Monitoring and Evaluation Study of the Rural Water Supply and Sanitation Programme

Study undertaken for Rajiv Gandhi Drinking Water Mission

Ministry of Rural Areas and Employment

Rajasthan

August 1998

Ecotech Services

ETS

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List of Abbreviations

RGNDWM	Rajiv Gandhi National Drinking Water Mission
M & E	Monitoring and Evaluation
NC	Not Covered
PC	Partially Covered
FC	Fully Covered
lpcd	litres per capita per day
SC	Scheduled Caste
ST	Scheduled Tribe
RRA	Rapid Rural Appraisal
GoI	Government of India
GoR	Government of Rajasthan
CGWB	Central Ground Water Board
WHO	World Health Organisation
PHED	Public Health Engineering Department
MNP	Minimum Needs Programme
ARWSP	Accelerated Rural Water Supply Programme
NGO	Non-Government Organisation
JJY	Janta Jal Yojana
P&T	Pump and Tank water supply scheme
RWSS	Regional Water Supply Scheme
TSS	Traditional Water Supply Scheme
HP	Handpump
HRD	Human Resource Development
sq km	square kilometer
cm	centimeter
UNICEF	United Nations International Children's Educational Fund
CE	Chief Engineer
SE	Superintending Engineer
EE	Executive Engineer
AE	Assistant Engineer

1. Introduction

The Rajiv Gandhi National Drinking Water Mission (RGNDWM), Ministry of Rural Areas and Employment, Government of India, vide their letter no Q-14019/42/97-TM (Stat) dated 26 02 98 sanctioned the conduct of a Monitoring and Evaluation (M&E) Study for the States of Gujarat & Rajasthan to Ecotech Services This report presents the M&E study for the State of Rajasthan

The mandate of the study was to evaluate the status of and appropriateness/.viability of norms set for the sustainable drinking water and sanitation coverage in the rural areas The study also aims at gauging the perceptions pertaining to present lacunas in the delivery mechanism and suggestions to improve them The terms of reference for the study are as attached at Annexure1

1.1 The Study Objectives

The Objectives for the study as laid down by the RGNDWM are as follows

1 To assess the present coverage & status of rural water supply and rural sanitation with a special emphasis on the coverage of backward classes / areas
2 To evaluate the safe water supply coverage in areas, where the quality of drinking water was a major problem.
3 To monitor and evaluate the people's response and perceptions about the coverage of rural water supply and sanitation and to evaluate community involvement in the planning and implementation of water supply schemes
4 To evaluate the operation and maintenance status of the water supply schemes
5 To monitor and evaluate the contribution by the users and willingness to pay towards capital and recurring cost for the rural water supply schemes
6 To monitor current knowledge, attitude and practices in rural areas with regards water supply and sanitation

1.2 Structure of the Report

The study report is structured in 10 sections The first introductory section is followed by the methodology in section 2 and a state & district profile in Section 3. Section 4 presents the findings of the study with respect to drinking water coverage, status, quality and government initiatives Section 5 highlights the findings related to the rural sanitation sector This is followed by observations on programme administration, organisation, institutional arrangements, planning, operation and maintenance, presented in Sections 6 to 8 Section 9 discusses the sustainability of the programme while section 10 concludes the report and presents recommendations for bringing some improvements to the drinking water supply & sanitation situation

The report is supported by a Reference Document, which presents District reports for the four districts selected in the State of Rajasthan, for the purpose of the study The reference document basically concerns itself with the district specific observations and findings

2. Methodology

The study is based on a review of secondary data furthered by the findings of a primary survey conducted in the State of Rajasthan Four districts, namely Ajmer, Barmer, Churu and Dungarpur were studied The selection of the districts was done in consultation with RGDWM and was done so as to ensure that the areas sampled were representative of the varied physical, social and technical conditions prevalent in the state The following specific criteria were used

- Coverage of the State in terms of physical spread, various climatic conditions and rainfall characteristics
- Coverage in terms of the representation of backward districts of the state
- Coverage of areas having different water quality problems
- Coverage in terms of different conditions (availability, practices, redressal by the department) that exist with respect to the rural drinking water and rural sanitation sectors

In each of the districts an average of 15 villages were selected for conducting the primary survey The village selection was done based on consultations with the district level PHED officials & inferences drawn from the available secondary data[1], with regards the drinking water and sanitation sector Again, to ensure a representative selection, the following criteria were used

- All types of schemes in the district be covered under the villages surveyed, so as to get an idea of the performance and effectiveness of all schemes in a district
- A view of the not covered (NC), partially covered (PC) , fully covered (FC) coverage of the habitations in the district[2]
- The Scheduled caste / Scheduled tribe (SC/ST) population should be adequately represented in the respondent samples For this the villages needed to be taken in regions with sufficient concentration of such settlements/ inhabitants.

Within each village 15-20 households were selected for the survey This selection was based on the following criteria

- All settlements (phalas/ dhanis etc) should be covered i e all communities to be covered
- The backward classes, SC/ST populations should form at least one third of the respondents surveyed This criteria was subject to suitable amendments where the

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[1] List of secondary information requested for at the state level and district level is provided in Annexure 2 1

[2] The three categories are defined as follows
FC Fully covered by a public source providing safe drinking water amounting to atleast 40 litres per capita per day (lpcd) for a maximum population of 250 for the whole year and 70 lpcd for the desert area

PC Fully covered by a public source providing safe drinking water amounting to less than 40 litres per capita per day (lpcd) for a maximum population of 250 for the whole year
NC Not covered by any public source of drinking water supply

Also the water source should exist within 1 6 kilometers in plains and within 100 meters elevation difference in hills

number of SC/ST households in a village, were found to be less than seven, out of which if possible and applicable at least one was a women and/or backward class

- At least half the respondents to be females
- No two members from the same household to be taken as respondent

The components of the study at the village level were a village level panchayat members survey (Annexure 2 2), a household survey (Annexure 2 3) and a Rapid Rural Appraisal (RRA)[3] The RRA involved a mapping exercise, where in specifications pertaining to drinking water (operational status, nature of associated problems, dependent households, nature of ownership and capacity addition, distances) and drainage vis-vis the settlements and main landmarks associated with the village, were illustrated This exercise was done in a village meeting called, with representation from all settlements (phalas/ dhanis/ magras etc) wherein female respondents were encouraged to participate. The mapping exercise helped initiate the discussions on issues related to the sector under study

In addition to the village level survey, discussions were also held with the relevant Government departments, Non-Government Organisations and other agencies[4]

[3] Sample RRA maps have been provided in Annexure 2 4

[4] List of people met has been provided in Annexure 2 5

3. State Profile

The state of Rajasthan, located in the north west of India covers an area of 3,42,239 sq km, making it the second largest state in the country According to the 1991 census, the population of Rajasthan is 44 million, with an average population density of 128 6 persons per sq km Of the total population, 77% reside in rural areas and 23% in urban areas A high variation is observed in the state in terms of population density, which ranges from 335 persons per sq km in the districts of Jaipur and Dausa to 9 persons per sq km in the desert district of Jaisalmer The state has 17.3% of its population belonging to the Scheduled castes and 12 4% to the Scheduled Tribes, concentrated in southern, south-eastern and eastern parts of the State Table 3 1 presents the demographic details of the districts under study

Table 3.1: Demographic profile

District/ State	Total Population (in lakhs)	Population Density	% of SC/ST population
Ajmer	17 23	203	20 5%
Barmer	14 33	50	21%
Churu	15 39	91	25%
Dungarpur	8 74	232	70%
Rajasthan	440 06	129	29 78%

Source Resource Atlas, Rajasthan, 1994

The linear tract of the Aravalli hills running from the north-west to south-west divide the state into two parts viz western arid region and the eastern semi-arid region The north-west part is sandy and includes the Thar desert The south-eastern area is dissected by several patches of plateau with heights of 100 m to 350 m above the mean sea level The study district of Dungarpur borders this area and has a hilly topography The eastern part of the state is flat and fertile

The climate of Rajasthan varies from arid to sub-humid It is arid in west of the Aravalli ranges and semi-arid to sub-humid in the east of Aravalli's The areas west of the Aravalli ranges are characterised by extremes of temperature, high wind velocity and low humidity The areas in east of Aravalli ranges, observe moderately good rainfall, high humidity, comparatively low wind velocity and extremes of temperatures The study districts of Ajmer and Churu lie in this latter segment The rainfall in Rajasthan shows an increasing trend from north-west to south-east The average annual rainfall of the state is 586.4 mm Table 3 2 presents the details pertaining to rainfall for the districts under study

Table 3.2: Mean annual rainfall

District	Mean annual rainfall (cm)
Ajmer	25 9
Barmer	12.7
Churu	19 4
Dungarpur	76 17

Source Resource Atlas, Rajasthan, 1994

The state has 14 rainfed river basins, which comprise most of the surface water sources The total average flow of all rivers is around 2 05 million hectare meters Only 50% of the total run-off is presently utilised The distribution of ground water in the state is distinctly uneven and varies considerably from region to region Despite this, most of the regions in the state are heavily dependent on the ground water sources for meeting their drinking water needs 87% of the total ground water is used to meet the drinking water needs of the state Such high pressures on this source have put considerable stress on it On an average, in the period between 1984-96, 24 of the 30 districts in the state recorded a decline in the ground water levels ranging from 6 16 m in Nagaur to 0 54 m in Kota[5] In terms of level of ground water development, of a total of 235 blocks in the state, 45 have been classified as over exploited where the level of ground water development is more than 100% of the utilisable ground water recharge and 11 as dark zones, where the level of ground water development is between 85% to 100% of the utilisable ground water recharge

The over-exploitation of ground water sources is partly due to a lack of perennial surface water sources Rajasthan is being fed by only 1 1% of the county's total surface water potential

Many of the areas suffer from very poor quality of water, in terms of high levels of salinity, fluoride content and nitrate content Among the districts selected for the study this problem is a concern in the districts of Ajmer, Churu and Dungarpur

[5] Source Progress Report (in Hindi), 1997-98, PHED Rajasthan

4. Findings : Rural Drinking Water Sector

This section presents the analysis of the secondary information collected from the department and the primary survey conducted in the selected districts and brings out the main findings and examines the emerging issues with respect to drinking water The section especially focusses on the overall coverage status, availability of drinking water and status of sources, the quality issue, main problems expressed by the community and the department Also presented are the various Government and non government initiatives taken in the sector

4.1 Coverage Status

As per the 1991 census, the state of Rajasthan has a total rural population of 3 4 crores living in 37,889 villages According to the departmental statistics, as of December 1997, 98 9% of the total habitations in the State of Rajasthan were covered under different drinking water schemes For the districts under the study, namely, Barmer, Churu, Dungarpur and Ajmer these figures stand at 93 2%, 99.1%, 100% and 100%, respectively. The coverage of the different districts under the study is shown in Table 4 1. drinking water schemes have been implemented in the state under 3 main programmes, viz., Minimum Needs Programme, Accelerated Rural Water Supply Programme (ARWSP) (Normal) and ARWSP (Desert Zones).

Table 4.1 : Extent of Coverage

District/ State	Total habitations	Habitations covered	% habitations covered
Rajasthan	37889	37477	98 9 %
Ajmer	985	985	100 %
Barmer	1626	1515	93.2 %
Churu	926	918	99 13 %
Dungarpur	846	846	100 %

Source PHED , GoR, 1997-98

The primary survey results also show that there is a good coverage of the rural households under drinking water supply schemes with a drinking water source for less than 250 households However, there is a wide variation among various districts, ranging from a drinking water source for 31 households in Churu to 190 households in Barmer This also gets reflected in low per capita water availability, as discerned during the primary survey 88 1% of the surveyed households in Barmer have a per capita drinking water consumption less than 40 lpcd while the corresponding figure for Churu is 29 8% only The results from the primary survey as illustrated in Table 4 2 indicate the coverage status with respect to some basic indicators

Table 4.2 : Status as per Coverage Indicators

Indicators	Ajmer	Barmer	Churu	Dungarpur
No of households per source	48	190	31	36
Average distance to the source in metres	155	2900	175	370
Average no of trips per household per day	5	3 9	4	9 7
Per capita water availability >40 lts per day	63.2%	11 9%	70 25%	69%
Per capita water availability < 40 lts per day	36 8%	88.1%	29.75%	31%

Source . Primary household survey, 1998

4 1 1 Coverage Status with Regards Backward Areas

Coverage of backward areas is an issue that is emphasised in the state policy As per the departmental records of January 1998, of the total number of habitations covered during the year 1997, roughly 31% were classified as SC/ST habitations. But the primary survey and the RRA exercises revealed that the SC/ ST settlements, which were not classified as main habitations by the PHED, did suffer from a lack of adequate drinking water facilities In the case of Dungarpur, where a sizeable segment is comprised of the ST population, the status in terms of number of sources in the ST *phala*s was found to be adequate but the status in terms of the operational sources was very unsatisfactory (in comparison with the other *phala*s of the same village). This was partially due to less access of these communities to the departmental staff and hesitation in approaching them with their problems. Contrary to expectations, apart from some private sources in Ajmer and Dungarpur - access to community sources was reported not to be restricted on caste basis The problem of water shortage being so acute and all pervading in specific periods of the year that restricting access to sources for specific communities is not at all acceptable any more. In the case of Ajmer and Dungarpur, it was observed that the SC/ ST settlements, (apart from those under mandatory coverage targets) faced the problem of lack of approachability to the services of the delivery mechanism and complained of discrimination in quality of service provided to their settlements vis-a-vis other community settlements However, the PHED departmental functionaries attributed this more to the low level of awareness among the SC/ ST settlements leading to hesitation in approaching the department with their problems

The coverage under drinking water supply schemes is, in general, influenced by factors such as ease in access and physical approach to the settlement, reach of the socially and geographically disadvantaged sections to delivery mechanism for need addressal as well as human and financial resource constraints of the department.

4.2 Status of Drinking Water Sources and Availability

The State is covered by various schemes such as Regional Water Supply Schemes, Hand pump, Piped/ Pump and Tank as well as Supply Schemes tapping traditional sources Of the total habitations covered under the drinking water sources in the state, 61 3% are covered under hand pumps, 24% are covered under Regional Water Supply Schemes and 8 5% are covered under piped / Pump&Tank schemes Almost 5% of the total habitations in the state are covered by water supply schemes based on traditional systems

While hand pump schemes are the main source of drinking water in the State as a whole, large

variations are noted between different districts For instance, for the districts covered under the survey, Ajmer and Dungarpur had the maximum dependence on hand pump schemes (80% and 85 5% respectively), while Churu and Barmer had the maximum dependence on the Regional Water Supply Schemes (83% for Churu and 77 1% for Barmer) In many areas hand pump schemes are increasingly being replaced by other schemes. This is mainly owing to the depleting water table and the resulting increase in areas under the collapsible strata Table 4.3 presents the extent of coverage by different sources for the study districts.

Table 4.3: Extent of coverage by different schemes

Scheme / State/ District	Number of Habitations Covered under					
	Piped/ P&T	Hand pump	Regional Supply	TSS/ JJY	Diggi/ Others	Total Habitations Covered
Rajasthan	3190	23138	9005	1862	282	37477
Ajmer	133	788	47	17	0	985
Barmer	161	50	1257	8	39	1515
Churu	133	0	708	77	0	918
Dungarpur	49	724	55	18	0	846

Source PHED, GoR, 1997-98

As per the primary survey, with the exception of Barmer, the dependence of surveyed households on the government sources is varying between 77% to 93% In the case of Barmer it is extremely low (only 7%), which may be attributed to a high percentage of sources lying defunct. Also, as can be seen from Table 4 4, the dependence of households in Ajmer and Dungarpur was largely on handpumps, while in Churu and Barmer the Regional Water Supply Schemes were the dominant means of supply

Table 4.4: Dependence on government sources

(As a percentage of surveyed households)

Districts	Dependency On Government Source	On Dominant source [6]
Ajmer	82 8%	88 8% (Handpump)
Barmer	7%	77 1% (RWSS)
Churu	93%	83 %(RWSS)
Dungarpur	77%	85 5% (Handpump)

Source Primary household survey, 1998

As in the case of other hand pump dominated districts of the state, even Ajmer district is experiencing a change over to other schemes with the hand pumps being supplemented or replaced by Pump and Tank schemes for habitations having a population of over 1500 As mentioned earlier, this is mainly in response to the declining water tables being experienced in the area The high creation of Regional water supply schemes (RWSS) in Barmer is explained by the

[6] These figures are percentages from the existing dependence on government source

low ground water table of the district Here the RWSS are rather extensive, covering large areas The source villages feed areas to the tune of 70-90 km around them owing to the scattered settlement pattern However, the primary survey reveals that though coverage under these schemes is high in the district, dependence is marginal.

4 2 1 Traditional Drinking Water Sources

Traditionally, dugwells have been the main source of supply of drinking water in areas where the water table was high While in Barmer draught animals are used to draw water from these dugwells, in Dungarpur, the practise of digging shallow *kuaris*[7] near the surface water sources for water is a prevalent practise. In Churu district, traditionally, rain water is harvested and stored in a *tanka*[8]/ *kund* located inside the house Most of the households have such a storage structure Though this is not enough to meet the demand for the entire year, but is useful, with regards drinking[9] and cooking needs In addition, there are also some community *kunds* where the rain water is harvested

In most of the places, the traditional water systems have gone defunct due to lack of maintenance However, some successful community interventions towards establishment and upkeep of traditional sources are evident in Dungarpur and Ajmer, Also, the department has schemes which aim at adopting traditional sources and managing their upkeep and operations with community co-operation[10]. The lack of focus on these schemes is manifested in the low percentage of villages under these, as per the total covered in the state (4 96%). Among the districts covered in the study, this figure stands at 1.7%, 0 05%, 8.4% and 2 1% for Ajmer, Barmer, Churu and Dungarpur respectively[11] (Source : Departmental statistics).

The performance of these schemes, where (neglected) traditional structures (wells, storage tanks) are fitted with modern equipment (pumps, pipes, valves, cables, switchboards), was generally found to be dismal. All of these are usually in a visibly neglected state, caused by poor, irregular or even non-existent maintenance walls showing cracks, lids broken, loose or missing, surroundings of reservoirs and cattle-troughs muddy, valves and pipe joints leaking, electrical installations ramshackle and often dangerous. The overall impression is usually one of a temporary arrangement, exceptionally tolerable in a situation of urgency, say, an overnight solution at a building site, but not for permanent supply to a human settlement

These technical shortcomings are not only factors in the deterioration of water quality, but also of endless breakdowns, followed by more improvised repair, which often creates the next

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[7] Shallow pits near the river/ stream boundary from where water is collected

[8] Circular holes in the ground lined with fine polished lime, in which water was collected during rainfall and used only when other supplies failed

[9] Also used for mixing with inferior quality water to make it taste better

[10] These schemes are classified as Traditional Supply Schemes/ Janta Jal Yojana

[11] Given the high dependence on non-governmental sources (93% as per the primary survey), in the case of Barmer and the corresponding low emphasis on the T S S, it reinforces the lack of focus of the department with regards utilisation and upkeep of traditional sources The relatively higher percentages for Churu are as per the German aid programme - "Aapni Yojana" interventions there

foreseeable breakage point

Shortage of money is the ready explanation, but is not a convincing argument since, as a rule, the accumulated cost of poor workmanship and permanent improvisation exceeds the cost of systematic installation and maintenance The real causes are rather lack of awareness, of responsibility and of elementary organisational and technical skills. A clear distinction between those aspects is difficult, especially with regard to the traditional components of water supply Several decades ago, when people had to rely on traditional means of supply only, there were organised systems of maintenance in place Checking of and response to risk factors, e.g cracks in walls or wear in water drawing equipment, must have been rather quick and effective, as there were no alternatives. The basic skills involved have not disappeared in every village, plastering is done on houses, though not on wells

Thus it seems to be on the attitudinal rather than on the technical side where things have worsened Communities, seemingly unable to mobilise existent local inputs, turn to government and sector administration who are thus tied up in endless subsidisation and improvisation.

