] वीज पुरवठा अनियमित असल्यास पाणी पुरवठ्याच्या वेळाही अनियमित राहतील.

१४] उन्हाळ्यामध्ये उगमामधून उपलब्ध होणाऱ्या पाण्याप्रमाणे मिळणारे पाणी कमी अधिक मिळेल.

१५] कनेक्शन दिलेल्या ठिकाणापासून ग्राहकांस अतिरिक्त पाईप लाईन ग्राहकाने स्वखर्चाने घ्यावयाची आहे.

१६] ग्रामपंचायत पाणी पट्टी नियमाप्रमाणे वेळच्या वेळी वसूल करते किंवा नाही हे गटविकास अधिकारी याने पहावे नियमित वसूली करण्या-याने ग्रामपंचायतीला वसुली करण्याचे आदेश उपमुख्य कार्यकारी अधिकारी [ग्रा.पं.] यांनी द्यावयाचे आहेत.

१७] पाणीपट्टी वसुलीची रक्कम स्वतंत्र खाते उघडून बँकेत ठेवावी. व ती रक्कम त्याच-कामासाठी खर्च करता येईल.

१८] दुरूस्तीचा खर्च ग्रामपंचायतीने स्वत:च्या रकमेतुन करावा. त्या करीता वेगळे अनुदान जिल्हा परिषदेकडून मिळणार नाही.

वरील प्रमाणे बाँडवर अटी व शर्ती लिहून त्या कबूल असल्या बाबत ग्राहकांची सही घ्यावी व त्यांवर सरपंचाचीही सही असावी.

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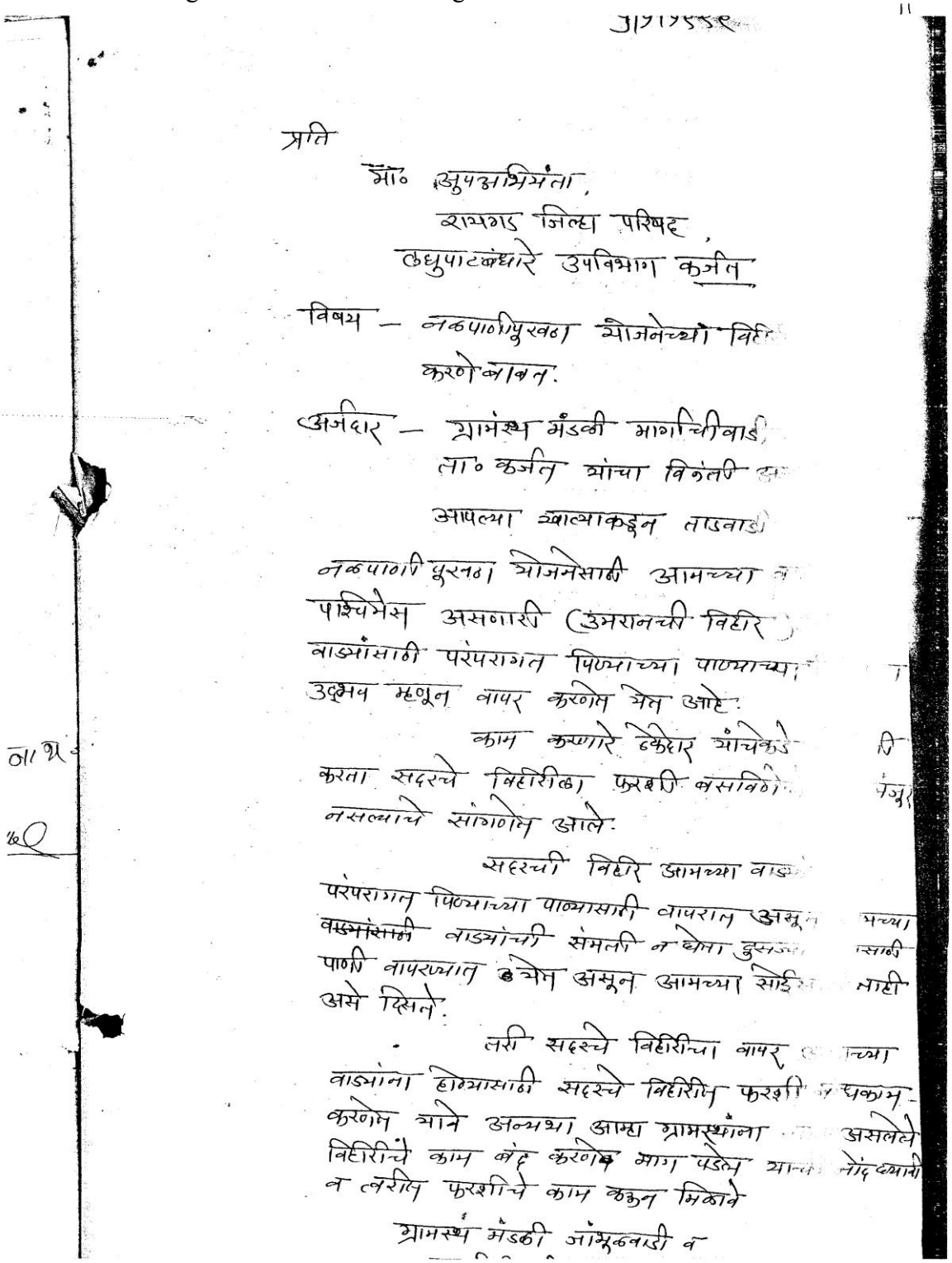
Appendix 5: Margachiwadi Letter