4 2 2 Defunct and In-operational Sources

The statistics with regards the in-operational sources available with the department are indicative of only those sources which have not been working for a few months due to reasons of maintenance or seasonality in availability of water at the source; i.e. are "not out of operation permanently" In fact there are no proper separate records maintained for sources/schemes which are out of operation permanently or not operational for a period of more than a year The non-operational sources assessment is an inadequate indicator of the actual status that prevails in the field It would be more practical to emerge with a monitoring indicator providing information on "extent of in-operationality" of sources in the area which would help to understand the type of inputs required to revitalise the source and more importantly, if it is possible at all. This information could further feed back to up date the status of the drinking water scenario as per the classification. Further, in the case of RWSS schemes, though the scheme may be operational, the status for the villages at the tail end may be a "not operational" one as the villages at the tail end may not be getting any water at all either due to low pressure or low availability etc This aspect regarding operational status of schemes, is also not well reflected in the statistics kept at the departmental level

In the surveyed villages the percentage number of defunct sources and the average duration[12] for which the sources have been defunct is provided in table 4.5

[12]The average time , as per the recollections of the participants in the village group discussions

Table 4.5: Percentage & duration of defunct sources

District	% Defunct	Average duration
Ajmer	7 2%	Not available
Barmer	33 6%	4 years
Dungarpur	7 6%	2 years
Churu	4%	Not available

Source : Primary survey, 1998

As per the departmental records for Barmer district, the percentage of defunct hand pumps averaged 10% for the last three years However, during the course of the primary survey in the seven villages having hand pumps in Barmer, none of the handpumps were found working

The PHED departmental functionaries at the field level cited the following main reasons for the sources going defunct:

- Collapsible strata and diminishing ground water table
- Number of sources inadequate in terms of quality and thus the increased pressure on the few sources.
- Poor maintenance, due to low allocations for maintenance, further worsened by inaccurate assessment of maintenance needs, leading to pressure on the limited resources the department has.
- Lack of adequate number of field staff and local level trained personnel for carrying out maintenance tasks.
- Infrastructure constraints such as lack of spare parts and vehicles for meeting the service needs of the maintenance team.
- The frequent power trips in the case of RWSS which lead to losses in the supply hours
- The lack of adequate number of booster stations which lead to low water pressure and at times no supply to the villages far off from the source villages
- Frequent damage to the pipelines where they have not been laid at the prescribed depth resulting in them being exposed.

The state policy disallows (as from the end of the financial year 1995-1996) any allocations with regards the hiring of labourers to assist the task team during the hand pump repair and / or summer campaigns. This is a further constraint on the limited field level staff Lack of funding is evident from a perusal of the allocations made.

The responses recorded in the primary survey reveal the following reasons cited by the people for the existence of these defunct sources.

- High "use" pressure on a few sources resulting in their over exploitation
- Inadequate upkeep and general maintenance and infrequent cleaning of sources
- Damage by miscreants[13]
- Improper planning in specific cases (such as existence of pumps but no storage tanks and

[13]In the case of Dungarpur "damage by miscreants" recorded a high 39% as being the main reason for a source becoming defunct

vice versa)[14]

- Pipeline damage in Regional Water Supply Schemes
- Depleting water table

4 2 3 Problems Pertaining to Drinking Water Supply

Physical accessibility to the source was the most frequently stated problem during the primary survey (basically referring the long distances to be traversed to reach the source) As expected, the next most frequently stated problems were those of inadequate quantity and poor quality of water. In actuality, in most cases long distances to be traversed was also an indication of lesser quantities available in the nearby sources. For example in the case of Barmer , though quantity per-se was not quoted as a problem, it very much exists, as the respondents have to cover larger distances to access water, because of fewer number of sources

Table 4 6 presents the main problems faced by the villagers with regard to drinking water in general and with regard to the drinking water sources in particular. The most critical issue emerging in Barmer related to the already low and continuously falling water table[15] and the resultant dependance on fewer water sources which are facing higher pressure over time The performance of the Regional Water Supply Schemes was most dependant on the power supply to the scheme. It was observed, during the survey, that the relative coverage status of villages near roads and main routes was much better. For Ajmer the main issues that emerged were similar in description but less grave in magnitude as compared to Barmer Poor water quality and difficult terrain leading to problems in physically accessing the resource were the common problems stated in Dungarpur The factor of distances to be traversed on difficult terrain is compounded by the scattered settlement pattern in the district. The issues dominating in Churu are the poor quality of water, maintenance of schemes and also the distances traversed, given the few good quality sources

[14] Reported most in Barmer

[15] Although the Progress Report, 1997-98 of the PHED, Rajasthan mentions that water levels have risen on an average by 0 3 m over the period 1984-96, the primary survey revealed that the water table is falling

Table 4.6 : Main problems stated by the villagers

(figure as percentage of respondents)

Main Problems	Barmer	Churu	Dungarpur	Ajmer
Drinking water in general				
Distance	82%	39%	26%	
Quality	15%	36%	24%	44%
Quantity			33%	32%
Multiple responses	3%	25%	17%	24%
Drinking water Sources				
Maintenance, set up and improper use	27%	71 %	34%	65%
Overuse	73%			
Damage by miscreants		19%	39%	
Natural decline in source		10%	27%	35%

Source Primary household survey, 1998

The survey also reveals that apart from Barmer district, in all the other districts, most people do not have to travel more than the set norm of 1 6 kms[16] to fetch/ access drinking water. Despite this, "distance" still figures as an important problem in the responses generated from the same people. This does provide indication of the need to re look at the norm pertaining to acceptable distance expected to be travelled

4.3 Water Quality and Water Testing Arrangements

The quality of water in the state is a concern particularly with regards the high fluoride content. Twenty districts of the State (4500 habitations) are afflicted by this problem. Nine districts of the state have high fluoride content in more than 25% of their villages, some of them are Ajmer, Bhilwara, Tonk , Sirohi and Jaipur. High salinity is found in a total of 3000 habitations spread across the districts of Sikar, Jaipur, Alwar, Sawai Madhopur, Jodhpur, Jalore and Jaisalmer. The level of nitrates is in the unacceptable range in a total of 16,652 habitations (nearly 43% of the total number of habitations) across the State.

The poor quality of water, besides natural reasons, is also a result of lack of regular cleaning of the water storage tanks and wells. In the villages afflicted by poor water quality, the villagers have undertaken a variety of initiatives to dilute the problem Some of the more common practices are

- Use of other sources, discounting the nearest source with poor quality
- Using harvested rain water for drinking, either directly or as mixed with poor quality water
- Spotting potentially good quality aquifers and requesting for a source their from the government

[16] As mentioned earlier in the report, a habitation is considered not covered if it does not have a safe drinking water source within 1 6 kms of the habitation

- Proper attention/ contribution on the maintenance of good quality sources if any
- Contribution towards construction of new source on expected good quality aquifer

A number of interventions address the quality issue and are presented in the next section. While programmes addressing the fluoride and salinity problems have been formulated and are being implemented in the state, no interventions exist for addressal of the nitrate problem [17] This is mainly because no technology exists in the country for treatment of nitrate problem and the harmful effects on health are also visualised to be lower than the other quality problems

Testing arrangements

The testing arrangements are planned at the circle level and executed by the field level staff, under the supervision of the Junior engineer The analysis of samples takes place in the locally contracted laboratories and in PHED laboratories like those in the districts of Bikaner and Dungarpur, while in some cases the analysis is carried out by the defence lab at Jodhpur. In all, the PHED has one state level, five regional and twenty five district level laboratories, for carrying out water testing The status with regards the actual testing done is generally guided by the extent of water quality problems in a region.

However, in general the observations from the study indicate that the follow up to water testing interventions is not adequate (even the field level departmental staff acknowledge this). The water quality aspects are not strictly adhered to and the water in most cases is supplied without any emphasis on quality aspects.

4.4 Governmental and other Initiatives to Tackle the Supply Issue

The Government of Rajasthan has been involved in periodic assessment and planning to address the issues that exist in the Rural drinking water sector in the state.

The priority areas as identified in the action plan for 1997 - 98 for the PHED include:

- Completion of incomplete works of rural and urban water supply schemes
- Augmentation of existing schemes and improving water pressure in towns
- Reducing wastage of water
- Coverage of 4673 NC habitations and 600 PC to FC habitations as per expected new habitations to be classified
- Conversion of hand pump schemes to P& T (in case of settlements / main habitations with population over 1500) and piped water schemes (population over 4000)
- To deal with problem of quality / failure of sources
- Construction of 12000 hand pumps
- Water supply facility for 2500 primary schools

Non plan expenditure for the drinking water sector is constantly on the rise. In 1997-98, out of a total of 460 crores, electricity charges were 43 8% and the salary and others were 49 4%. Pump and machinery and pipeline replacement were 3 2% and 3 6% respectively

[17] For further details see Annexure 4 1

Ninth Plan provisions.

The ninth Plan outlay for the rural segment stands at Rs. 964 crores, including the Rs 164 crs allocated under the KfW aided project being implemented in Churu.

The provision in the Ninth Five Year Plan with regards Coverage of mian and other habitations is as follows

- It is proposed to cover about 5000 habitations every year including Partially Covered to Fully Covered habitations as per given budget indications under MNP/ARWSP.
- An integrated project for potable drinking water in saline belt of Jhunjhunu, Churu, Ganganagar districts (353 villages and 2 towns)for which a provision of Rs 164 crores is kept in the Plan

The Ninth Five Year Plan strategy is evolved to cover Not Covered Category habitations, low service level habitations, problematic villages/habitations, P&T/Piped schemes, plugging of wastage of water through water supply system and effective O&M of rural schemes

It is also proposed to complete the German assisted Churu Project for which Rs 164 crores has been provided during the Ninth Plan

Sub Mission projects sanctioned for Ganganagar, Hanumangarh and Fluoride projects for Chaksu and Ajmer are to be completed

Emphasis is to be given to get Bilateral assistance for Nagaur, Barmer and some other projects in the rural sector.

Source : Draft Ninth Five Year Plan

There are a number of externally aided projects being implemented in the state, the details of which are provided in Annexure 4.2.

Also, many canal water supply projects serve the area , but fall way short to meet the irrigation needs in general and drinking water needs in particular. Some of the major multi purpose projects are

- Indira Gandhi Nahar Pariyojana (Multi purpose project with drinking water focus)
- Bisalpur Project (Multi purpose project with drinking water focus)
- Cambial valley project (Multi purpose project with drinking water in its mandate)

Allocations under various Rural drinking water programmes are given below:

Table 4.7 : Programme allocations 1997-98

Sr.no	Programme	Allocation (lakh Rs.)
1	Minimum Needs Programme	16941 50
2	Accelerated Rural Water Supply Programme (normal)	10117 76
3	Accelerated Rural Water Supply Programme (desert zone)	2549 33
4	Staff training	20

Source PHED, GoR,1997-98

Some specific interventions for the rural drinking water sector which may be noted for the districts under the study in particular and in context of the type of interventions being designed are as follows

1 Indira Gandhi Nagar Barmer Lift Water Supply project
2. ED Plant Addressal of water quality
3 RIGEP Follow up to guineaworm eradication programme
4 BADP Integrated system improvement programme
5 Rain water harvesting.
6 Extra Deep Gravel packed hand pumps
7 Allocations for fluoride treatment.
8 Hand pump repair campaigns and other special summer contingency plans
9 German Aid- Aapni Yojana, Churu and Hanuman Gadh Integrated rural drinking water and sanitation programme.
10 Churu -Bisau drinking water programme
11 GangaNagar and HanumanGadh water quality addressal programme
12 Water leakages redressal programme .

5. Findings : Rural Sanitation Sector

5.1 Coverage Under Rural Sanitation

The situation vis-a-vis sanitation is best presented by the Ninth Plan Document of the state. "*The hygienic and sanitary conditions in the villages are far from satisfactory and much has to be done to improve the sanitary conditions in rural areas to give better living conditions to the rural population* "

Rural sanitation was launched in the state in 1986 with the support of the Government of India and UNICEF. Presently it is being implemented in all the blocks of the state, although in a very limited number of villages The goal for sanitation is to cover 25% of the population by the year 2000. The state government envisages covering 14.25 lakh rural families, including 4.9 lakh below poverty line (BPL) families through motivation and awareness campaigns. The government plans to use an integrated approach to sanitation and health education, through the village community itself.

The basic State strategy for sanitation & health education

- Training and orientation
- Social mobilisation and awareness building
- Development of package programme
- Establishment of rural sanitation
- Involvement of NGOs for non-BPL families

Source: Draft Ninth Five Year Plan, 1997-2002, Volume-I, Government of Rajasthan.

Though the state government has identified a strategy and also set certain targets for itself, it is significant to mention that the Draft Ninth Five Year Plan of the State does not refer to sanitation at all in the chapter on Water Supply and Sanitation It gets a marginal reference under the heading of 'Construction of Rural Latrines' in the chapter on Rural Development, and as a sub-section of the 'Rural Development & Panchayat Department'. Presentation under such headings misleads the reader and also subverts the focus of the strategy, which is rightly on an integrated development of the sector, and not just on construction of latrines

It is also of interest to note that sanitation is not seen as a 'basic minimum service' by the state. This is clear from the fact that the state does not include sanitation in its Basic Minimum Services Programme, which has identified 7 such services[18]. Also of interest is the fact that most of the state statistical reports do not make any mention of the coverage of the state under sanitation. All these go towards pointing the low significance accorded to the sector in the state

[18]These basic minimum services are

- safe drinking water in every habitation according to national norms
- provision of efficient primary health care for every group of 5000 people
- Provision of public housing assistance to all the shelterless poor
- Connectivity to all villages/ habitations by providing all weather roads to the market or main road
- Nutritional support to every child from the poor families during pre-school and elementary education
- Fair price shop to supply essential commodities from the public distribution system in every village Panchayat
- Adequate arrangements for universal as well as compulsory primary education, specially of women and girl child in every village together with related measures for spread of literacy

5.2 Knowledge, Attitude and Practices

The primary surveys were directed at gathering information about the percentage of households having access to sanitation facilities and understanding the communities response to the provision of such facilities The attention was also focussed at appreciating the practices considered to be hygienic by the local people and their perception of problems that may afflict their neighbourhood because of unsanitary conditions

7% of the surveyed households in Barmer district have reported that they have private latrines, while almost a quarter of the surveyed households in Churu reported ownership of a private latrine In the other two districts, the coverage was around 12-13% None of the districts reported the presence of any community latrines Most of the households did not give much regard for the provision of latrines and in fact in some areas like Barmer, 84% of the respondents did not want the state to divert money towards provision of sanitation facilities, but instead focus on the drinking water interventions only.

Over 75% of the respondents in Churu, Dungarpur and Ajmer said that there was a satisfactory level of cleanliness maintained around the sources of drinking water. In fact, in Ajmer almost all respondents felt that the surroundings were clean. However, the number was considerably lower in Barmer, where over 50% of the respondents felt that the conditions around the source were unsanitary

Over 90% of the respondents regarded washing of hands before meals and after defecation as an important practise for maintenance of health and hygiene.

As far as the drainage of the wastewater in the village is concerned, 91% of the households in Ajmer and 83% in Panchmahals reported a lack of a proper drainage for water. The drainage facilities around the storage tanks and stand posts etc. were generally in foul condition. In Churu and Dungarpur, people were largely satisfied with the drainage facilities in the village.

5.3 Peoples' Participation

Almost all respondents regarded the provision of sanitation as the responsibility of the government. None of the respondents were willing to make any contribution, either in cash or labour, towards the construction of these facilities. In fact there seems to be very little demand for the construction of latrines as such and people do not feel the need for it. This may be interpreted in light of the fact that scattered habitations and availability of abundant common lands allow sufficient privacy for open defecation Also, the rainfall and soil conditions are such that there is not much water stagnation and pollution even during the monsoons

6. Programme Administration

This section deals mainly with the organisational structure that is put in place to administer and manage the rural drinking water supply and sanitation sector. The section also highlights the hierarchy through which projects have to before they can be approved, which has a bearing on the kind of structures and water supply mechanisms that are put in place. It also presents the village level institutional arrangements made by the Department to help in the administration of the programme

6.1 Structure

The drinking water and sanitation sector in the State is the responsibility of the following government bodies

- The Committee of Direction
- The Public Health Engineering Department (PHED)
- The Rajasthan Water Supply and Sewerage Management Board (RWSSMB)

The main function of the Committee of Direction is to lay down policy relating to formulation and execution of water supply and sewerage schemes and also decide on the financial allocations at the State level.

The Public Health Engineering Department (PHED) has the responsibility of planning and construction of water supply and sewerage facilities, as well as their operation and maintenance The PHED functions as an independent administrative organ and is headed by the Secretary The Organogram for the PHED set up is as presented in Annexure 6.1

The RWSSMB is a policy making and controlling authority with respect to areas like technical approval, material procurement, staff selection, allocation of funds and policy planning activities A number of Functional Committees are formed under the Board to carry out these tasks·

Technical committee	technical approval of schemes/proposals prepared by the PHED
Stores purchase committee	: matters pertaining to material purchase and control of stores
Policy planning committee	. matters pertaining to administrative approval & plan preparation
Finance committee	matters pertaining to sanctioning of tender for works, review of the financial position and examination of tariff proposals
Staff committee	: matters pertaining to review of staff strength and creation of new posts

6.2 Sanction Limits and Approval

The projects/ schemes prepared have to move through a channel to get sanction/ approval from the competent authority The projects are prepared at the Junior Engineer (JE) level and then forwarded to the Assistant Engineer (AE), Executive Engineer (EE), Superintending Engineer (SE), Additional Chief Engineer (CE), CE and to the policy planning committee, in that order, depending upon the outlay of the scheme and the competent authority to sanction it The sanction limits are as summarised in Table 6 1

Table 6.1: Sanction Limits

Sanctioning Authority	Sanction Limits (Rs in lacs)
Executive Engineer	1
Superintending Engineer	2
Additional CE	5
CE / Finance committee	20
Policy and Planning committee	above 20

Source PHED, GoR, 1997-98

It is clear from the above that large proposals have to pass through a long chain before they are approved. This has implications for the kind of schemes that are implemented readily in the field Since schemes like wells and hand pumps require a low budget these are the ones that get sanctioned when the PHED staff faces a lot of pressure from the village for construction of a new source

6.3 Village Level Institutional Arrangements

The following mechanisms exist at the village level to help in the administration and management of rural drinking water in the state

- Collection of water charges: The collection of water charges at the village level is done through the office of the village panchayat. The PHED sends the bills to the panchayat office which are distributed to the individual consumers by the *gram sevak*. The village people are supposed to make their payments at the office of the panchayat which is then collected by the PHED. Though this arrangement exists, the record of payments collected is extremely poor
- Up till the year 1995-96, the Department used to hire local labour to assist the task team in the field during the hand pump repair and/ or summer campaigns. This strategy was helpful as local people have a greater stake as well as peer pressure to do the repair work well and in time. However, from the end of the financial year 1995-1996, the state policy disallows any allocations with regards the hiring of labourers. Not only has this affected employment generation in the area, but has also had rather serious consequences for the repair work that is taken up. In the absence of external labour and lack of any institutional mechanism to elicit people's participation, the department is under serious stress during the summer months when maximum complaints are registered with them

7. Planning and Implementation

Looking at the way schemes are planned and implemented in the state, it is clear that the system faces a lot of stress from the fluctuating and unreliable climatic conditions as well as from internal departmental mechanisms This section presents some of the main points of concern, as they emerged in discussions at the villages and at the departmental level as well as with other agencies.

- Lack of participatory planning. There is hardly any involvement of the people in the planning of schemes No discussions are held with the villagers regarding the types of schemes that should be set up, the ways to revive existing schemes and regarding present problems that the villagers face in meeting their needs Some discussions are held at the panchayat level, but these mainly relate to siting of a particular scheme that has been selected for implementation in the village Positive results may emerge if discussions are held with the village people while planning for the drinking water source This will not only result in interventions that the people see beneficial but would also facilitate their involvement from the beginning in the operation and maintenance of the source

- Low inter-departmental coordination: During the course of implementation of various water supply schemes, the PHED usually needs to consult and/ or seek permission from some other government departments as well. The prominent among them are the Irrigation Department and Rajasthan State Electricity Board. The channels for inter-departmental coordination are not very smooth and the mechanisms for such coordination are not clearly spelt out. As a result, the schemes involving more than one department are invariably delayed

- Technical plans While proper feasibility studies are carried out as part of the planning done for schemes, in most places they have to be modified to accommodate political will representing local interests. Political pressures dictate resulting in more villages being included in the command of a scheme which was meant to cater smaller numbers resulting in high pressure on the source and the distribution channel providing larger scope for frequent breakdowns

- Centralised stocking: All materials required for construction and maintenance are stocked centrally. This leads to time lags in the implementation and upkeep of schemes

8. Operation & Maintenance

As is clear from the preceding sections, a number of problems plague the drinking water and supply system that can be traced to the sub-optimal operation and maintenance (O&M) of these systems. In the course of the study, many factors came to light that help explain the reasons for such a performance Some of these factors are presented in this section The section also presents the extent of people's involvement in O&M as also their willingness to participate in the O&M activities at the local level

8.1 Factors Affecting Operation & Maintenance

Some of the factors affecting O&M are presented below. These findings are based on discussions with the village people as also with the departmental staff

- Smooth operation and maintenance of schemes, at the macro level, is usually more assured when the schemes collect enough money to be able to pay for themselves However, it was clear from the field survey that the present system of water charges is both inadequate and almost inoperational[19]. Charges for water supplied at the stand post stand at one rupee per person per month. For household connections the rate is Rs. 20 per month[20]. More than 75% of respondents were not even aware of existence of any billing system/ revenue collection mechanism. Obviously then, the collections are extremely low. This assumes greater significance in light of the fact that the budgetary allocations for maintenance are quite low in the state and in fact have been declining over the years. In 1990-91 33.6% of the revenue generated was earmarked for maintenance. However, this fell down to 22.8% in 1996-97. Also, the allocations for maintenance of smaller schemes are almost non existent, with the exception of hand pumps.

- The Departmental staff attribute sub-optimal O&M to a variety of reasons that include.
  - A high task load, in terms of area coverage, for each level of supervisory staff which naturally affects performance.
  - Lack of adequate resources in terms of vehicles and things like basic tool kits at pump houses
  - Inadequate communication links between field staff in booster stations and sub divisions This means that there are delays in addressing the problems.
  - The estimates regarding broken down pumps received from the *Panchayats* are generally inaccurate and the pressure for repairs from the *Zilla Parishad* and *Samitis* high In fact all the feedback from the *Samitis* is provided at the beginning of summers and there is no regular feedback to help the PHED spread out the task load over the entire year. The department felt that a regular need assessment was necessary in view of the inaccurate and loaded assessment during the beginning of the summer season by the local bodies. It was also suggested that a post in the PHED or the *Panchayat samiti* should be created to handle the communication and co-ordination gap.

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[19] As recognised by the departmental staff themselves , the PHED does not have the adequate machinery for follow up and collection of bills. In the villages people have stopped paying for the stand-post supply and the PHED has also stopped efforts towards collection in most cases The village water supply through stand-posts is now treated as free supply in many cases.

[20] As against this, the metered domestic rates that are applicable in the urban areas, are Rs 1.25 per cu m

- Low presence or absence of maintenance staff to address service points leads to improper use of the installed structures and equipment This normally results in wastage and reduced reach in terms of low pressure and frequent breakdown of equipment and maintenance needed for structures

- Specifically in the case of RWSS, a number of problems are faced during operations:
  - Each station in the scheme is dependent on the preceding station for its supply as there exists a linear link between them Hence in the case of a supply disruption at any point in the system, the entire chain below it is affected
  - Due to lack of adequate number and spread of storage reservoirs, whenever maintenance stipulates closing down of systems, the water availability is very adversely affected in a number of villages
  - Pumps are old and hence are not very fuel efficient and also require a lot of maintenance, which is not always forthcoming
  - Most significantly, the Regional Water Supply Schemes of the PHED are not connected directly to the RSEB grid and lose valuable supply hours in case of power trips. The situation is very critical in districts like Churu where large parts of the district are covered under the RWSS and where power cuts are frequent and long At times the power cuts stretch upto 3-4 days continuously The frequent power cuts also mean that enough water pressure cannot be developed in the supply line to reach the villages further down in the chain From the side of the PHED no steps to solve these problems in consultation with the RSEB seem to have been undertaken.
  - In many cases the Ground Level Reservoirs (GLRs) are located such that the feasibility of supply through piped system becomes hydraulically impossible.
  - The operating staff often has a very low level of education, adversely affecting operations At the fitter, pump driver and helper level, some are even illiterates While this need not necessarily be viewed as a constraint, it does highlight the need for specialised training for these operators
  - In many areas, due to shifting sand dunes, the pipes are exposed to damage in some cases and susceptible to overburden in the other cases

8.2 Community Initiatives and Participation

Community initiatives towards helping the department field teams in repair of water supply systems have always existed and continue, though on a limited scale, following the withdrawal of the provision of hiring local labourers for field tasks since the beginning of the last financial year The community initiatives also exist in the form of collective efforts like *adarsh kuans* where the community digs a well by raising contributions of labour, material and money from amongst themselves. An organised effort for community mobilisation has also been undertaken in the form of a Community Participation Unit (CPU) in the Aapni Yojana project in Churu An encouraging aspect of this initiative was that the technical staff drawn from the PHED took a lot of time and effort to appreciate the role of the CPU.

In general, the people are willing to get involved in the O&M of the schemes and are also willing to pay for creation and maintenance of drinking water services However this is conditional to the transparency in utilisation of the funds generated from such contributions, as also the quality and reliability of water from the sources created. This is, to an extent, matched by the fact that the people are at present also purchasing water in times of stress Hence, they are currently also paying for water, although not to the government. Table 8.1 presents the findings of the primary

survey in this regard

Table 8.1: Willingness to pay and current purchases

(as percentage of respondents)

District/ Parameter	Barmer	Churu	Dungarpur	Ajmer
Willingness to pay for drinking water (monetary)	57% condition. sources should be close by	66% condition sources should provide good quality water, i e sweet water	24%	47%
Purchase of drinking water	19%	45%	14%	0 5%

Source Primary household survey , 1998.

The preference regards upkeep of sources showed a marked skewness in favour of association of the user groups with the government . This reinforces the need for transparency in the system

Local panchayat level functionaries showed a general lack of willingness to take up the upkeep and management of drinking water services as an institution, largely due to the lack of clarity on their roles and the impending resource constraint. However, in most cases, individual panchayat members were willing to participate in management initiatives.

8.3 Departmental Views on Participation of the Local Bodies and Community

The potential benefits of community inputs in O&M of water supply schemes is yet to be fully recognised by the department staff. The poor performance of the local bodies has been responsible for the PHED not being positive about the level of participation that can be drawn from the local community. Most of them preferred privatisation of the sector rather than promoting community based interventions

9. Sustainability of the Drinking Water Programme

The continuous fall in the groundwater table and deterioration in the quality of the available water are the major causes of concern in the whole state of Rajasthan, especially with respect to the sustainable supply of drinking water The constraints imposed by the low rainfall and the increasing pressure put on the scarce water resource by the growing population as well as competing needs of agriculture and industry place greater significance on the judicious management of the drinking water supply in the state

However, under the present water supply and management system, which is largely exploitative rather than conservationist[21], the sustainability of the drinking water programme in the state is highly suspect The ensuing threats are clear from the fact that despite heavy investments in water resources, the people of Rajasthan are suffering from water scarcity Further, in the face of government interventions that introduced new and ironically, convenient water supply systems[22], traditional water harvesting mechanisms have been heavily neglected If such trends continue, dependence on outside sources of water, that require huge investments and call for highly organised and capital intensive management, will only rise, which does not augur well for the sustainability of the system

Looking at the scenario in detail, 87% of the ground water used in the state today is for meeting the drinking water needs And the decline in groundwater levels is reaching alarming proportions, indicating serious imbalances and evoking state wide concern about over-exploitation. It is, therefore, important to reduce the use of groundwater and develop other sources. Besides, the activities of several departments have a bearing on water exploitation. For example, electricity rates, subsidies for energisation of wells, supply of credit, all affect water development. But as yet there is no integrated approach to water development.

The problem of excess salinity in the ground water in certain districts and high fluoride levels in others are another stress on the sustainability of water supply systems that depend almost exclusively on ground waters Both the communities and the officials have reported that the salinity as well as the fluoride content in the water has been increasing over the years.

It is hence imperative that to make the drinking water supply system sustainable, measures must be taken both to enhance supply and to control demand. On the supply side, the building of water harvesting structures that help in ground water recharge and allow the ground water dependent sources to regenerate, need to be an integral part of the water management

State Strategy for Sustainable Development of the Drinking Water Sector

- Scientific source development.
- Conservation of water and recharging of ground water aquifers
- Adequate funds and decentralisation/ involvement of local bodies for schemes and O&M

[21]Refer Dying Wisdom, State of India's Environment, the 4th Citizen's Report, 1997.

[22]Convenient in the sense that instead of having to expend effort in first collecting/ harvesting the water in traditional structures like kunds and tankas, in maintaining these structures and then in drawing water from, water was now available in a tap at community stand posts or even at home if a household connection was available

system[23] Also, the system needs to diversify its source base and develop surface water sources that complement the present system as well as tap into the traditional water harvesting mechanisms existing in the region The sector can also benefit greatly by involving the people in planning, operation and maintenance of these schemes, as they have great traditional wisdom in this area, having managed their water supplies for centuries before the government stepped in

In the area of demand management, community awareness raising needs to be combined with measures, both fiscal and technical that will put pressure on the local people to reduce wasteful practices and encourage conservation of the resource Financial sustainability of the programme is also essential if it is to be overall sustainable in the long run

[23] At present focus on the schemes which concentrate on water recharge structures is low, amounting to only 5% in terms of area coverage vis-vis the other schemes which are ground water dependent.

10. Conclusions & Recommendations

The monitoring and evaluation study for the rural drinking water and sanitation sector, for the State of Rajasthan, brings out several facets with regards the status of the sector. These relate to the constraints imposed by the natural conditions, the coverage status, resource constraints of the PHED, strengths and lacunae of programme administration and associated concerns of level of community participation and community preferences. Most of these concern themselves with the rural drinking water sector

The state of Rajasthan, marked by scattered habitations, low population density, harsh climatic conditions and scarce surface water flows, poses a serious challenge to the provision of drinking water facilities in the state. Unsustainable practices have resulted in over exploitation of ground water leading to declining ground water levels accompanied by deteriorating water quality. The cumulative impacts of depleting water table and the falling water quality are inter-linked. These include impacts like loss of productive time in traversing long distances to fetch water, health problems in the population that consumes poor quality water, depletion of aquifers leading to increasing dry zones resulting in defunct sources. It also leads to the rise in the costs of the schemes due to the need for deeper drilling for sources dependent on ground water and thereafter, makes such schemes difficult to be maintained due to high maintenance cost and low operational life of the sources. In light of the scarcity of locally available potable drinking water, the department is forced to substitute these small scale village level schemes by large scale regional water supply schemes whereby water is transported over long distances.

With regards to coverage, among the most positive features is the fact that the state has established quite an extensive network of water supply infrastructure covering almost 99% of the total habitations. The primary survey also reveals that there is a good coverage of the rural households under drinking water supply schemes. However, the fact that over 30% of the inhabitants in all the survey districts were receiving less than the requisite 40 lpcd of water is an issue of concern. The number was even higher for the desert districts where, according to the norms, people should have access to 70 lpcd of water. Of equal concern is the fact that coverage of backward habitations, not classified as main habitations, was poor. Another area requiring attention is the rather poor performance of the RWSS in some areas, notably the desert areas of Barmer.

It is clear that the drinking water coverage statistics furnished by the department are inadequate in terms of representation of the coverage status. One, they do not give an updated picture of the status of sources, whether they are defunct, inoperational etc. Two, the norms related to coverage do not seem to be fully applicable in special areas like deserts. Villagers regard the distance of 1 6 kms as too long, especially given the fact that they have to make, on an average, more than 4 trips per day to fetch water. So while the departmental statistics might regard a habitation as fully covered, the villagers themselves might feel that they are not covered.

The survey revealed that the coverage under drinking water supply schemes is, in general, influenced by factors such as ease in access and physical approach to the settlement, reach of the socially and geographically disadvantaged sections to delivery mechanism for need addressal as well as human and financial resource constraints of the department.

It is pertinent to mention that the programme reach and performance is also affected by the way

it is administered, planned, implemented, operated and maintained. Some of the most significant observation in this regard include the following:

- The sanction limits set for the schemes are such that for most of the schemes approval has to be taken from departmental entities far removed from the field. This often leads to delayed execution and manifests in terms of partial execution of schemes like provision of water extraction machines/ pumps but no storage tanks, non compatibility with set norms of scheme execution like the requisite depth of pipelines etc. The facet of keeping stocks centrally also leads to a delay in scheme implementation and repair.

- There are few mechanisms at the state level to undertake participatory planning for the development of drinking water sources in the state. Except in the case of the externally aided Apni Yojana Programme people are neither consulted nor their traditional wisdom tapped, for identifying sources that would be sustainable in the long run. Further, there are no attempts at involving them in the operation and maintenance of the sources created.

- The lack of an integrated approach to water development that would coordinate with other departments to tackle issues like electricity rates, electricity supply, energisation of wells, supply of credit, etc, that have a bearing on both the supply of and demand for drinking water.

- Attempts at rejuvenating traditional sources, largely harnessing surface water, are almost negligible. Given the over-exploitation of ground water resources, the conjunctive use of water is imperative.

- Further, in the face of government interventions that introduced new convenient water supply systems, traditional water harvesting mechanisms have been neglected by the villagers themselves. If such trends continue, dependence on outside sources of water, that require huge investments and call for highly organised and capital intensive management, will only rise, which does not augur well for the sustainability of the system.

- Lack of focus on billing and revenue collection in rural areas is quite evident, though the primary survey revealed that the village community was willing to pay for an assured and adequate supply of potable water.

The rural sanitation sector is a low priority sector, considering that the community does not feel the need for any significant interventions, partly due to the low utility of such facilities and partly due to the prevalent traditional practices felt to be adequate. A dominant feeling that existed in the department and the community alike was that the scarce resources of the department should be channelised towards addressing the needs of the drinking water sector, rather than the sanitation sector.

In light of the above, it is recommended that the state consider the following aspects in order to strengthen the water supply and sanitation programme in the state:

- Tap surface water sources to meet drinking water needs. This is necessary keeping in mind the declining ground water levels as well as the deterioration of ground water

quality. Given the existence of scattered and low density habitations, that result in the availability of large catchments to harness rain water, such options are indeed still feasible in the state.

- Rejuvenate existing traditional sources of water, in association with the local people. This will allow the state machinery to not only capitalise on the existing infrastructure but also on the traditional community management systems, that can go a long way in alleviating the problems related to operation and maintenance that are being faced in large parts of the state.

- Adopt an integrated approach to water development that lays stress on inter-departmental coordination. This is essential in light of the fact that water supplies in many parts of the state are dependent on electricity supplies. Erratic and infrequent electricity supply results in a lot of hardship in meeting one of the minimum basic needs of the people.

- Involve the local people, specially women who have traditionally been involved in the management of domestic water, in the operation and maintenance of schemes. Such efforts must be accompanied by training and motivation campaigns as well as back-up support from the department in cases of acute stress that cannot be handled by the local people themselves. Formalised institutional arrangements need to be worked out in this context. A standardised contractual agreement, stipulating clearly the respective roles and responsibilities of the village and the PHED, would provide the necessary legal basis on which the strengthening of local institutional structures and capacities could be built. The agreement should clarify the question of ownership of pumps and other equipment (owned by PHED, by the local community, by private persons?) as well as stipulate all major consequences of ownership (rights and responsibilities). Costs for repair, maintenance and energy should be paid for by villages (as was the practice up to 1990), for three main reasons: 1) this would help in the integration of villages into water supply projects 2) a step closer to payment of the actual price of water would help to re-install both its regulative and allocative functions as a pre-requisite for sustain ability of supply.

- The coverage criteria needs to be re-defined to include indicators of :
  - level of operationality of existing sources and average life of a source.
  - assessment of the existent traditional community sources.
  - the "within 1.6 kms distance"criteria needs to be amended to a lower frame given the expressions of the community under this study.

- Revisit the criteria for deciding the status of coverage, which elucidates the provision of at least 40 lpcd of safe drinking water. It is important to differentiate between the amount of water required for drinking and the other domestic requirements which do not necessarily require the best quality water. For instance, the ISO classifies different categories of water as being fit for drinking, bathing and washing etc (refer annexure 10.1). Along the same lines, it is imperative to classify the available water and focus on provision of a much lesser quantity of safe drinking water, but at the same time assure

the required amount of water for other purposes[24] This is particularly so in areas where quality of water is a critical issue and where it is becoming increasingly difficult to identify new sources of safe water.

- Monitoring mechanisms need to be set in place which ensure that
  - due to geographical and locational factors, habitations are not left out;
  - backward settlements which exist as a part of main habitations or are main habitations themselves are capacitated regarding liaison with the department towards "better operational status" of drinking water sources; and
  - that the norms regarding issues such as depth of placement of pipelines and testing follow up are met.

- It is also important to educate people about water quality issues prevalent in their area. The water testing arrangements need to be strengthened and at the same time, it is essential that the information is disseminated among the local communities. Measures for tackling the water quality problems must be discussed with the local people.

- There is a need for carrying out health education activities and raising the awareness in hygiene consciousness among the rural population of the state.

- Finally, it is suggested that since declining groundwater levels cannot be looked at in isolation of the irrigation and industrial processes for which the water is being utilised, drinking water must be viewed as a part of all such water intensive developments in the area. Water for drinking has the highest priority over all other uses, but this policy of the government needs to be judiciously implemented. Allocation of the water resource for different uses must be carried out keeping this factor in mind.