Letter dated 12th December 1998 from *Margachiwadi* and *Jambulwadi* residents complaining about the scheme using their traditional drinking water well as source



प्रति

मा० उपअभियंता,
रायगड जिल्हा परिषद,
लघुपाटबंधारे उपविभाग कर्जत

विषय – नळपाणीपुरवठा योजनेच्या विहि
करणेबाबत.

अर्जदार – ग्रामस्थ मंडळी मार्गाचीवाडी
ता० कर्जत यांचा विनंती
अपल्या खात्याकडून ताडवाडी
नळपाणी पुरवठा योजनेसाठी आमच्या
पश्चिमेस असणारी उभरानची विहिर
वाड्यांसाठी परंपरागत पिण्याच्या पाण्याच्या
उद्भव म्हणून वापर करणेस मेत आहे.

काम करणारे ठेकेदार यांचेकडे
करता सदरचे विहिरीला फरशी बसविणे
बसल्याचे सांगणेस आले.

सदरची विहिर आमच्या वाड्
परंपरागत पिण्याच्या पाण्यासाठी वापरात असून
वाड्यांसाठी वाड्यांची संमती न घेता दुसऱ्या
पाणी वापरण्यात येणे असून आमच्या गैर
असे दिसते.

तरी सदरचे विहिरीचा वापर
वाड्यांना होण्यासाठी सदरचे विहिरीस फरशी
करणेस यावे अन्यथा आम्हा ग्रामस्थांना
विहिरीचे काम बंद करणेस भाग पडेल
व तरीत फरशीचे काम करुन मिळावे

ग्रामस्थ मंडळी जांभूळवाडी व

नाव	सही
1) श्री. सिताराम देऊ केवारी	
2) श्री. रामचंद्र धर्मा पारधी	रामचंद्र धर्मा पारधी
3) श्री. हरिचंद्र धर्मा पारधी.	H.D. pardhi.
4) श्री. मंगरू राघो केवारी	मंगरू राघो केवारी
5) श्री. मोतीराम शंकर पुजारी	Pujari
6) श्री महादू धाकू पादीर	M.D.Padir
7) श्री. राम महादू केवारी	राम महादू केवारी
8) श्री. कांता भिका पादीर	K.B. Padir
9) श्री. मोतीराम चांगो पादीर	मोतीराम पादीर
10) श्री. काशिनाथ धाकू बांगारे	काशिनाथ धाकू बांगारे
11) श्री. गणेश महादू केवारी	G.M.Kevari
12) श्री. धोंडू धर्मा पारधी	धोंडू धर्मा पारधी
13) श्री. तुकाराम धाकू पादीर	तुकाराम पादीर
14) श्री. धाकू नागो केवारी	धाकू नागो केवारी

Appendix 6: Scheme Facts

MINOR IRRIGATION DIVISION R.Z.P. ALIBAG.
Tadwadi, Morewadi Village Water Supply Scheme.
Taluka Karjat. Dist:- Raigad.