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[24] Although the state government also recognises the different needs to be met by the 40 lpcd provision, it does not discriminate in the quality of water to be supplied for these purposes. The state government norms are:

Items	Non desert districts (in lpcd)	Desert districts (in lpcd)
Drinking	3	3
Cooking	5	5
Bathing	15	15
Washing	7	7
Ablutions	10	10
Livestock	-	30
Total	40	70

References

- PHED (1997-98), *Pragati Vivarnika*, Rajasthan.
- PHED, *Circle Strategy Paper (1994)*; Barmer.
- PHED *Circle Strategy Paper (1994)*; Churu.
- PHED *Circle Strategy Paper (1997)*, Dungarpur
- Intra - Departmental notifications and information regarding status of works.
- Department of Science &Technology, Government of Rajasthan, *Resource Atlas Rajasthan (1994)*
- Aapni Yojana Churu, *Annual report (1997)*.
- Aapni Yojana Churu, *Inception Project document*.

Annexures

Annexure I

TERMS AND CONDITIONS FOR THE MONITORING AND EVALUATION STUDY

I OBJECTIVES

i. To assess the present coverage status of rural water supply and sanitation with a special emphasis on the coverage of backward classes/ areas.

ii. To evaluate the safe water supply coverage in areas where quality of drinking water was a major problem

iii To monitor and evaluate people's responses and perceptions about the coverage of rural supply and sanitation , to evaluate the community involvement in the planning and implementation of water supply schemes.

iv. To monitor and evaluate contributions by the users in capital and recurring cost on rural water supply schemes.

v. To monitor current knowledge, attitude and practices of villagers on water supply.

II. SAMPLING:

The study may be based on the sample survey in selected districts. In each district 15 villages may be selected at random and 15-25 households in each village, may be covered depending on the population of the village.

III. TIME FRAME:

The study may be completed within a period of three months from the date of award. A tentative time schedule may be as under :

Activity	*No of weeks*
Planning and preparation	2
Field work	5
Data processing and analysis	3
Submission of draft report	2
Total	12

The draft report would be presented at the end of three months from the date of award of the study and the final report could be submitted within two weeks of the receipt of the comments from the Mission The institutions will have a close interaction with the Mission at all stages of progress of the study An interim progress report, in presentation format , may be prepared mid way through the assignment , to brief the Mission of the purpose

IV METHODOLOGY:

The study may be based on the collection of information from the primary sources. Questionnaire/ observations, checklist may be developed so as to elicit , inter-alia, the following information-

- Sources of water supply - piped or private, type of sources - handpump, piped water or stand-post; distances of the source of water
- Availability of water - during scarcity period and non-scarcity period, whether water supply is dependable
- Quality of water - whether potable, whether water testing done at regular intervals.
- Operation and maintenance of piped water sources, measures taken for cleanliness of handpump sites, status of breakdown and repair.
- Extent of community participation - whether willing to contribute labour / contribute to the capital requirements and share the recurring cost of construction and maintenance of piped drinking water sources.
- Whether community is satisfied with water supply and related activities.
- A format of the questionnaire is provide . The Questionnaire is not exhaustive, but this can form a basis on which further information can be built up.

V MAIN ITEMS TO BE HIGHLIGHTED IN THE STUDY:

1 Present coverage status in Rural Water Supply Sector with special emphasis on the coverage of Special /Backward Areas. People's perception about coverage.

2 Water quality issues - Government response and people's views, testing arrangements.

3 Actual status of drinking water sources (Tubewells, Piped water schemes, Others -SPV etc.).Percentage working / not working , reasons for not working, down time analysis.

4 O& M status - local efforts in O&M, cost recovery , working of village level committees, prospects for additional cost recovery.

5 Community participation - modes, extent, special features, if any. Involvement of the local bodies, need for training / empowerment.

6 Sustainability issues, scientific source finding.

7 Willingness to pay (WTP) - first order estimates, conditions conducive for higher WTP.

8 Special Initiatives - Sub-Mission activities, externally aided projects, special projects.

9 Comments on the working of the concerned agency, (PHED, Board, Jal Nigam, Zilla Parishad) - organisational issues, staff motivation, attitudes towards community participation.

10 Brief observations on rural sanitation coverage, practices, prospects, local involvement etc.

Annexure 2.1

List of Information or Documents Requested for at the State and District Level

State Level

- Annual reports
- Organisational set-up
- Monitoring and evaluation reports
- List, information and appraisal reports of externally aided projects
- Any other sector specific studies undertaken
- Information indicating outlays on operation and maintenance with respect to new investment
- Area coverage and budgetary allocation for different supply systems
- Information pertaining to mini missions
- Capacity building / HRD programmes at the state level
- Specific areas of relevance in the Draft Ninth Plan
- Letter of introduction

District / Circle Level

- Coverage under NC, PC and FC categories
- Area coverage and budgetary allocations under different water supply and sanitation systems
- Special problem areas concerning water quality
- Information, if any, on traditional sources and systems
- Monitoring and evaluation reports
- Information on externally aided projects and studies conducted
- Work plan and financial outlays
- Capacity building / HRD programme at the circle level

Annexure 2.2

Village panchayat members (PRIs) Questionnaire

Respondent identification
Name of respondent
male/female
panchayat position held

Village profile
geographical and administrative
total population
total no of households
major castes
no of phalas/ mohallas
total no of drinking water sources under each type
no of traditional drinking water sources
no of operational drinking water sources

1..What are the main problems pertaining to drinking water in your area:
in order of response.....

Checklist
Quality
Quantity
Seasonality
Distance
others

2..What is the ground water level in your area (time line).....

3..Ranking of institutions for O&M of DW sources :(1-3)
Current practise and assessment.. ..... .
Alternatives suggested.....

Checklist:
User groups(with Panchayat participation...pani panchayat mode)
User groups (without Panchayat participation)
Govt. managed
Voluntary Org
Others

4..Are you willing to undertake the O&M of drinking water sources in your area Y/N

If yes then in your perception these are the problems faced :
Ranking of problems faced by the PRIs pertaining to (1-5)
(Use placards)
Checklist:
Insufficient funds

No trained manpower at community level
No felt need for community participation due to supply driven approach
Lack of general awareness issue
User's unwillingness to pay

5..Are you consulted for drinking water interventions in the area Y/N.....if yes
for what
by whom
significance of your suggestions for the implementers/ planners in your opinion

6..Who is the most reliable government functionary, in terms of handling of drinking water and sanitation services for your area

7..Panchayats contribution towards improvement in status pertaining to drinking water and sanitation in the panchayat area

8...Major lacunas (apart from income) which act as impediments towards motivation for contribution.....

Checklist :
Transparency regarding use of generated funds
General awareness
In-operational mechanisms

Annexure 2.3

Village level non-panchayat (Community Individuals) Questionnaire

Household identification :
Name of respondent
Sex.
Village
Block

Total no Of family members
Main Occupation
Whether SC/ST
No. Of earning members
Total income (all sources) per month (avg)
peak months of income & months when income is low
No. Of Animals
Drinking Water consumption for household needs per day(matka/bucket in litre terms)
Water consumption for animals(drinking)

1...Detail of main drinking water sources used (ranking if applicable :as per use frequency)
Community well
Own Well
Tank Water (community tap)
Tank Water (house hold tap)
River /Canal/ Pond
Others

2...Distance of Primary DW source:.....
<50mts
51-100mts
101-200mts
201-500mts
501<mts

3..Nature of Water from the main DW source being used:
Potable-sweet
Potable-normal
Non Potable-normal
Non Potable-saline
Non Potable
Others

4.. Frequency of water releases if piped
Every day / no. Of days in a week.....

No. Of Hours
Non Scarcity *Scarcity months*

Morning

Evening

5...Collection

a..
Where do you get your water for drinking

1 wells	1 private	1 inside house	1 inside village
2 HP	2 govt.	2 outside house	2 outside village
3 tap			

any others . please specify.....

b ..
Is this the nearset source of water Y/N
if N then why don't you use the nearest source:

caste problem
quality problem
in sufficient quantity
family conflict
any others

c.
How long doe it take to reach your main drinking water source: .....minutes.....Km
d..
How many trips do you make daily.....
e..
What is the quantity that you collect daily from this source.....litres
f .
If you use other sources also, What is the quantity that you collect daily from other sources.... ..... litres
g
For summer month s do you go to the same place to collect water Y/N
if N . .then where do you go to collect water

1 wells	1 private	1 inside house	1 inside village
2 HP	2 govt.	2 outside house	2 outside village
3 tap			

any others .. please specify..... . ...

6..Purposes for which the main drinking water source is being used
collection
drinking on site
drinking by cattle on site
washing on site
bathing on site
bathing animals on site

7..Problems perceived in the main source being used

a..

List of problems in order of response.....

Checklist:

Distance

Seasonality

Quality

Quantity

b.

Main reasons for source going out of order:

Improper use

Damage due to natural calamities

Damage by miscreants

Theft of Parts

Lack of maintenance

Others

8..Hygiene conditions around the DW source: (poor, satisfactory, good)

If poor, response statement on why considered poor:.....

9..Purchase of water

Months

no Days in the month

amount spend in the month on purchase

amount bought per day of purchase

10..Demand assessment / Willingness to pay:

a What the household currently pays for DW & S services

b Have you contributed for capital investment towards a community DW source if yes, the amount..... type of source.....

<Rs100

Rs100-Rs300

Rs300-Rs500

Rs500-Rs1000

Rs1000<

c...Have you contributed towards O&M of a community DW source, if yes.....amount .... Type of source.....

d..Do you need more water for domestic purposes? N

Y How much more per day? _____ litres

e..Suppose your village people got together in a small group(samiti) to build a new source for this additional water, and you all had to collect money to do this work. How much would you

becontribute?

Rs _____ or _____ days of labour time or
_____ amount of material.

f Now the group would also need money to do repairs and maintain and to clean this new source. If this money was collected as a monthly fee, how much would you pay?

i. Rs. _____ per month/per litre

ii. Nothing.
Why? _____

g .What sort of system would you prefer for making additional water available?

11.. Under what mechanism....
Would you contribute more easily (separately for O&M and capital costs) :
A Collection system exclusively by Panchayats
B. Collection by district / block level government functionaries
C Local user association collection units
Present Contribution mechanism if any.....

12.. Perceptions about safe drinking water for humans..and for animals.(One statement each)
checklist: sweet, clear, source based judgement

13.. Ranking of practices considered as most important to hygiene (1-7):
(Use of placards)
Washing of hands after defecating with water.
Washing of hands before meals.
Preventing water stagnation near drinking water sources.
Use of community latrines.
Use of in house/ private latrines.
Use of fields/ running water for latrine.
Collection storage and use practices

14.. Do you have a house hold latrine Y/ N
If yes type of house hold latrine.....
If no: defecating practices.....
Utility of Household latrine (None, indifferent, useful, acute need felt)

15.. Measures suggested for making provisions for HH latrine
Most preferred measure
What kind of contribution would you provide to make this possible

16.. Problems of accumulated waste water--list of problems generated in order of response . .....

17.. Drainage Route check:(draw as per the response)
Waste water generated

Water thrown into drain within house

Water collected temporarily

Thrown outside house

Open Space /road within sett

Field/farm

Open space

Drain outside house

Stagnates

Goes a little distance

disposal outside house

Joins common village drain

Pit

Water Source

Annexure 2.4

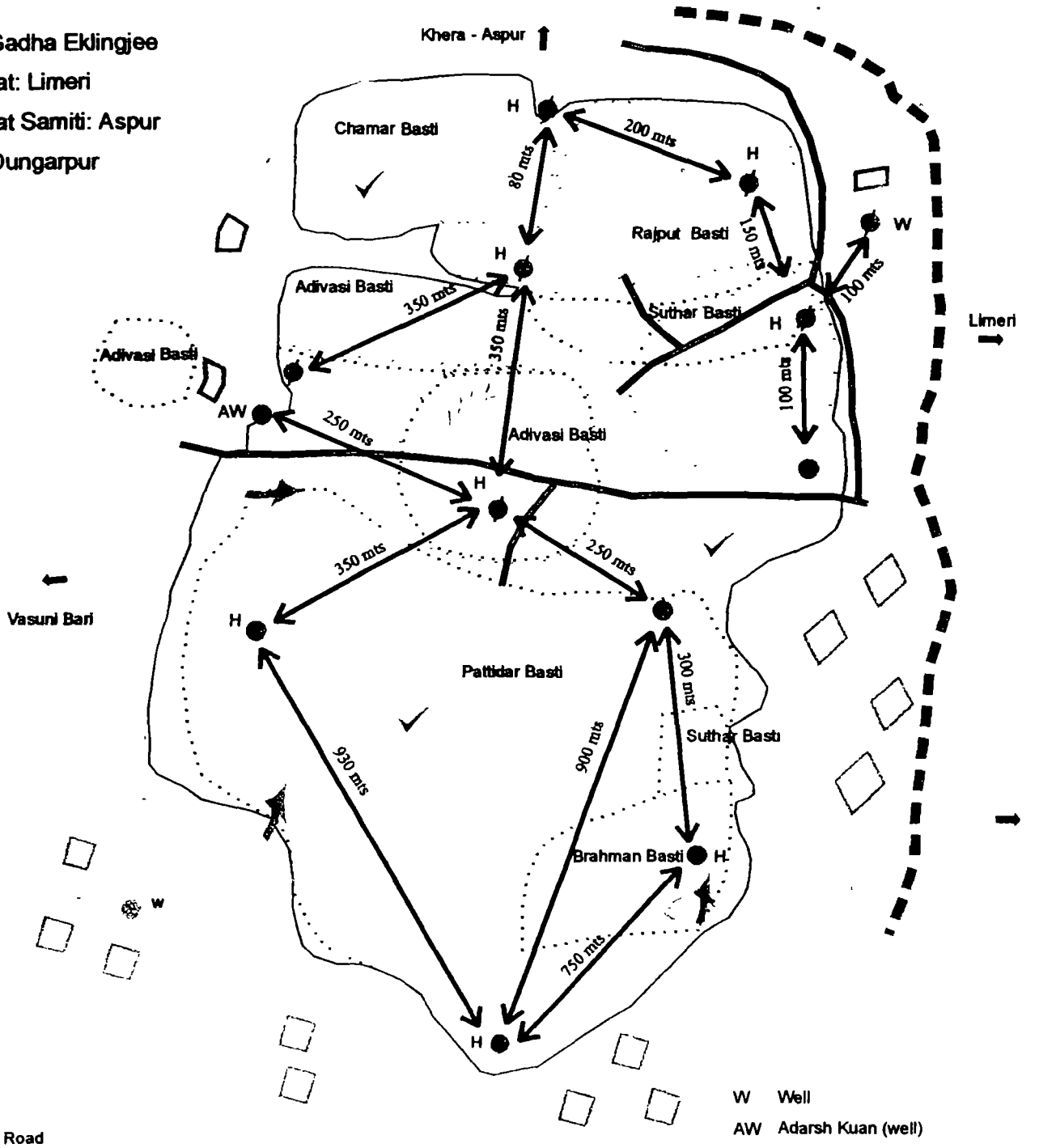
RRA - Village Map

Village: Gadha Eklingjee

Panchayat: Limeri

Panchayat Samiti: Aspur

District: Dungarpur



Road

Canal

Slope Direction

Village Boundary

Extent of Influence of water source

Hamlet Boundary

Temple

Primary School

Fields outside the village belonging to people of the village

W Well

AW Adarsh Kuan (well)

H Handpump- Government

Site/Area where drinking water sources are needed

Private source for both drinking water & irrigation

Low yield Handpump

In-operational Source

Annexure 2.5

List of People met for Secondary Information

Mr. Sanjay Mitra, Director (CRSP), Rajiv Gandhi National drinking water Mission , *N. Delhi*

Mr. Vijay Kumar, Deputy Director (CRSP), Rajiv Gandhi National drinking water Mission , *N Delhi.*

Mrs Krishna Bhatnagar, Principal Secretary, PHED, *Jaipur* .

Mr Devi Singh, SE, PHED, *Barmer.*

Mr. S.K. Dhawan, SE, PHED, *Churu.*

T.A to the SE, *Barmer.*

T.A. to SE, PHED, *Ajmer* .

Shri KP Sharma, EE, PHED, *Jaipur.*

Mr. K.D Sharma, EE, PHED, District Rural division Ajmer, *Ajmer.*

Mr. Gokul Singh, EE, PHED District rural division Beawar, *Ajmer.*

Mr. Sharma, EE, PHED, *Dungarpur.*

Mr. M.L Hemkar, AEN , PHED, *Churu.*

Mr. Manish Baniwal AEN, PHED, *Jaipur.*

Mr. Shouken Khethat, JEN officiating AEN, PHED, Beawar division, *Ajmer* .

Mr. M. Ali, JEN (TA II), PHED, *Churu.*

Mr Vinay Sharma (Purchase Clerk), PHED, *Dungarpur.*

Mr. K.K. Upadhaya, Project Director, Aapni Yojana, *Churu*

Mr. Hemant Kumar Pareek , CPU, Aapni Yojana, *Churu.*

Ms. Meera Srivastava, CPU, Aapni Yojana, *Churu.*

Shri Nadkar, PMC, Aapni Yojana, *Churu.*

Mr Bhuvenesh Jain, Nehru Yuva Kendra, *Barmer.*

Mr. Chauhan, Rashtriya Sahara, *Barmer.*

Shri Acharya , MMVS, Beawar, *Ajmer*

Shri Devilal Vyas, PEDO, Mada, *Dungarpur.*

Annexure 4.1

Status Pertaining to Quality Concerns

Fluoride Affected Areas

Severe Problem

Districts	*F>:1.5ppm(%hab)*	*costs (ongoing prgs)*	*vill (nos.benefitted)*
Ajmer	52.90	Rs. 20.48crs	94
Bhilwara	39.30	-	-
Tonk	38.10	Rs. 11.50crs	221
Sirohi	33.60	-	-
Bharatpur	32.20	-	-
Jalore	32.00	-	-
Jaipur	29.50	5.61 (Chaksu) 0.88 (Dudu)	175 4
Jaisalmer	27.90	-	-
Nagaur	28.00	-	-

others:

District	*F>1.5 ppm (% habitations)*
Sikar	23.80
Dungarpur	23.70
Churu	22.00
Pali	21.20
Alwar	20.00
S.Madhopur	19.70
Dholpur	19.50
Barmer	15.60
Banswara	15.30
Jodhpur	11.30
Udaipur	10.50

As per the existing and deteriorating water quality the following concerns and outlays have been proposed by the state government:

Excess Fluoride	*Excess Salinity*	*Excess Nitrate*
F >3ppm (4500 habitations)	TDS > 3000 (4830 hab)	NO2 >45ppm (16652 hab)
Investment required to overcome the problem a) Capital -Rs. 675 crores b) O&M -Rs. 67.50 crores	Investment required to overcome the problem a) Capital- Rs. 966 cr. B) O&M - Rs. 72.45 cr.	No existing treatment technology in the country
causes dental and skeletal flurosis	imparts objectionable taste and other health problems	causes methaemoglobinaemia in infants, the carcinogenic impact is under investigation

Annexure 4.2

Details on Externally Aided Projects

KfW aided project in three districts of Churu, Jhunjhunu and Hanumangadh:
The project proposed to cover 113,747 and 96 villages respectively of the above mentioned districts The project has an outlay of Rs. 253.01 crores where in the German Government shall provide a loan of Rs. 72 crores plus an assistance of Rs. 45 crores towards meeting the extra cost of piping.

Fluoride prevention programme: This was initiated in the Chaksu block of Jaipur and 94 villages of the district of Ajmer The total sanctioned cost is Rs. 26.09 crores (Rs 5.61 and 20.48 crores). The cost sharing between the GOR and GOI is in the proportion of 25% and 75% respectively.

Saline water treatment programme: This is being executed in the districts of Ganaganagar and Hanumangadh: (220 and 42 villages respectively).The total outlay of this project is Rs.27.98 crores.

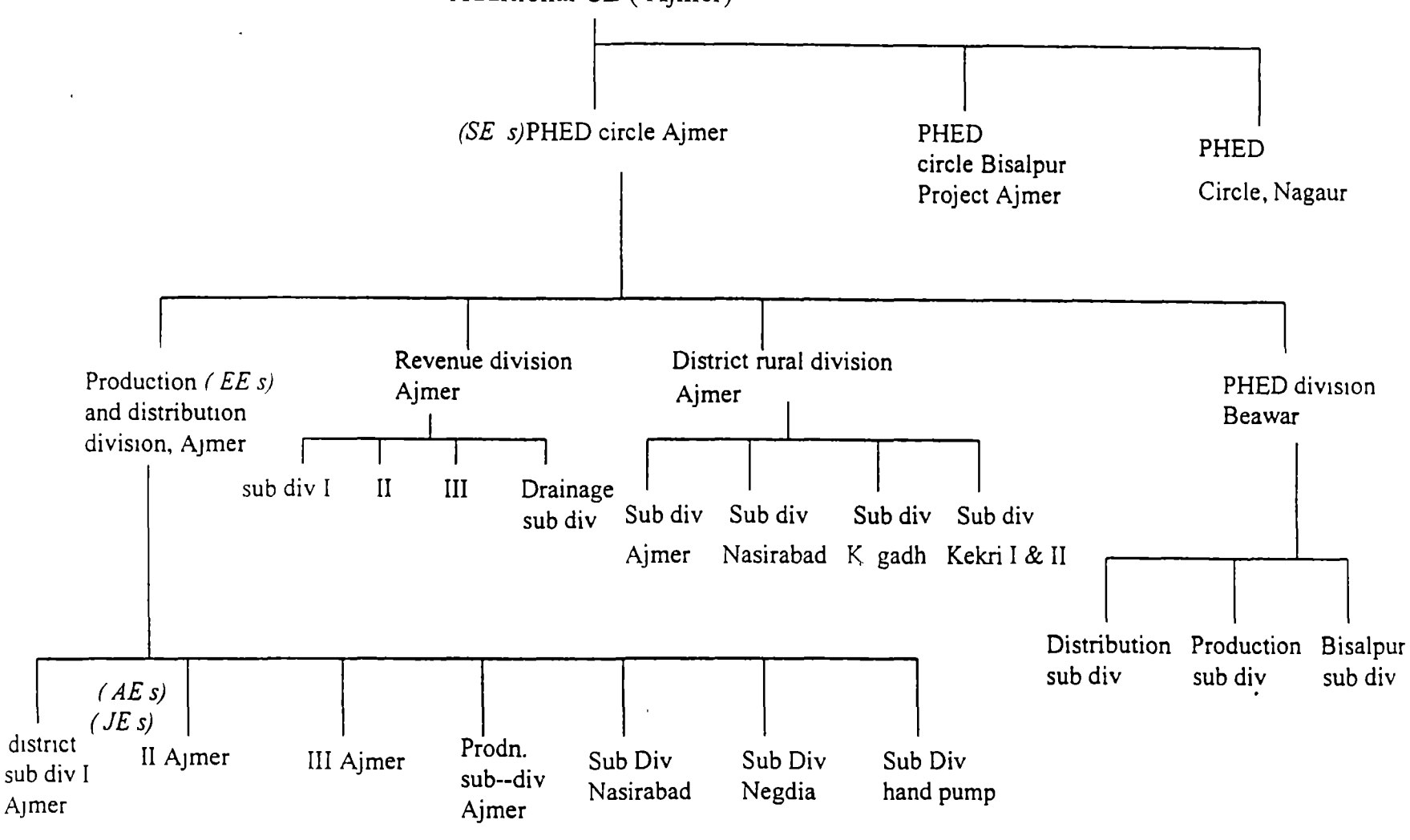
Dudu-Mangalwar-Khudalia project: This project has been sanctioned by the GOI in the year 1996 (30.3.96). The total outlay is Rs. 88.15 lacs and till 3/1997 an expenditure of Rs.53.15 lacs has been incurred, as against a total release of Rs. 30.50 lacs .

Among the other projects that are of direct consequence to drinking water it might be significant to note the Bisalpur project. This is because the PHED has set up an independent unit handling this scheme. This multi purpose project is being constructed on the river Banas and the drinking water supply from the dam is to serve the towns of Ajmer, Beawar, Nasirabad , Jaipur and the villages in route, among the other items in its mandate.

As regards the human resource development component an HRD project costing Rs.83.10 lacs has been sanctioned by the GOI in the year 1995. The project covers training of workers up to the grass root level. An HRD cell has been created to carry out the training activities. The training is imparted as per the following sub segments, under both state and centrally sponsored programmes:

operation and maintenance of water treatment plant .
laying, joining and repair of pipelines
installation, operation and maintenance of electrical switch gear and starters.
Repair and maintenance of hand pumps
installation and repairs of pumps and motors.
Operation and maintenance of desalination and deflouridation plants.

PHED - Setup , Circle Ajmer



Pump drivers I & II fitters I & II , electricians , forman, helpers and panchayat samiti mistris during summers

Annexure 6.1

Annexure 10.1

Water Quality Standards as Prescribed by ISO

Water Class	Designated Best Use	Criteria
A	Drinking water source without conventional treatment but after disinfection	Total coliform organism = <50 MNP/100 ml pH 6.5 to 8.5 DO => 6mg/l BOD 5 days 20 degC =<2mg/l
B	Outdoor bathing (organised)	Total coliform organism = <500 MNP/100 ml pH 6.5 to 8.5 DO => 5mg/l BOD 5 days 20 degC =<3mg/l
C	Drinking water source with conventional treatment followed by disinfection	Total coliform organism = <5000 MNP/100 ml pH 6.0 to 9.0 DO => 4mg/l BOD 5 days 20 degC =<3mg/l
D	Propagation of wildlife and/or fisheries	pH 6.5 to 8.5 DO => 4mg/l Free Ammonia (as N) =< 1 2mg/l
E	Irrigation, industrial cooling, controlled waste disposal	pH 6.0 to 8.5 Maximum electrical conductivity at 25 deg C = 2250 us/cm Maximum Sodium Absorption Ratio 26 Maximum Boron =< 2mg/l

Source: Indian Standards Organisation

Reference Document

District reports

District Churu

1. Introduction

District Churu, situated in the northern part of the State of Rajasthan, has a total area of 16,830 sq km., which is 4 9% of the total area of the State The district has a total population size of 15,39,470 (3.5% of the State population), with an average density of 203 persons per sq.km. 25% of the total population of the district comprises of Scheduled caste/ Scheduled tribe (SC/ST) population. Churu is subdivided into seven tehsils, namely: Sardarshahar, Taranagar, Rajgarh, Churu, Sri Dungargarh, Ratangarh and Sujangarh.

Agro-climatically, the district is classified under the zone of "transitional plain of inland drainage" Topographically, the district mainly comprises of low sand dunes and sandy plains.

2. Water resources - an overview

The mean annual rainfall in the district is 19.4 cm. While the surface water availability is low, hydro-geologically also, the district is endowed with poor to moderate alluvial aquifers. The average ground water development in the district is 3.11% with none of the blocks classified as dark or over exploited blocks with respect to the level of ground water development. Although all the surveyed households complained of a fall in ground water level over the years, the departmental statistics report of an average rise of 0.22 m in the water level of the district during the period of 1984-96.

The primary problem with regards to the water quality in the district is that of the contamination of drinking water sources and high level of fluoride content in the ground water.

3. Coverage under water supply

As per the departmental records, 99.1% of the total habitations in the district have been covered under a government installed drinking water scheme. The statistics regarding the percentage of habitations that have been partially covered or fully covered were not available with the department

The departmental records of high coverage are supported by results of the primary survey which reveal that there is a drinking water source existing for every 31 households. But as per the primary survey, 28% of the households reported of a water consumption of less than 40 lpcd, making them partially covered.

Although the average distance to a drinking water source was found to be about 175 meters, which is considerably lower than the norm of 1.6 kms, 5% of the respondents reportedly traverse a distance of more than 1 6 kms and thus, qualify as "not covered" households Regional variations in distances traversed are very high, which in extreme cases can go up to 25 kms (parts of Taranagar and Nohar tehsils). People cautiously manage the storage of water and its use for domestic purposes, because of the large distances required to be traversed for collection of water, with old water being used for purposes like washing and bathing. The status of coverage as per

some basic indicators derived from the primary survey are as follows·

Table 3.1: Status as per coverage indicators

Indicators	*Findings*
No of households served by a source	31
Average distance to the source in metres.	175
Average no of trips per household per day	4
Per capita water availability >40 lts per day (as % of respondents)	70.3%
Per capita water availability [1]< 40 lts per day (as % of respondents)	29 7%

Source Primary household survey, 1998

There are no caste related restrictions within a village, especially with respect to community water sources. In the event of one of the wells becoming inoperational, the consumers depending on it can collect water from the other operational well/s of the village.

In the backward areas of the district, there exists a relative lack of both government and community efforts towards improving the water supply status. These settlements also have relatively fewer traditional sources and private water harvesting structures.

4. Drinking water sources and water availability

As per the departmental records, about 71% of the total villages in the district of Churu depend upon water sources installed by the PHED, while the remaining 29% of the villages depend primarily upon traditional sources like *tankas, kunds* and dug wells. Tehsil Dungargardh was an exception to this with 69% of the habitations covered under panghat schemes. 69% of the total habitations in the district are covered under RWSS, while the dependence on handpumps is non-existent. The coverage under departmental schemes is as illustrated in the following table:

[1] 45% of the total respondents reported a purchase of water for about ten to twenty days during the summer months On an average 130 litres of water is bought everyday by a household, incurring an expenditure between Rs 5 to Rs. 15. In summers, the price of water rises to Rs 1 per clay pot (10 litres)

Table 4.1: Tehsil wise coverage under different schemes

Tehsil	*M. habi*	RWSS	*Panghat*	*Piped*	*TSS*
Churu	101	53	35	1	12
Ratangadh	95	54	24	3	15
Sujangadh	153	131	17	4	1
Taranagar	111	106	2	1	
Rajgadh	205	196			9
Sardarshahar	170	89	46	3	30
Dungargadh	90	10	62	8	10
Total	926	639	186	20	77

Source : PHED Churu, 1998

The eastern part of the district is well covered under Regional Water Supply Schemes while the western part is predominantly covered under TSS and panghat schemes and the north-western region is has predominance of panghat schemes.

5. Traditional sources

Most of the villages have traditional water sources like dug wells, open ponds, kunds and tankas. Majority of the wells and ponds had been constructed by affluent individuals or by the community to meet the increasing water demand. Rain water is harvested in open ponds but the accumulated water is not enough to meet the water requirement for the entire year. In an event of good rainfall, the water lasts for about 4-6 months, while in drought years the ponds often collect no water at all.

Some of the households in every village have kunds inside their compounds, in which rain water is collected for domestic use. This reserve lasts for 7-9 months, depending on the respective sizes of household and kund. Poor households generally do not have kunds, so at the time of water scarcity they depend on the richer households for water supply.

In the past, villagers used to be almost entirely dependent on the village well for their water requirements. But collecting water from a dug-well was a laborious and time-consuming job. Water was drawn in big leather buckets on a rope over a pulley, using mostly animal power[2]. The electrification of villages opened a new era in water arrangement for villagers. In some of the villages, either a rich man or the village community installed an electric pump on the village well, resulting in reduction of time and labour involved in the withdrawal of water.

In the past, the practice was not to allow anybody, person or animal, to move within the

[2] In villages having dugwells, camels were used to draw water from the well. The villagers undertook this task by rotation If a villager did not own a camel, he had to pay the camel owner Rs 100 per day when his turn came On an average, a villager not owning a camel spent about Rs. 25 per month

catchment area of the pond. Villagers never dumped garbage near the pond and its catchment area. But over the last few years, the practice has been abandoned. The growing negligence and lack of awareness has resulted in heaps of garbage and dirt near the ponds and their catchment areas. Also, due to the increased availability of water from other sources set up by the PHED, the need for these structures has declined which too has resulted in the abandoning of traditional management practices. As a result the pond water is found to be severely contaminated and not used anymore.

6. Defunct sources

As per the primary survey results, about 4% of the total government installed drinking water sources are lying defunct or inoperational in the surveyed villages. These comprise mainly of well with defunct government installed pumps.

7. Quality of water

The primary problem with regards to the water quality in the district is that of the contamination of drinking water sources and high level of fluoride content in the ground water. As per the departmental records, around 22% of the total habitations in the district have ground water with unacceptable levels of fluoride content.

Out of the 44 villages studied under Aapni Yojana[3] in Churu, results of the analysis of groundwater tests were available for 35 villages. Fluoride was found in the samples from all 35 villages but in 23 villages the content was found to be less than 1 ppm[4]. In nine villages, the fluoride content was below the nation-wide accepted standard of 3 ppm. But three villages reported having extraordinarily high and unacceptable fluoride contents of 4 ppm, 4.2 ppm and 4 ppm. Total Dissolved Solids (TDS) level was higher than the acceptable limit of 2000 ppm (WHO and national standards) in the groundwater samples from 28 villages. Although nitrate content was not analysed, but it is known to be very often unacceptably high and well beyond the WHO standard of 45 ppm in the whole district.

In most of the villages, dug well water is brackish. But for the lack of an alternative, the villagers have been using this water for years, either directly or after mixing it with rain water from a clean pond or a private kund. The well water becomes more brackish during summer, and if there is no rain, the water problem becomes really acute. In some households groundwater with known high fluoride content is also mixed with rain water from kunds.

The pond water is no longer used because of visible contamination. The wells and kunds are also

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[3] The PHED in Churu is at present involved in an Integrated Water Supply Sanitation and Health Education Project (*Aapni Yojana*), funded by the German Bank The project is being undertaken in collaboration with five NGOs . The project aims at lifting drinking water from two points on the Indira Gandhi Canal and transporting it by a pipe line to 956 villages and 11 towns in Churu, Hanumangadh and Jhunjhunu districts

[4] International (WHO) and Indian national standards for safe drinking water allow only a maximum of *1 5 ppm* (parts per million) or 1 5 mg/l (milligram per litre) of fluorides Because of the extent of the fluoride problem in the country, special national standards for "acute conditions" (no alternative source of supply) allow up to 3 ppm

exposed to risks of biological pollution, like seepage of muddy run-off water, mixed with animal dung and garbage, from the surroundings. Even a perfectly maintained plaster cover inside the well does not offer complete protection against such invisible pollution. Hygienic habits and techniques in storage and handling of water are practiced by some of the households.

The department officials claim that water testing initiatives are regularly undertaken by the PHED with the water samples being collected by the field level PHED officials, at least once in two years from a village. However, the respondents in 50% of the villages did not recall any such tests ever being conducted in their village.

8. Operation and maintenance

Electric pump failure or power failure[5] are the main reasons of water-related emergencies. Pump repairing usually takes about 3-4 days. The major lacunae identified by the department officials primarily related to lack of vehicles and frequent power trips which render the water supply mechanism dysfunctional. It was cited that during the summer months, on an average there were seven to eight power trips in a day which implied the shutting down of the whole system under the RWSS for at least an hour (average duration of a power cut) for every power cut. The power failure also, at times, continues for 3-4 days. Under such situations, villagers fetch water from nearby villages with camel carts[6].

Most of the local supply systems show neglect in terms of proper installation and maintenance, primarily because the work was executed by contractors. Many of the schemes are usually in a visibly neglected state with walls showing cracks, lids either broken, loose or missing, dirty surroundings of reservoirs and cattle-troughs, leaking valves and pipe joints and ramshackle electrical installations which can be dangerous. These technical shortcomings not only result in the deterioration of water supply and quality, but also lead to endless breakdowns

Shortage of money is the ready explanation, but is not a convincing argument since, as a rule, the accumulated cost of poor workmanship and permanent improvisation exceeds the cost of systematic installation and proper maintenance.

As per the policy of the government of Rajasthan the water supply from public facilities in rural areas is free of charge. However the house holds which have domestic connections are suppose to pay Rs. 16 collected once in two months, which is rarely possible.

9. Problems pertaining to drinking water supply

Distance and quality emerge as the most predominant problems in the district, with 39% and 36%

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[5] On increasing demand for the installation of electric pumps on village wells, PHED with its limited manpower and resources was not able to run village water supply for individual villages, given the number of such villages As no negative effects on the health status of villagers using wells with pumps were reported over several years, PHED began to install electric pumps on village wells under the scheme known as TSS

[6] A camel cart carrying about 300-400 litres of water costs about Rs. 30-50, depending on the distance of the water collection point

respectively, of the total respondents identifying them as the most important drinking water related issue in their village.

The primary survey brings to light that in most of the villages all settlements do not have their own good quality water source and as a result depend on sources available in other settlements. This trend is more pronounced in villages where the number of settlements is high (generally more than four) and in villages where water quality is a problem. Due to lack of adequate number of potable water sources, the caste factor does not inhibit access to drinking water in the case of the private sources.

Table 9.1: Main problems afflicting the drinking water sector (*figure as percentage of respondents)*

Main Problems	*Findings*
Drinking water in general	
Distance	*39%*
Quality	*36%*
Quantity	
multiple responses	*25%*
Drinking water Sources	
Maintenance, set up and improper use	*71 %*
damage by miscreants	*19%*
natural	*10%*

Source : Primary household survey, 1998.

People also complain of improper use and inadequate maintenance and repair of the existing infrastructure in their villages. Both the PHED officials and the local respondents identify lack of awareness among community members and of low capacities of community representatives as the core reasons, blocking the participation of the community in achieving better technical and maintenance standards.

10. Community and panchayat participation

Traditionally, most villages in Churu had a system of community participation and management of water sources, called the *Siyari* system. In this system, every household had to run the village well on a daily basis (with their camel) to provide water for the whole village. The turn was decided on the basis of a traditional unit for estimating water requirements of households, known as *Anga.* In most villages, a medium household having 9 angas was to run the village well once in a round. For example: if in a village there were 100 households, a household having only 4 or 5 angas had its turn once in every two rounds; in each round, each household having 9 angas was to run the village well for one day per round, but a household having 18 anga had to run the village well for two days.

In some of the villages, where the community had installed an electric pump on the village well, a contractor was running the village well. All households paid the contractor according to the number of angas. Water charges changed every year according to the total amount negotiated for the contract. The contract amount was then divided by the number of angas in the village and household contributions were fixed according to the respective number of angas. In most of the villages, the contractor was also responsible for repairing the electric pump. All the caste leaders took responsibility for payment of water rates by the households of their caste to the contractor. Water charges varied, from 50 paisa to Rs 2 per anga, per month, in the villages. The water charges per medium-sized household having 7 persons and two cattle units varied from Rs 5 to Rs 18 per month. Only in a very few villages, was there a fixed date for depositing water charges. In these villages, people came to pay their water charges at the village well. Collection was done monthly in the majority of villages. In a very few villages, water charges were collected only twice or even once in a year. In the majority of the villages, water charges were collected by the contractor or by the pump driver, whereas in some villages, committee or caste leaders collected the water charges. Some households had house connections from the village well. Anybody who wished to have a house connection could have it, at their own cost. In most of the villages there were no specific rules for house connections. The extra charges on house connections ranged from Rs 2 to 10 per house connection, per month. In a few cases, extra water charges were applied for better services.