MAIN FEATURES OF THE SCHEME.

1)	Name of Village.	Tad wadi, Morewadi.	
2)	Taluka	Karjat.	
3)	District	Raigad.	
4)	Source of Supply	Ground Water Source Well.	
5)	Population in persons(536+101) @@ as per 1991 census.	637 persons.	
6)	Populations in designed stage. (persons)	796 Immediate (2015)	892 Ultimate (2030)
7)	Rate of Water Supply	55 LPCD	55 LPCD
8 8)	Daily water supply in designed stage	43780 LPCD	49,060LPCD
9)	Daily gross demand with losses	43780 LPD	49,060 LPD
10)	Rate of Pumping (Litres per hour)	5000	5000
11)	Daily Pumping	6 hours	6 hours.
12)	Cost of the scheme DSR 19	Rs. 10,91,603.00 Net Rs. 11,46,838.00 Gross	
13)	Per Capita cost of the scheme (Ultimate Stage.)	Rs. 1295.69	
14)	Cost of water per 1000 litres.	Rs.-----	
15)	General Water tax per	Rs. ----	
16)	Recurring Charges per year per head.	Rs. -----	

Dy. Engineer (M. I.)
R. Z. P. Sub. Division,
Karjat.

MINOR IRRIGATION DIVISION R.Z.P. ALIBAG.

TAD WADI, MORENADI, VILLAGE WATER SUPPLY SCHEME

TALUKA KARJAT, DISTRICT :. RAIGAD.

DESIGN OF PUMPING MACHINERY.

(IMMEDIATE STAGE.)

*1) Rate of Pumping Q = 1.38 lit/Sec.

5000 lit/hr.

2) Static Head.

a) F.S.L. of reservoir	---- M
b) Lowest suction level in the well	-- M
c) Hence, static head (a-b)	42 M

3) Frictional Head.

a) Discharge in MLD (1 ph x 24)	---MLD
b) Length of Main	1710.00 M
c) distemper type and class of pipe	65.00 mm dia. G.I 'B' class pipe.
d) C	---- --
e) Hf	4.00 M/km.
f) Total frictional loss	6.84 M
g) Add for losses in bend, valves etc. @ 10% of above (f)	0.68 M
h) Total friction head (f + g)	7.52 M
Say-	8.00 M

4) Velocity head at reservioir -

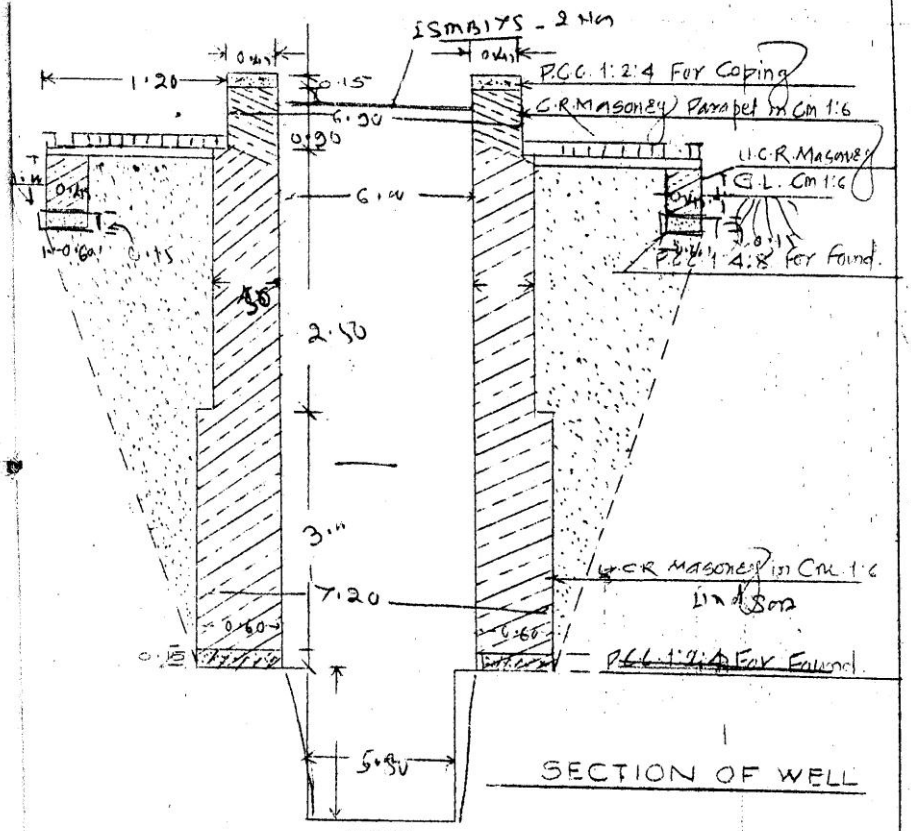
5) Total head on pump (2+3 (h) +6) 50.00 M