This traditional system is being reinstated in the district as part of the Aapni Yojana Pogramme. For the first time community participation was invited by the PHED to run the traditional water schemes in Churu. Under this scheme, the community were required:

- To form a committee of villagers, for management and administration of the water supply system in the village.
- To charge a water tariff from the consumers.
- To use the surplus of water charges collected for repair of electric pumps, wells and water reservoirs.
- To maintain village wells and electric pumps and to pay the wages of the pump driver.

Most of the respondents complained that they were never consulted regarding drinking water interventions and the field level staff of the departments hardly ever visited their village. 89.3% of the respondents felt that lack of information was the main reason for poor community participation in the operation and maintenance of drinking water schemes followed by the non-existence of a transparent and reliable contribution mechanism.

As regards the willingness to contribute towards maintenance or capital cost, a number of respondents were agreeable, provided they are assured of a reliable supply of good quality water by the department.

11. Rural sanitation

Rural Sanitation, as in the other districts covered under the study, is a rather low priority sector in the district. Small scale interventions, like the one's initiated by the Aapni Yojana (a hybrid

PHED and Community participation unit set up under German aid) target this sector as an integral component of drinking water supply and health segment.

As per the primary survey, 23% of the responding households reported ownership and use of household latrines, while community latrines were reported to be non-existent in the surveyed villages. Some related aspects as per the findings of the primary survey may be noted as per table 11.1:

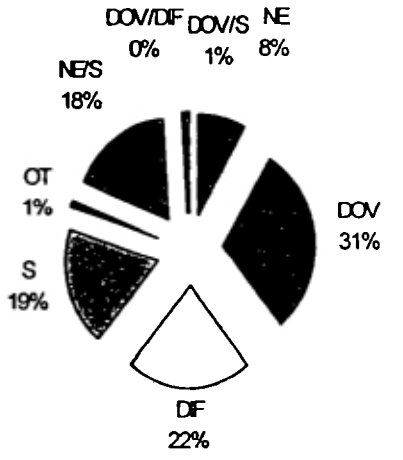
Table 11.1: Rural sanitation *(Figures in percentage of respondents)*

Parameter	*Findings*
Sanitation facility (private)	23%
Sanitation facility (community)	NE
Provision of the facility should be made by	Government
Willingness to pay for sanitation(monetary)	non existent (NE)
Cleanliness near drinking water sources of acceptable standards	84%

Source : Primary household survey, 1998

The drainage mechanism in the villages of Churu shows a wide variation as per the inference drawn from the primary survey. In 37 % of the surveyed villages, a need for improving the existing drainage was expressed. The people are well aware of the negative impact stagnant water can have on their already poor quality water sources, besides the aspect of water borne diseases.

The respondents felt that it was the sole duty of the government to make arrangements for sanitation facilities in the villages. None of the households reported willingness to contribute in any form for the provision of sanitation facilities



Drainage mechanism of households in the villages

Drains in a facilty (DIF)	*22 %*
Drains outside village (DOV)	*31 %*
No exit (NE)	*18 %*
Stagnates (S)	*19 %*
others (OT)	*1 %*

12. Conclusions

Although the departmental statistics report a high level of coverage (99.1% of the habitations) under drinking water schemes in the district, the distinction between the fully covered and

partially covered habitations is completely missing from the departmental records.

The primary survey brings out that about 28%of the respondents were receiving less than 40 lpcd of water and were thus, only partially covered under drinking water scheme. Also, 5% of the respondents traversed a distance of more than 1.6 kms for collecting water and thus, qualified to be considered as "not covered" under a drinking water scheme.

As 69% of the total habitations depend on RWSS, frequent and continuous power trips in the district lead to considerable inconvenience and water shortage in large parts of the district.

Most of the villages have traditional water sources like dug wells, open ponds, kunds and tankas for harvesting rain water. In the past, villagers used to be almost entirely dependent on these traditional systems for their water requirements.But over the last few years, due to the increased availability of water from other sources set up by the PHED, the cleaning and maintenance of the traditional structures has been abandoned.

As per the departmental records, around 22% of the total habitations in the district have ground water with unacceptable levels of fluoride content. Nitrate content in the ground water is also known to be unacceptably high in the whole district. Half of the respondents reported the purchase of water because of sweeter taste. The villagers have been using brackish water of the dug-wells for years, either directly or after mixing it with rain water from a clean pond or a private kund. The growing disuse and neglect of traditional systems is likely to make the situation becoming more acute.

Although the department officials claim that water testing initiatives are regularly undertaken throughout the district, the responses to the contrary were found during the primary survey with respondents in 50% of the villages not recalling any such tests ever being conducted in their village.

The local community and panchayat have traditionally been very active in the operation and maintenance of drinking water systems in their villages. The traditional system is today being reinstated as part of the Aapni Yojana Programme, under which the community has been invited to operate and maintain the traditional water schemes in the district.

Most of the respondents agreed to contribute towards the construction and maintenance of drinking water systems, provided they were assured of a reliable supply of good quality water.

Rural sanitation is a low priority sector in the district with only 23% of the total households reporting ownership and use of a sanitation facility. The respondents also opined that it was the sole duty of the government to provide sanitation facilities in their villages.

In conclusion it may be stated, that district Churu has a combination of the quality and distance problems plaguing it, with the quantity problem at times existing as a function of the poor quality of water. As per the people's perception, even the large number of regional supply schemes in the district have failed to address the water quality issue. The phenomenon of mixing of rain water with ground water to improve the taste and selective use of sources emphasise the need for potable water. The willingness to pay, among the local people, for better quality water also points towards the same. The positive result of "Aapni Yojana" must be used as a guideline and as a demonstration towards revival of traditional practices and eliciting community participation not only in other parts of the district but in the entire state of Rajasthan. This kind of an integrated programme may be also used for interventions in the rural sanitation sector.

Annexure I

Village Case Studies

Village : Nakrasar

Tehsil : Churu

Village Profile

The village is located 5 kms off the main road from Sardarshar to Churu via Pulasar. A large part of the village is covered under sand dunes.The area of the village is 1.6 sq kms (approx) and the number of households in the village is 300; total human population is 2000 and nearly the same number of cattle population. Eight castes spread over four settlements exist in the village. The main occupation in the village is agriculture.

Sector Status

The village has 3 wells, one constructed by the PHED in 1997 and the other two being traditional village wells. All three are in working condition, the PHED has installed water pumps on all these three wells, which feed the water tanks in the village. The water tank supplies water to the standpost and in the case of domestic connections to the individual households. The water quality of all wells is poor. The water quality is very poor in the well located in the SC/ST settlement (harijan basti) of around 45 households.

Because of its status as a gram panchayat the village has drinking water facilities which are above average for the region. However, though the quantity on an average is adequate, quality is a very acute problem. For storage there are 4 water tanks out of which one is not working. In three locations there are community taps/ standposts. Some village households also have private kunds for storage of rain water.

The drinking water delivery mechanism is totally under the PHED. There exist household connections for water supply in about 200 households, the supply to these connections is continuous (throughout the day). The water supply towards storage in the tanks is from 7 a.m.to 9 a.m in the morning and 7 p.m to 9 p.m in the evening. The monthly water charge is at a flat rate of Rs. 30 per connection.The distance of the main drinking water source in case of no household connection averages around 200 mts.

The water is available throughout the year but the erratic power supply and the lack of maintenance of pipelines, makes the situation more acute than it seems. The households which neither have pipe line connections nor private sources to serve them, buy water in the month of June. The reason for purchase being aggravated by the poor quality The number of days of purchase in the month range from 15 to 18 and the average price paid out per litre is 60 to 70 paisa, the average purchase per day being 60 to 70 litres. A total of 15 to 20 such purchase days exist on an average.

No water testing initiatives have been under taken in the village, as per what the villagers recollect. Over time the maintenance of the sources has declined, the frequency of visits by the concerned department officials has remained the same but the status of the sources regarding breakdown and disruptions in water supply has gone down from satisfactory to poor.

Predominant suggestions that came from the village meeting focused on spotting of potential sweet/ good quality water locations, within the village boundary, connecting the village through pipeline, to nearby sources which have better water quality and building of a water storage tank to receive such supply. The concerns pertaining to exposed pipe lines being subject to damage by vehicles were also expressed. A suggestion pertaining to the drainage system in the village was for construction of pukka *nallis* in the village.

The panchayat members (village level) expressed the opinion that they are not consulted in any fashion by the government bodies regarding interventions pertaining to the Drinking water and sanitation sector in the region; as is the general trend in the district of Churu. They felt that the village user groups should take responsibility towards upkeep and initiating interventions in the sector in keeping with the needs of the community . Awareness is high in the entire region about the water level changes in the region and its impact on the water availability status. Members of the panchayat were willing to undertake the responsibility for management of drinking water provision, the major problem envisaged here being that the contributions from the community may not be forthcoming and that the information/ orientation towards such a set up being non-existent in the community.

The villagers on an average were willing to contribute towards establishment of a quality drinking water source under a user committee . The contribution range was Rs. 300 to Rs. 500 for a total unit contribution from the community equivalent to Rs. 10,000(to be used by 20 people). The payment towards upkeep and maintenance of such a source was equal or towards the upper end of the current payment for water supply / purchase of water. The noteworthy fact being that the households currently drawing water from household connections were also looking forward to such an arrangement ; the condition being : good quality / sweet water.

A majority of the respondents in the village wanted government intervention towards initiating the creation of new sources, if a participatory mechanism was adopted specially with regards fund management and institutional/ funding support. What we can thus visualise, is lack of trust in panchayat management of community funds and possibly lack of initiative towards managing funds at the village level, in any other fashion. The major impediment visualised towards upkeep of sources are the improper use of sources and lack of emphasis on maintenance.

Sanitation

Towards the southern end of the village the dirty water accumulates, there are no properly built *nallis* for drainage. The impact on the community due to accumulation of waste water is minimal as it takes place more-o-less on the outskirts of the village. However in some sectors of the village residents complained of water logging on path ways in the rainy season. In some settlements crude, small soak pits serving one or two households (where the waste water drains) exist

As per the mechanism pertaining to latrines, given the current status where a few households have private latrines , the orientation towards toilets being made available in individual households by the government with contributions from the beneficiary households, was predominant. The same kind of response existed for the community latrines provision, however the relative emphasis was poor.

The villagers are well aware of the health problems that affect them, due to poor quality of

water. Among hygiene practices washing hands properly after defecation and before meals was considered important as is a common observation for the region.

Village : Dadaharia Charanan

Tehsil : Churu

Village Profile

The village is located 22 kms from the Churu town, on the Churu- Sardarshar road. The area of the village is 0.70 sq kms (approx) and the no. of household in the village are 150. The total human population is 2250, and nearly the same number of cattle population. The village derives its name from the caste of the settlers that are in majority in the village, namely : the *Charanans*. The village has a minority population of *Harijans*, who are located towards the south-west corner of the village. Towards the center of the village all communities reside except the SCs (harijans). Out of the total population, around one third are in service, the rest depend upon agriculture for livelihood.

Sector Status

The village has one main well which serves two tanks built for water supply, to households where ever connections have been taken and to the community taps , again as in many parts of the district the delivery mechanism is managed entirely by the PHED. The village has one community kund for collection of rain water and numerous private kunds, for rain water storage.

The basic problem brought out related not only to the poor quality of water but insufficient quantity as well, that comes out as an offshoot of the quality problem . The water quality is so poor that it is not used for drinking at all. Most people have not taken connections as the water can be used only for drinking by cattle to some extent and for some household chores like washing. The water causes stomach pain on consumption by humans, the long term ill effects of which are also known to the community. The predominant drinking water source is rain water which is collected in private kunds and in the community kund which is located near the village bus stand. The panchayat members were rather non-committal about taking up the responsibility pertaining to drinking water and sanitation sector, as may be recognised as a trend in the region, contrary to most of the other areas under the study .

The aspect pertaining to a contact person between the village (need assessment and provision) and the relevant agencies was considered important, any such agency / individual however, was not cited. The last re- collected water testing initiative as per the village group discussions had taken place about an year ago. The maintenance of the existing sources is deemed to be satisfactory, over time but of no consequence to the drinking water status in the village. This is because the drinking water status here is a direct function of the solution of the problem pertaining to the poor quality of water.

Most of the households purchased water from private tankers in the month of May and June when their kunds and the community kund dries up. The rates paid vary from 20 to 30 paisa per lit , the average purchase being 80 -100 litres a total of 15 such purchase days, per household, exits on an average in a year during the summer months.

Regarding contributions towards the building of a (quality drinking water source only) drinking water source by the community the consent is towards an arrangement where an equal amount

by all beneficiary households shall be provided. The upper limit of contribution capacity being around Rs. 300. Willing contribution towards upkeep and maintenance from each household, for this source was put across in the range of Rs10-.20, on the condition of all beneficiaries paying an equal amount.

The government and voluntary organisations featured as preferences in this village regarding provision of up keep and maintenance of drinking water sources. Though the community seemed willing to contribute and participate in such initiatives, the fund collection, i.e.contribution management was said to be preferred by the government as was the general trend in the region.

Sanitation

The community was well aware of the drainage problem in the area. This was represented in their considering cleanliness around drinking water sources as an important contributing factor towards hygiene, among other basic things like washing of hands before meals and after defecation.

The prevalent practice pertaining to defecation is use of open area and fields , some households do have *kaccha* latrines . The drainage facilities in the village are very poor, water from the community taps and leaking tanks accumulates in the area and does not have an exit to the outskirts of the village or to soak pits.

The need for private latrines or community latrines was moderatly felt. This was manifested in the community wanting such intervention s by the government , specially pertaining to the issue of funds support, in many cases however, they were willing to contribute labour.

District Dungarpur

1. Introduction

District Dungarpur, located at the southern end of Rajasthan, has an area of 3,770 sq.kms (1.1% of the total area of the State). The district has a population size is 8,74,329 (2% of the total population of the State), with nearly 50% of it comprising of Scheduled tribes (ST). The district is sub-divided into four Tehsils namely; Dungarpur, Aspur, Simalwara and Sagwara. Agro-climatically, the district falls in the zone of Humid Plains.

2. Water resources - an overview

The district has surface water sources in the form of run off water from the hilly topography found in the form of rivulets and streams. The ground water potential is meagre to low in metamorphic aquifers. The average ground water development in the district is 27% with no blocks classified as Dark blocks or over exploited blocks, in terms of the level of ground water development. The ground water level in the district has been recording a steady decline over a period of 1984 to 1996 at an average rate of 1.2 m per annum. The ground water is characterised by poor quality, with high fluoride content in over 20% of the habitations in the district.

3. Coverage under rural drinking water supply

Dungarpur district has 846 main habitations, all reportedly covered under a government installed drinking water supply schemes. The primary survey results also indicates a high level of coverage with a drinking water source for 36 households. There are no records of the percentage of fully covered and partially covered habitations. As per the primary survey results, 31% of the total respondents are receiving less than the requisite 40 lpcd of water and thus, fall in the partially covered category. Even the departmental assessment of the coverage indicates that the villages are facing the problem of non-availability of adequate quantity of drinking water, although the quality of water in general, is satisfactory. The basic coverage indicators for the district, as per the primary survey results are as follows:

Table 3.1 : Status as per coverage indicators

Indicators	Findings
Average no. of households served by a source	36
Average distance to the source in metres	370
Average no. of trips per household per day	9 7
Water availability >40 lpcd (as % of respondents)	69%
Water availability < 40 lpcd[1] (as % of respondents)	31%

Source . Primary household survey, 1998

[1]As regards the purchase of drinking water, only 14% of the respondents said they purchased water The pattern of purchase was not restricted over a few selected months or in terms of quantum bought per day For most of the respondents purchasing water, the average number of purchase days in the last year was twenty five days

Although most of the respondents reported the presence of a drinking water source at a distance of about 370 metres, but owing to a number of trips that are necessary to collect the required quantum of water (9.7 trips on an average), the households eventually cover a distance of more than 1.6 kms., which has been prescribed as a norm for coverage under drinking water schemes

The district has a large percentage of ST population and not all ST settlements are classified as main habitations. During the primary survey, in case of the ST habitations which have not been classified as main habitations, relatively poor status of coverage has been observed, with the backward settlements being further away from the water sources vis-vis the non SC/ST settlements.

4. Drinking water sources and water availability

Although handpumps are the most prevalent source of drinking water with 86.5% of the total main habitations covered under them, the district also has 45 piped water supply schemes, 17 regional water supply schemes (RWSS), 4 panghat schemes and 11 traditional supply schemes (TSS). The spread of various drinking water schemes is as follows:

Table 4.1: Drinking water sources (in terms of number of habitations)

Sr no	P. Samiti	Main habitation	Piped	RWSS	Panghat	TSS	HP
1	Aspur	142	10	10 (33 vill)	-	-	99
2	Bichiwara	174	3	-	2	3	166
3	Dungarpur	158	5	-	-	1	152
4	Sagwara	153	16	7 (20 vill)	-	4	113
5	Simalwara	219	11	-	2	3	202
	Total	846	45	17 (53 vill)	4	11	732

Source · PHED, Dungarpur,1998

As per the primary survey results, 72% of the total households are dependent on a government installed source for fulfilling their drinking water requirements. Out of them, 50% of the respondents are primarily dependent on handpumps.

5. Traditional drinking water sources

The traditional sources in the district comprise primarily of dugwells and ponds. In places where surface water sources like rivulets exist, *kuaris* or small pits are dug near the source to access drinking water. Ponds are seasonal in nature and are mostly naturally formed

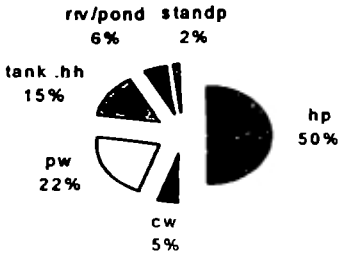


Figure 1: *Main drinking water sources*
rv/ pond river stream pond
standp standpost
tank hh tank household connection
pw private well
cw community well
hp handpump

being natural run off collection sites.

6. Defunct and inoperational sources

As per the results of the primary survey, 7.6% of the total number of departmental sources in the surveyed villages are reported to be out of order. These sources have been reportedly lying inoperational for an average duration of two years. The main reason reported for the sources going defunct/ in- operational in Dungarpur is the lack of proper upkeep and maintenance.

7. Quality of water

The quality of water in certain pockets of the district is poor due to very high fluoride content. Out of the listed 846 main habitations, 62 habitations (7.4%) are reported to be fluoride affected with *Aspur* panchayat samiti being the worst affected.The problem of poor water quality is being addressed under three heads:

a. supply of drinking water from external sources.
b. proposals under Janta Jal Yojana
c. proposals for hand pumps with fluoride treatment set up

Water which appears to be clear and sweet to taste is considered to be potable by most of the respondents. In 88.3% of the cases, the respondents had a different perception about what was safe drinking water for humans and what was safe drinking water for animals. In the summer months, when the area faces an acute scarcity of water, there is a discriminant use of the different water supply sources, as per the quality of water felt appropriate for consumption by humans and that for animals.

Water testing in the district is undertaken by the PHED. A laboratory in the city of Dungarpur has been hired for the purpose. The laboratory collects samples for rural areas and presents a water testing report every year.

8. Various programmes and schemes

Under 32 different proposals, various work plans had been approved to improve the existing drinking water supply schemes in the district. Most of these have been accomplished as per departmental records of February, 1998. The remaining, which include pipelines in 21 villages , ground level reservoirs in 5 villages and open wells in 4 villages are ongoing and scheduled to be finished soon

External interventions with government participation, towards improvement of water quality have been undertaken in the form of programs run by the UNICEF and SWACH (local NGO) These interventions are basically targeted at promoting innovative and cost-effective methods[2] of water treatment and also spread awareness about issues related to poor water quality

[2] Some of these methods are the Nalgonda technique and the Activated alumina methods

9. Planning, operation and maintenance

The PHED rates the handpump scheme as the best among the various water supply options. The reasons for this range from the cost effectiveness to associated procedural convenience at the community and government level (w.r.t. sanction and approval). The circle level officers recognise that all kinds of assistance from the state level is channelled through regular procedures only, (with allowance for flexibility at the circle level). They felt that more autonomy at the circle level regarding resource management (and financial resources use) and scheme sanction limits, would be helpful in increasing the efficiency of the system and coverage status.

Departmental statistics (of February, 1998) reveal that water distribution under all schemes is stipulated to be normal and that no major problems were envisaged in the summer months of 1998. Still on some schemes like Nandli Ahada, Nithaua, Gamdi, Rastapal and Nandia, low water levels in the wells has put forward the need for making proposals for cleaning of wells and their deepening as part of the "summer contingency " plans.

Under the 24th handpump repair campaign, 2214 of the total 7998 hand pumps in the district had been addressed till the end of April'98 and the work was still in progress. Five fitters and 175 handpump *mistris* from the panchayat samitis are working under the programme. Putting in additional pipe length, wherever the water level is expected to go down further, has also been undertaken as part of this campaign. Some details pertaining to the operation and maintenance of hand pumps in the rural areas of the district are as follows:

Table 9.1: Statistics regarding repair of handpumps (1995-96 to 97-98)

particulars	*as a percentage of HPs existent (as a percentage of no. in any given year)*
average no. of hand pumps out of order	6.67
pumps checked cumulative -last three years	100
pumps repaired in every year	46.9

Source : PHED, Dungarpur ,1998

The PHED officials in Dungarpur recognise lack of adequate resources and poor linkages as the main problems in the upkeep and maintenance of water supply schemes. The officers were in favour of privatisation in the water supply sector rather than opt for collaboration with local bodies. The unsatisfactory performance of the local bodies in "need identification" and "village level management of schemes" were cited as reasons for this.

The PHED officials favoured the privatisation of the drinking water sector, with water extraction, distribution and revenue collection all being handed over to private agencies. It is visualised that such a step would lead to increased efficiency, reduction in cost and better cost recovery, reduction in labour problems and quicker addressal of public complaints.

Regarding tariff measures, the department is in favour of uniform tariff throughout the state. None of the connections in the rural areas of the district are presently metered Revenue collection system is applicable only under the rural piped system with a flat domestic rate, which is rated to be partially satisfactory, by the department. As per the sector strategy, the tariff basis

proposed by the circle for rural areas is as follows:

Table 9.2: Tariff measures

particulars	*regional schemes*	*Piped schemes*	*P&T, HP*
on the basis of actual operating costs (ignoring investment depreciation and interest)	No	Yes	No
partial cost recovery and state subsidy	Yes	No	Yes

Source : PHED, Dungarpur ,1998

The technical manpower is perceived to be inadequate by the PHED division level officials. Deficiencies in the number of personnel have been cited at each level. Also a need for more vehicles and increased vehicle maintenance allocation has been cited. The need for additional resources in the form of computers at the divisional level and communication systems has also been expressed by the government functionaries.

10. Problems pertaining to drinking water supply

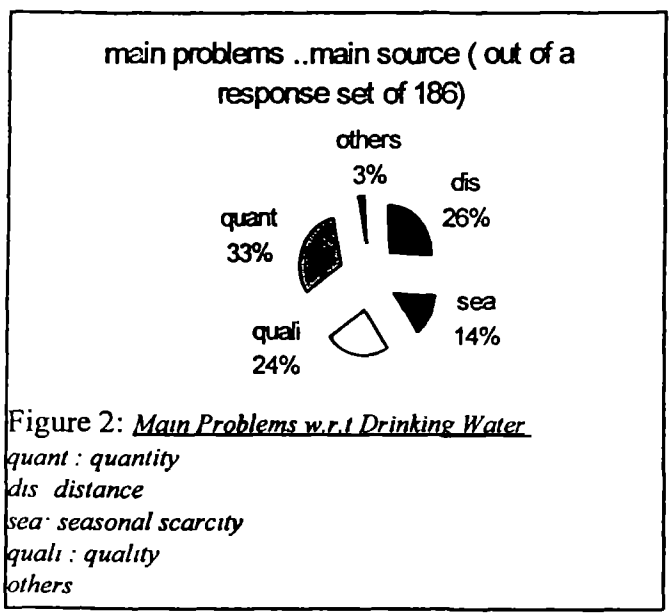


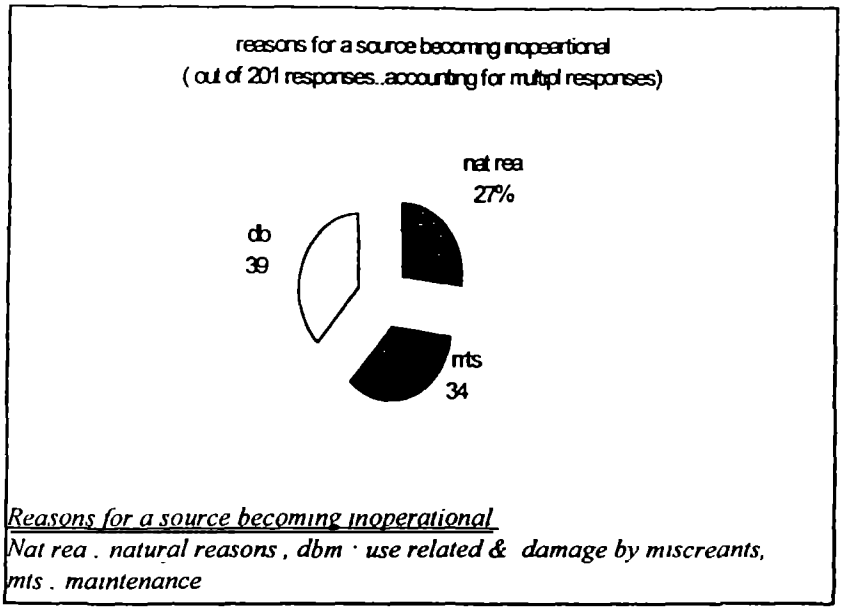
Figure 2: *Main Problems w.r.t Drinking Water*
quant : quantity
dis distance
sea· seasonal scarcity
quali : quality
others

As per the surveyed respondents, inadequate quantity of drinking water coupled with large distances required to be traversed to collect the requisite quantity of drinking water emerged as the most important issues with respect to drinking water. The poor quality of available water was also an issue in a number of surveyed villages. The seasonal water scarcity was also brought up by the respondents, along-with the major problems of quantity and quality. The following table presents the user-problems for the rural drinking water sector in Dungarpur:

Table 10.1: Problems related to drinking water sector (*figure as percentage of respondents)*

Main Problems	*% of respondents*
Distance	26%
Quality	24%
Quantity	33%
Others	17%

Source · Primary household survey, 1998.



Reasons for a source becoming inoperational
Nat rea . natural reasons , dbm · use related & damage by miscreants, mts . maintenance

The main reasons for a source becoming in-operational, as identified by the surveyed respondents, include improper use and damage by miscreants, natural reasons and poor maintenance. While the natural reasons identified include deterioration in the quality, increasing pressure on the better quality sources and consequent drying out of these over time.

Table 10.2: Peoples perception of problems related to operation and maintenance

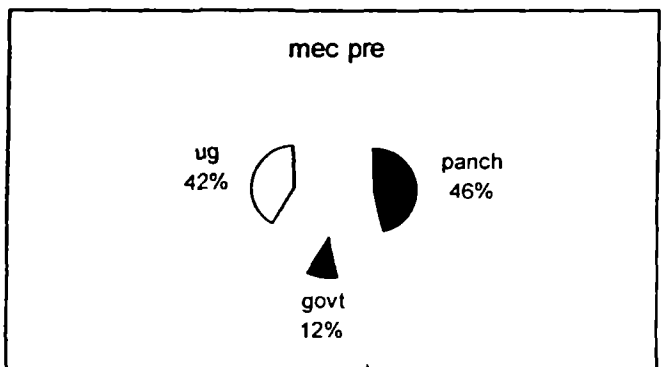
Main Problems	*% of respondents*
Maintenance, set up and improper use	*34%*
damage by miscreants	*39%*
natural	*27%*

Source : Primary household survey, 1998

Given the high dependence on government installed handpumps, their poor maintenance and damage by miscreants appears to be major issues of concern in the district.

11. Community and panchayat participation

83 % of the responding PRIs were of the opinion that panchayats were not contributing towards the upkeep of drinking water sources. The respondents also complained that they were never consulted regarding drinking water interventions in their village and also were not aware of any government staff ever coming to their village for any work related to drinking water supply.



Mechanism preferred for up keep and management of drinking water sources
ug · user groups
panch user groups with panchayat participation
govt government

Nearly 67% of the respondents expressed willingness to take up the responsibility for the up keep of drinking water systems. 88% of respondents identified

User Groups, either individually or in collaboration with panchayats, as the most preferred institution for upkeep and maintenance of drinking water sources. There was recognition of the fact that the capacity building of the user groups through the voluntary organisations would be necessary, before such institutions are set up at the community level.

The main bottlenecks envisaged by most of the respondents for the user groups to take up the responsibility of up keep and management of drinking water sources were the lack of training at the community level and the financial constraints.

Pertaining to contribution, one third of the respondents accepted that they had been contributing for the upkeep and maintenance of drinking water sources in their village. But when asked about their willingness to contribute, most of the respondents were in favour of the labour contribution, while only 44% expressed willingness to make monetary contribution for setting up of a new water source and only 37% were ready to make monetary contribution towards maintenance of the existing systems.

12. Rural sanitation

Rural sanitation emerged as a low priority sector in the district. Only 13.3% of the surveyed households reported an ownership of a private latrine, while no community facility was reported to be provided in any of the surveyed villages.

34.4% of the respondents felt that household latrines while 63% of households felt that community latrines had a high utility level. Out of these 66.8% were willing to contribute labour, only if it was complemented by financial support from the government. Only 27.6% hinted at the possibility of some form of monetary contribution.

Some other facets related to rural sanitation are as summarised below:

Table 11.1: Rural sanitation (Figures in percentage of respondents)

Parameter	*Findings*
Sanitation facility (private)	13..3%
Sanitation facility (community)	Not Existent
Provision of the facility should be made by	Government
Willingness to pay for sanitation(monetary)	27.6%
Cleanliness near drinking water sources of acceptable standards	76%

Source . Primary household survey, 1998

47% of the respondents opined that there was a satisfactory level of cleanliness near the drinking water sources. The drainage system in the villages of Dungarpur is in poor condition. The 70% of the respondents complained of stagnation of water.

As regards the perception about important practices pertaining to health and hygiene, in 98% of the cases, the response of washing of hands before meals and after defecation were felt to be

important for general health of the community.

13. Conclusions

The departmental records reflect a complete coverage of the main habitations under rural drinking water schemes. But, the distinction between "fully covered" and "partially covered" habitations is missing from the departmental records.

The primary survey highlights that about 31% of the households are receiving less than 40 lpcd of water and thus, are only "partially covered" under a drinking water scheme. Also, the status of SC/ ST habitations, other than the main habitations is reported to be relatively poorer.

Although the average distance to a drinking water source is reported to be about 370 metres, but owing to a number of trips that are necessary to collect the required quantum of water the households end up traversing far more than 1.6 kms., which has been prescribed as a norm for coverage under drinking water schemes.

Certain pockets of the district have a high fluoride content in the groundwater. Owing to the variations in the quality of water available through different sources, the local people discriminate in the use of these sources for drinking and for giving to their animals.

External interventions, with the participation of the government, have been undertaken for the improvement of water quality. These interventions are primarily aimed at promoting cost-effective techniques of water treatment and also making the local population aware of the quality issues.

User Groups either individually or in collaboration panchayats were recognised as the most appropriate institution for upkeep and maintenance of drinking water sources and a need for their capacity building by local NGOs was felt. Willingness to contribute is existent, with most of the respondents being in favour of labour contribution.

Like other rural parts of Rajasthan, sanitation emerges as a low priority sector from the governments end. 63% of the respondents expressed the need for sanitation facilities in their village, a large part of them also expressed willingness to extend labour contribution towards the construction of such facilities in their village.

In conclusion, it may be stated, that the district Dungarpur has a combination of quantity and quality problems with respect to the drinking water sector. The large distances required to be traversed, because of number of trips essential for collection of requisite quantity of water, also emerges as an important problem in the district. The sector status in the district is also indirectly a function of the scattered settlement pattern and the inability of the backward communities to put forward their demands. Another highlight of the findings in Dungarpur is that more than one thirds of the respondents cited improper use and damage by miscreants as a major factor for inoperational status of drinking water sources.

Annexure I

Village Case Studies

Village : Goethe Eklianjee
Tehsil : Aspur

Village Profile

The village is located near the Aspur Sagwara main route. It is 2 kms. from the main road and is spread in an area of about 4 sq. kms. Six main castes reside in this village. The total human population being 1338 and the total no. of households being 180. The cattle population is about 1000. There are four phalas in the village, the *Adivasi* phala being very scattered, in fact amounting to three sub-phalas if one may term it so. The main occupation is agriculture for the *Rajputs*, *Chamars* and *Patidars*. The *Adivasis* are mostly daily wage labourers

Sector Status

There are twelve drinking water sources in the village, two of them (wells) being privately owned. Eight of the sources are handpumps and four are wells, all wells being in operational condition . Out of the eight handpumps four handpumps are not in working condition. In the case of other four hand -pumps also, the water quantity/ yield is poor. One new well is being dug by community labour contribution (*adarsh kuan*). Though the wells are being used the water level is very low and the summers see them go very low. One well, located towards the south of the village, in the fields outside the village, which is privately owned, has a relatively better water level , it is on an average at a distance of 1 to 1.5 kms from the different settlements. The general perception , as per the problems pertaining to drinking water in this village is that quality of water is not as much of a problem as the scarcity/ yield of the source. The *Adivasi* settlements are very scattered (on different dungars) besides, on an average on areas away from the drinking water sources. Thus the settlers here have to traverse relatively longer distances, compared to the residents of other settlements, for accessing sources both inside and outside the village.

Due to low income levels and orientation towards drinking water as a public good; the government providing the community with drinking water supply was a ready response. The contribution towards construction of a community drinking water source was not very forthcoming with the figures ranging between Rs. 60 to Rs. 90 for construction and Rs. 15 to Rs. 35 for maintenance. The proportionally high amount for maintenance (relative to the other villages)was observed because the predominant feeling was that the government was providing the sources but their in-operational status was a result of inadequate attention towards up-keep and maintenance

The need for community level participation towards upkeep of sources was felt, the intervention of a voluntary agency being considered important for facilitation of such a process. The village level panchayat members felt the need for external intervention in terms of funds and training to community people to be done by voluntary organisations. Though they could not identify any official who was most reliable in catering to the needs of the community pertaining to the sector, they pointed out the need for a link between the community and the government delivery

mechanism. Pertaining to the issue of community contributions and willingness to pay, it was pointed out that transparency in the end use of funds generated and an effective mechanism to ensure equitable contribution would be helpful in motivating participation.

Sanitation

Proper drainage system is absent in the village and the waste water generated is thrown outside the houses. There is no felt need for a system of private or community latrines. The prevalent practice of defecating in the fields is considered to be convenient enough. However, the thinking is that they *would not mind* private latrines, if the same was provided by the government. The utility of private latrines was marginally higher in the *Rajput* phala as compared to the other phalas and the least in the *Adivasi* phala.

Washing of hands before meals and after defecation was considered as the most important among all hygienic practices. The respondents of *adivasi* settlements were less aware of the problems arising from accumulated waste water and were also less forthcoming in giving their views on the aspects pertaining to participatory mechanisms towards provision of basic drinking water and sanitation facilities.

Village : Jahkahara
Panchayat samiti: Sagwara

Village Profile

This village is located around 3 kms, to the south east of the Dungarpur-Sagwara main route. The village has only. There are a total of 120 families (860 persons) in the village with all of them belonging to Scheduled Tribes (ST). The village has a total cattle population of approximately 700. The village settlement is distributed in three phalas. The main occupation in this village is daily wage labour; although land is available to all households. The reason for lack of focus on agriculture being that the land is infertile (top soil of very poor quality).

Sector Status

The total no. of drinking water sources are 12, these include 7 hand pumps, 2 government *bawaris* and three private wells. Seven of these sources are non-government sources including the 3 private wells. Another source apart from the above is the stream bordering the village.

The settlement pattern of the village as in most cases of the district makes it difficult for the villagers in terms of distances that need to be traversed for accessing drinking water. The stream marking the northern boundary of the village, has a low water level and the villager access the water by building small *kuaris*, which are small pits dug near the river boundary from where water can be accessed. In summer months due to the river going practically dry this practice does not serve the villagers. The water quality in the hand pumps is not of acceptable standards , two hand pumps are used for drinking water for animals only. In all, out of the seven hand pumps only four are in proper working condition. Long ques for getting water from the working community sources, are a regular feature in the village.

The distance traversed to reach a functional source averaged around 250 mts for the community, the maximum being 400mts and the minimum being 250mts. However the seasonality of sources and the in-operational status of the sources(few operational at a point in time) compound the average time spend in water collection . The average, as per number of trips is eight trips for water collection by each household (in a day) and the long wait in ques which can extend up to one hour. As for the village of Goethe Eklianjee this village is also subject to water testing arrangements, however the last recollected water testing was around two years ago. As per the opinion expressed by the villagers, the maintenance of drinking water systems has gone from bad to worse over the last few years, the need for water testing and subsequent treatment arrangements is also acute given the poor quality situation .

The willingness to contribute towards a community water source construction was existent though the amounts proposed were low, with the figure ranging between Rs.30-Rs.150. Wherever contribution towards upkeep was agreed to, the amount was proportionally high (around twenty to fifty percent of the capital contribution agreed to) compared to those in other areas. This illustrates the aspect of importance of upkeep and maintenance as per the views of the community. Due to the prevalent problem of dirty water accumulation near the drinking water sources the cleanliness aspect (near the sources) was a dominant response in the hygienic practices segment. The purchase of water is a non-existent phenomenon in the village No kind

of contribution or revenue collection mechanism exists. The village has been bereft of any special schemes and the current perception is that a user group managed system with adequate support from the government and voluntary organisations, would be effective in tackling the sanitation and drinking water problems.

Sanitation

The situation pertaining to the drainage of waste water and sanitation aspects is poor in the village. There is no drainage system and most of the waste water generated is thrown outside the households and also accumulates near the hand pumps. The household animals live inside the house, there are no separate enclosures for them. There are no latrine facilities in the village. The utility of a household latrine is low, however if it comes as a public good from the government funds, it was deemed to be "acceptable". But in the respondents opinion "all efforts" should be channelized towards provision of more drinking water sources, which provide quality drinking water and are subject to regular up keep and maintenance.

District Barmer

1. Introduction

Barmer is the second largest district of the State of Rajasthan, having an area of 28,387 sq. km (8.3% of the State area) and a population density of 50 persons per sq. km. The district has a total population of 1,433,351 (3.3% of the State population), 21% of which comprises of Scheduled caste/Scheduled tribe (SC / STs). Dominant among these are the SCs, which are the dominant community in the tehsils of Chohtan and Siwana. The district is subdivided into seven tehsils, namely: Shiv, Baytu, Pachpadra, Barmer, Chohtan, Gudha Malani and Siwana.