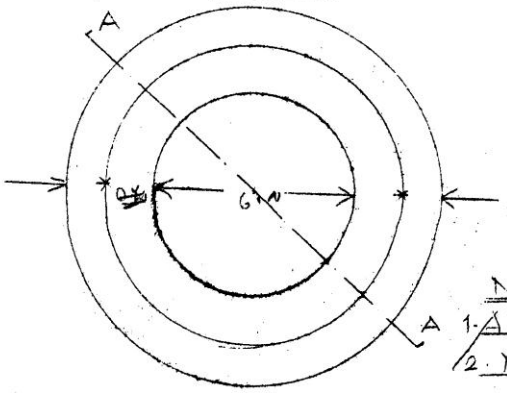
6) B.H.P. required .

$$\frac{Q \times h}{75 \times 0.6} \quad \frac{1.38 \times 50}{45} = 1.53 \text{ B.H.P.}$$

7) Add 20% extra for attitude. and temperature variations 0.31 BHP

8) Total H.P. proposed 5.00 BHP





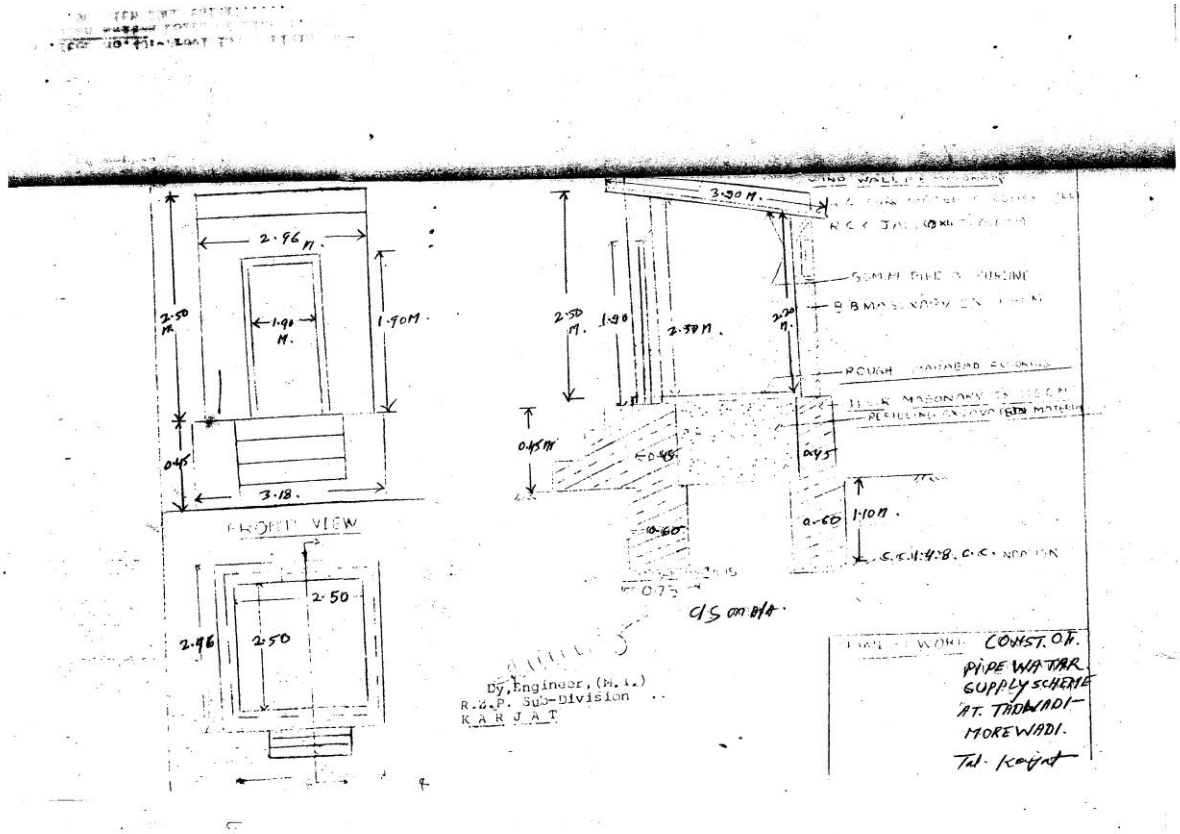
PLAN

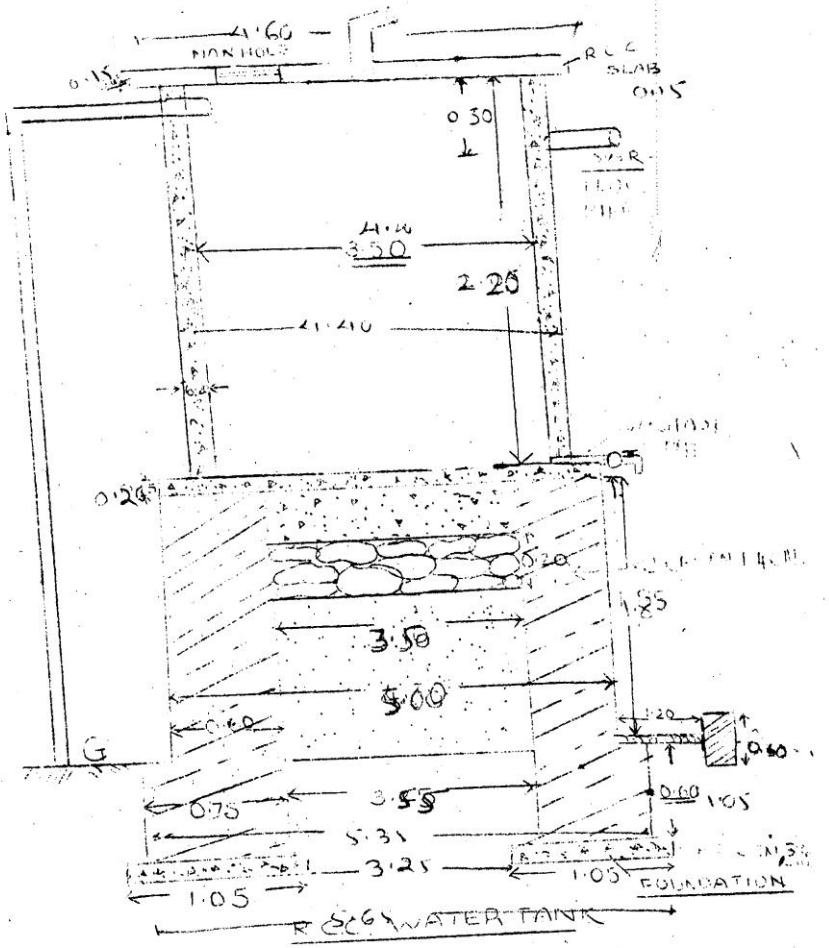
NOTE
1. All Dim are in Meter
2. NOT To scale

Raigad zilla parishad (M.I)

Name of work :- Construction of piped water Supply Scheme at Tadiwadi More Wadi Taluka Karjat.

Dy. Engineer (M. I)
R. Z. P. Sub. Division,
Kariat


2·96 M.
2·50 M.
1·90 M.
1·90M.
0·45
3·18.
FRONT VIEW
2·50
2·96
2·50
3·90 M.
2·50 M.
1·90
2·50 M.
0·45M
0·45
0·45
0·60
1·10 M.
0·60
C/S on R/A.
Dy. Engineer, (W.I.)
R.W.P. Sub-Division
KARJAT
COMST. OF.
PIPE WATER
SUPPLY SCHEME
AT. THAKWADI-
MOREWADI.



Capacity
25000 litres

NAME OF WORK : CONST. OF MINI WATER SUPPLY SCHEME AT Jadwadi Morewadi Taluka Karjat Dist Thane

Dy. Engineer (M. I.)
R. Z. P. Sub. Division,
Karjat.

Dy.Engineer,(M.I.)
R.Z.P. SUB-Divisdon
KARJAT

Appendix 7: Interview Excerpts

Excerpts from interviews with *Tadwadi*, *Morewadi* and *Margachiwadi* people

T-M Findings 8-Dec-2012 - Notepad

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Field Visit to Margachiwadi - Tadwadi - Morewadi (7th and 8th December, 2011)
- Vishal Mishra, Hemant Belsare

Discussions with villagers

* Margachiwadi

Sitaram Kevari, Mangal Kevari

Yield of Umbranachi well has decreased since the scheme started, i.e. after its depth was increased from 10ft to 9 m.

according to Sitaram Kevari, this happened due to blasting..

according to Mangal Kevari - there are two types of underground streams which give water to wells, one through rocks and other through mud streams. According to him, mud streams can easily change their course due to which the well source can be dislocated.. This can happen even due to underground crabs, and this generally happens in this area. Such dislocation may also have happened during deepening of well (question - whether this is correct?)

Both of them mentioned that before the scheme started, 5 or 6 villages (Margachiwadi, Jalkatwadi, Jambhulwadi, Dongarpada, Tadwadi, Tungi) were using this well as their drinking water source..

*** Current situation at the source site

The land around the Umbranachi well has been purchased by Jagdish Bhavsar, a huge builder in Karjat.
He has dug a well (we are not sure whether it's a tubewell or borewell) just 20m upstream of Umbranachi well.
Also there is an RCC bund just upstream of new well.
He has fenced the whole area.

T-M Findings 8-Dec-2012 - Notepad

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* Tadwadi

Vimaltai and women from bachat gat (around 10-15 were present for the meeting along with few males)

The scheme initially worked (for 1 to 1.5 months). During that period, they used to receive water twice a day with full force for one hour.
Suddenly water stopped coming, and since then the scheme has never worked again..

The watchman used to give water first to Morewadi, then to Tadwadi, because Morewadi was at higher elevation than Tadwadi. So both the villages were receiving water properly for 1 - 1.5 months.

They were paying the water cess of Rs 20 per month per household.

Kaluram - the watchman, said that he worked for 5 months, but did not receive his salary (he has still not received his salary) and that's why he left the job.

According to the villagers the cable and then the motor was stolen, and this is the main reason for scheme failure. Kaluram has lodged a complaint in Gram Panchayat Pathraj on the next day of theft.

Around 2002, a contractor from Khandas took the responsibility of repairing the scheme, but he did some minor repairing work and left the scheme as it was..

In 2010 or 2011 Mr. Gangurde had visited the village, when he identified a new source (a small mud pond in private land within the village) Mr Gangurde promised to do something about this source but hasn't done anything yet.
But according to the villagers, this source will be sufficient only for 10-15 households all round the year and they are not happy with it.

Currently all villagers from Tadwadi fetch their drinking water from Adachi well, which is around 500 m from the village. This well will suppy water only till December / January after which they will have to travel around 2 km to Umbranachi well till next June.

Tadwadi villagers also confirmed that Umbranachi well's yield has reduced since the inception of the scheme. They also agreed that before the scheme, around 5-6 villages depended on Umbranachi well for their drinking water.

As the path to the Umbranachi well is now fenced by private land-owner (Jagdish Bhavsar) they fear that they will not be able to access the well easily.
Also, due to new well just nearby Umbranachi well they fear that it will have an negative impact on Umbranachi well.

* Morewadi

Kisan Kevari, Bhau Padu Kevari and some villagers

One villager said water through scheme came only for 1 or 2 days.
Others said, it came hardly for one month.. There was confusion

When asked about water cess, it seemed that they were not aware of such cess. Instead they showed us Gharpatti receipt which contained panipatti of Rs. 75 which they have been paying per year since more than 20 years..

According to Kisan Kevari -
Morewadi received water for less than 1 month, that too with low pressure and finally it stopped coming. (i.e. from 18-4-2000 upto mid-may)
Due to higher elevation, Morewadi would get proper supply of water only if the tank was completely filled. Once the tank becomes half-empty, Morewadi would stop getting water.
As against this, Tadwadi kept receiving water till the start of rainy season (i.e. till June 2000) and scheme was stopped deliberately and the cable was stolen around Diwali, after which scheme did not work at all.
According to him, the tank never got fully filled due to unavailability of water in the well, and hence Morewadi could not get enough supply after first few days.

Currently they fetch water from four different wells (Tulshichi well, Wanganachi well, Kamathachi well and Chadhnichi well) All these wells (which are around 500m from the village) will go dry around January, after which they will fetch water from Gawandwadi bandhara till May end. (which is around 1.5 km from the village)

They told about a 60 feet deep well sunk by private land-owner (for construction purposes) just close to Tulshichi well (which is 8 feet deep). They fear that this new well will have negative impact on Tulshichi well which is the nearest of all.

* Disha Kendra - Sushmatai

Since last 5-6 years, people of Tadwadi are insisting Disha Kendra to bring water from Umbranachi well to adachi well through pipes. Due to negligence from the government side, they think that there is no ray of hope in the piped scheme. So, through help of Rotary Club, Disha Kendra is planning to go ahead with this newly proposed scheme.
But when we told Sushmatai about the possibility of reduced yield of Umbranachi well, she thought thata yield test of the well should be the 1st priority..
(Can this be possible? Whom should we approach? Can CTARA do it?)

T-M Findings 12-Dec-2011 - Notepad

File Edit Format View Help

Field visit to M.I. office and to sourcewell site
Hemant Belsare, Vishal Mishra - 12 Dec 2011

Meeting with Mr. Gangurde and Mr. Jambukar... and Nancytai and Sushmatai of Disha Kendra
At M.I. office:

a. According to Mr. Gangurde and Mr. Jambukar, piped water supply schemes generally don't work in adivasi areas. Reasons being:
1. People keep the pumps closed during monsoons or till their nearby sources have water (i.e. till december, january). During this time, due to jamming, rusting etc of pumps, theft of pipes, cables, the schemes don't start again at all..
2. If electricity bill is not paid regularly, MSEB cuts the supply which is not started again.
3. Local politics also plays an important role.

b. Mr. Gangurde was initially insisting for yield test before doing anything. Also, he was skeptical about the elevation problem of tank and standposts in Morewadi. But he assured that he will measure the elevations soon.

Both seemed eager to visit the source well site.

At Source well site:

After visiting the site and measuring water level in the Umbranachi well, both were more than 100% sure that the well has good yield and it will comfortably provide water to both the wadis till June 15.
The water level was 6.8m from the bottom of the well.

Both engineers said that the recharge is also good, because the water in the well looked clear.. Otherwise the water would have been dirty.

They saw the new well dug just 20m upstream of Umbrabanachi well (by private landowner Jagdish Bhavsar), but they assured that this well would not have any negative impact on the source well. Infact they predicted that the yield of source well will increase due to this new well
If the new well was dug downstream of the sourcewell, then there would have been a negative impact.. so we should take care that Bhavsar doesn't dig another well in downstream of sourcewell
[We could not understand this. This needs to be verified.. how?]

Mr. Jambukar assured that in case of acute shortage, any private well can be acquired by Tehsildar. So there won't be any problem caused by these new private wells as far as Tadwadi-Morewadi's drinking water supply is concerned.

Mr. Jambukar was confident that the scheme can be revived and water would reach both the wadis within one month.

Nancytai told both the engineers that IIT team (??? afterwards while talking to Vishal and myself, she talked about Rotary club) can take charge (finances, monitoring etc) of the whole revival project. Mr. Gangurde invited Vishal and me to come for taking readings and measurements for new estimates.