Agro- climatically, the district is a part of arid western plains. A large part of the district comprises of desert area with a very scattered settlement pattern.

2. Water Resources - an overview

The district is classified as a water deficient area (as per the mean annual water surplus statistics).The mean annual rainfall in the district is 12.7 cm. The district depends largely on the ground water resources which comprise of poor to moderate potential alluvial aquifers. Although the average level of ground water development in the district is 25.8%, Dhorimanna block is classified as a dark zone with the extent of ground water development between 85-100% of the total utilisable resource. As per the statistics furnished by the department, the ground water level in the district has registered a net rise of 0.3% over the period 1984-96.

3. Coverage under rural drinking water supply

As per the departmental statistics, 93.2% of the total habitations in the district have been covered under some government installed drinking water scheme. There are no records of the percentage of fully covered and partially covered habitations. As per the primary survey, 78% of the households reported of a water consumption of less than 40 lpcd, making them partially covered. Also the average distance to a source was reported about 2.9 kms., which is much higher than the requisite norm of 1.6 kms. All these observations lead to the conclusion that contrary to the departmental records, the district has a rather poor coverage under drinking water schemes. The status of coverage as per some basic indicators, derived from the primary survey are as follows:

Table 3.1: Status as per Coverage indicators

Indicators	*Findings*
No. of households served by a source	190
Average distance to the source in metres	2900
Average no of trips per household per day	3 9
Per capita water availability> 40 lts per day (as% of respondents)	21 9%
Per capita water availability[1] < 40 lts per day (as% of respondents)	78.1%

Source . Primary household survey , 1998

The district has a poor network of roads, making it very difficult to access a large number of interior settlements. Also, the lack of emphasis on planning of interventions and resources has led to the system anomalies like provision of water pumps without the provision of storage facilities and vice-a-versa.

4. Drinking water sources and water availability

In Barmer, Regional Water Supply Schemes (RWSSs) are the most widespread water supply systems serving 47.7% of the total villages. The source villages feed areas in a radius of 70-90 kms around them. The coverage as per the departmental records is as follows:

Table 4.1: Drinking water sources (in terms of number of villages)

Tehsil	*RWSS*	*panghat*	*piped*	*TSS*	*HP*	*others*	*Total*
Shiv	47	11	1	0	12	0	71
Bayatu	13	0	2	0	0	0	15
Pachpadra	13	5	4	0	1	0	23
Barmer	27	30	1	0	17	11	86
Chohtan	46	65	1	0	10	0	122
Gudamalani	56	33	3	0	3	0	95
Siwana	17	12	2	8	8	0	47
Total	219	156	14	8	51	11	459

Source · PHED Barmer ,1998

During the primary survey, only 7% percent of the respondents reported dependence on a

[1]During the primary survey, it was found that 19% of the respondents purchased water not to supplement existing availability, but in conditions of acute scarcity wherein the entire household demand was met by purchase of water This practice is essentially prevalent in the villages located on the main routes or near them. In the interior parts of the district such an arrangement was not available On an average 100-130 litres of water was bought daily, for an average duration of 10-20 days, incurring an expenditure of about Rs. 35 per day.

government source[2] for their drinking water requirements. The overall lack of number of sources is illustrated in the fact that 94% of the respondents reported that they used the same source irrespective of the water quality, till the water was accessible.

It is also noteworthy that the tehsil of Chohtan, which has a very high proportion of SC population, has the maximum number of PHED schemes (122).

5. Traditional sources

From the results of the primary survey, a high dependence on the traditional water sources as against government sources was noted. 65.7% of the sources in the surveyed villages were reported to be traditional sources, mainly comprising primarily of dug-wells. It was also observed that the dependence on traditional sources was even higher in the case of scattered interior settlements. In the case of most of the wells, on which significant number of households are dependent, the water is predominantly extracted using camels[3]. The provision of water extraction machines is extremely limited.

6. Defunct sources

33.65 of the total drinking water sources in the surveyed villages are reported to have been lying defunct on an average for a period of about four years, as per the primary survey. The presence of large number of defunct sources may be attributed to the low and receding ground water level and poor maintenance that make the sources inoperational. On the other hand, the departmental statistics show 100% addressal of the complaints regarding the inoperational handpumps.

Table 6.1: Status of handpump repair and maintenance

Particulars	*Rural*
Total no. of hand pumps	803[4]
Average no. of hand pumps which are out of order (as percentage of total)	10%
Percentage of HPs checked (during the last three years)	100%
Percentage of HPs repaired during the last three years of the total found out of order	100%

Source : PHED Barmer, 1997.

[2]This may be a little more skewed against the government sources, as out of the fifteen villages surveyed only two were covered under the RWSS, which is the most dominant government scheme in the district

[3]Camels are used to extract water from the wells. They are used only in the early hours and in the evenings to minimise the effect, heat and exertion Each pull from depths ranging from 250 to 400 mts yields around 15-20 lts of water People who do not have their own camels use the camels of the local villagers, paying around Rs. 5 for every pull. In many villages the adults and in some cases even children leave for water collection early in the morning with animals, *matkas, bedias and makhals*, leaving one person to look after the household

[4]Total number of hand pumps in the district are 881, out of which 803 are in rural areas

7. Quality of water

During the primary survey, 78.5% of the respondents found the water to be potable sweet. Here however, it needs to be pointed out that as per some responses the water quality has gone down significantly due to lack of maintenance of wells. But owing to the acute scarcity of water in the district, the quality factor becomes rather unimportant.

The fluoride content in the water in many areas of the district is reported to be high. Efforts directed towards improvement of water quality are found to be lacking. Very few interventions for improving the quality of water and cleaning of wells have been undertaken. Though the department reports that regular tests are conducted to ascertain the water quality in the district however, in most cases observations to the contrary were found during village group discussions.

8. Various schemes and programmes

As per the State annual plans, Barmer has been identified as one of the districts for substantial coverage under the segment of water quality. The total work to be taken up for the coverage, has been classified under the heads of those with high fluoride and or TDS (Total Dissolved Solids) levels and those areas/ villages with inadequate service levels with regards water testing and follow up [5].

9. Planning, operation and maintenance

With regards to operation and maintenance, shortage of power and frequent trips in power connections, resource inadequacy in terms of staff, vehicles and spare parts were identified as the main constraints by the circle level officials. As a result whenever the water extraction machines or pumps suffered breakdowns, there was a considerable time lag between breakdown and repair. The use of animals, is also discontinued after a certain level of water in the wells. The *anomalies* like existence of WEM but no mechanism for water storage (no *hodi* or tank), existence of a WEM but the well going dry, existence of a WEM but insufficient power supply, existence of a water storage mechanism but the WEM not in working condition are prevalent through out the district. Due to shortage of drilling rigs, the establishment of sources often lags behind the laying of pipelines and results in frequent and extensive cost overruns.

The handpumps are generally short lived , their average life in the area being not more than 2 years as against a state average of 8 to 10 years. This is because of the reasons of receding ground water level and collapsible strata. The most dependent structures apart from the stand-posts (community taps) under the regional water supply schemes are the dug wells. During the primary survey, not even a single handpump in the surveyed villages was found in a working condition

[5] Departmental estimates indicated that nearly Rs.260.00 crores were required to cover all habitations

The frequent power trips cause disruptions in the RWSS and stalling of the pumps[6]. Regarding the RWSS, it is important to note the difference in the relative status of the tail end, mid-way and near source villages. Apart from the power trips which affect timely and adequate supply to village GLRs (ground level reservoirs), due to disruptions/ break down in the supply lines being a direct function of the distance from the source[7], the condition of the villages fed under the RWSSs specially the tail end villages, is poor. These villages tend to resort to traditional dug wells more often than the source villages do. Also as per the norms, the pipelines layed out should be at a depth of one metre but in all areas visited by the team the depth was not more than one feet and in many cases the pipelines lay exposed. Despite the above problems in delivery, the situation of the villages covered under the RWSS and piped schemes is relatively much better, than the ones covered under the handpump, panghat and traditional schemes[8].

The department water tankers are also never found to be operating at full strength because of maintenance problems.

The collection of charges for water is non existent as observed in the villages under the survey. The department has not suggested any measures for improving the revenue collection. However, a uniform tariff increase, in keeping with proposed improved service levels, to the tune of 25% over existing rates in both rural and urban segments form part of the department's strategy proposals[9].

10. Problems pertaining to drinking water supply

As per the findings of the primary survey, the priority problems in the district are those of inadequate quantity and large distance. The quantity problem also, exists as a function of the distance. The lack of cleanliness around many sources and lack of interventions pertaining to cleaning of wells result in the manifestation of water quality problem. Other problems which manifest themselves as functions of either the distance or the quantity problem or both, range from loss of income due to time spent in water collection to illness of animals that draw and/or carry water.

The following table summarises the findings with regards user problems for the drinking water

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[6]Even in the villages covered under the RWSSs, due to inadequate and erratic supply; purchasing water in summer months is a common phenomenon . Also this facility is mostly available to villages on or near roads due to the access factor .

[7]The water pressure is also a problem , being a reverse function of the distance traversed by the pipelines

[8]The piped scheme is present in a few villages as an extension of the RWSS scheme The traditional source scheme has seen the PHED install motors on existing wells Rain water collection , which serves for a very limited time is in the pukka structures built under the panghat scheme

[9]The average cost of water in case of purchase of water from private distributors was Rs 15/ 1000 lts in rural areas as against Rs 10/ 1000 lts in urban areas.This, to some extent indicates potential for generating revenue from the rural supply schemes. The cost recovery is suggested to be in tune with either actual operating costs or full cost recovery (including depreciation and interest)

sector:

Table 10.1: Problems related to drinking water sector (*figure as percentage of respondents)*

Drinking water in general	
Distance	*82%*
Quality	*15%*
multiple responses	*3%*
Drinking water Sources	
Maintenance, set up and improper use	*27%*
Overuse	*73%*

Source : Primary household survey, 1998.

The main reasons for a source becoming in-operational, were cited as maintenance and improper use and over-exploitation of some of the sources.

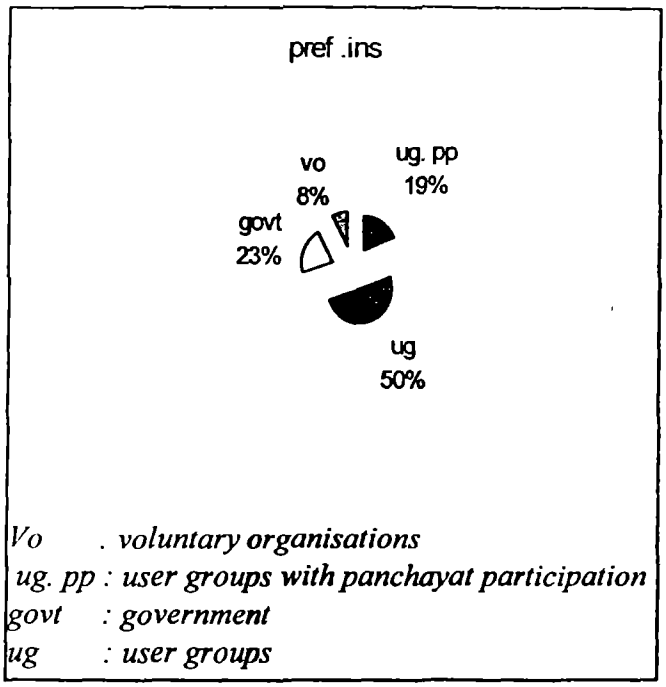
11. Community and panchayat participation

Most of the Panchayat members reported that they were consulted regarding drinking water interventions and also accepted that department functionaries regularly visited the villages. But, the villagers complained that the initiatives taken by the villagers are not complemented by the department, though departmental visits to most areas are regular. Regarding the panchayat's contribution towards works related to drinking water, most of the respondents complained that it had been non-existent[10].

52% of the total respondents expressed willingness to participate in the upkeep and maintenance of the drinking water sources. The people opined that significant government interventions only could make a change in the poor status of the drinking water sector in the district, and it was inconsequential to devote one's personal time to a fruitless endeavour.

57 % of the total respondents expressed willingness to contribute towards drinking water services. The contribution was forthcoming for establishment of new sources and maintenance of existing sources but not as a payment for existing level of services. Proportionally, more people were willing to contribute towards maintenance because they recognise that a large proportion of sources are lying inoperational. The average contribution for maintenance of a source lay between Rs 10 to Rs 20 per month while average capital contribution for a new source was in less than Rs. 300.

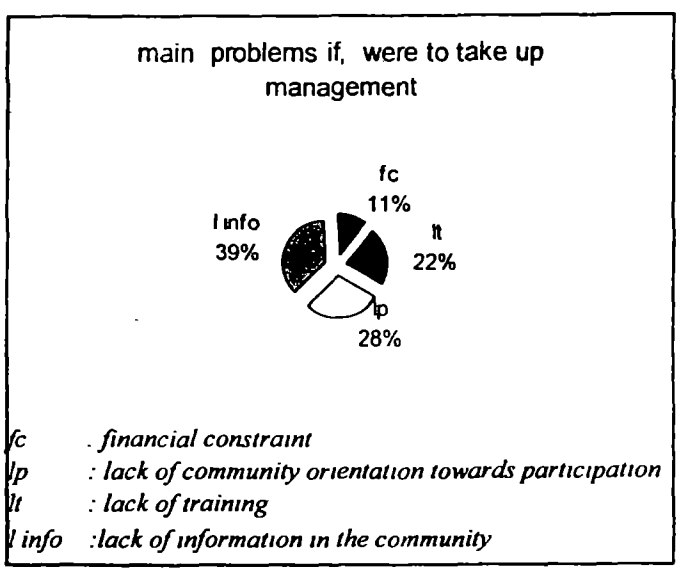
[10] The feeling in the department is that the gram panchayat does not actively support the cost recovery and this role needs to be emphasised given the resource constraint



69% of the respondents identified user groups (either individually or with panchayat participation) as the most appropriate institution for management and up keep of drinking water and sanitation in the area.

Lack of problem addressal by the existing delivery mechanism & the low dependence on government provided sources were cited as the main reasons for prefering the User Groups. In such responses a flow of funds from the government to the user groups was visualised. In cases where a flow of funds was not visualised, it was primarily the financial constraint factor that made the responses, go in favour of a government managed system.

A number of constraints were envisaged by the village level panchayat members, if the User Groups were to take up the up keep and management of sources. Lack of information regarding operation and maintenance of drinking water schemes along with inability in mobilising community effort were identified as the main constraints.



12. Rural sanitation

The Rural sanitation sector in the district of Barmer is untouched by any intervention. Only 7% of the surveyed households reported an ownership of a private latrine, while no community facility was reported to be provided in any of the surveyed villages

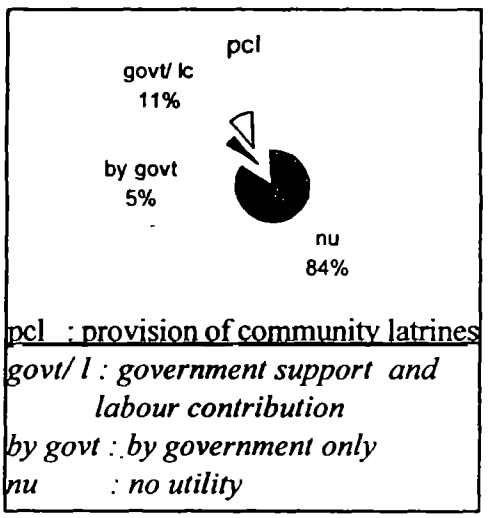
Some associated issues as inferred from the primary survey, may be noted as follows:

Table 12.1: Rural sanitation (Figures in percentage of respondents)

Parameter	*Findings*
Sanitation facility (private)	7%
Sanitation facility (community)	Non Existent
Provision of the facility should be made by	Government (low utility related no responses - 84%)
Willingness to pay for sanitation(monetary)	1%
Cleanliness near drinking water sources of acceptable standards	47% (basically refer to the RWSS tanks and the *pukka* structures built around the sources)

Source : Primary household survey, 1998

Only 16% of the respondents felt that household/ community latrines had a high utility level. The reasons for such low utility of sanitation facility may be the existing living practices and the recognition of the fact that there needs to be a greater focus on drinking water sector. Out of the people who felt that sanitation facility were of high utility, 11% were willing to contribute labour, only if it was complemented by financial support from the government. Only 1% hinted at the possibility of some form of monetary contribution.



pcl : provision of community latrines
govt/ l : government support and labour contribution
by govt : by government only
nu : no utility

13. Conclusions

As per the primary survey, 78% of the households reported of a water consumption of less than 40 lpcd, making them partially covered. Also the average distance to a source was reported about 2.9 kms., which is much higher than the requisite norm of 1.6 kms. All these observations lead to the conclusion that contrary to the departmental records, the district has a rather poor coverage under drinking water schemes.

The problems regarding the drinking water sector in Barmer district could be attributed to the harsh climatic conditions and limited water availability in the district Given that the water level is very low and the number of potential aquifer spots are few, the distances to be travelled to access drinking water and the pressure on a few sources are issues of concern for the region.

Apart from the natural reasons, lacunas also exist in the form of inadequacy in the types of interventions and of the resources with the government supply mechanism. The associated factors of poor connectivity of the scattered settlements and lack of electricity connections also add to the problem.

The issue of improper linkages in the service delivery, specifically in terms of interdepartmental

linkages with the RSEB and the facets poor planning in terms of existence of a water extraction mechanism no storage tanks on a source, plague the sector. The improper linkages may also be looked at in terms priorities and their addressal, for example given the low number of sources, the aspect of cleanliness around the sources is considered important by the community and the department alike, but little action has been taken in this regard.

The need for better liaison between the community and the department and rejuvenation and maintenance of the traditional structures (non departmental sources) by the department, in light of the pressure on existing sources are some of the options, that could be explored given the current resource constraints.

Annexure I

Village Case Studies

Village : Savalor
Tehsil : Chohtan

Village Profile

Located at a distance of 50 kms from the Barmer district headquarters, on the Barmer Chohtan main route is the village of Savalor. The village has five major castes and the village settlement is spread across six dhanis . The total human population of the village is 1300, spread across 200 households, the cattle population being 5000. Given its proximity to the main route, the pattern of occupations pursued, is well spread out in service, agriculture and animal husbandry, with a skewness in favour of the latter.

Sector Status

The village is connected, to a regional water supply scheme and as is the case with most villages located on main routes, has a relatively better position as compared to the interior villages. The PHED has built a ground level water reservoir in the village. This caters to around 150 households in the village , through standpost (community taps). There is no mechanism of revenue collection in the village for this water supply.

The dhanis are located as per the following distances (average approximates) from the water reservoir and the community stand post.

(Approx distances)

Choudharion ki Dhani (I)	: 200 m
Muslim dhani	: 3-4 km
Kumharon ki dhani	: 2 km
Bhilon ki dhani	: 3 km
Naiyon ki Dhani	: 4.5 km
Choudharion ki Dhani (II)	: 1.5 km

There exists in the village one structure for rain water collection, that is a *hoad,* near the *Kumharon ki dhani* and one community well with a water extraction machine (WEM) that is non-operational .Also located near the PHED water reservoir (300 mts) is a private well with a WEM. An operational handpump towards the west of the village at a distance of 2 kms, in the nearby settlement also exists.
People not owning any camels (low income groups) tend to collect relatively low quantities of water than the ones with camels to carry water. In most cases both suffer, as there is a limit on water that can be drawn out by one person, in one turn of the que.

The private well caters to the needs of not only the villagers but nearly 200 dhanis located in the

spread of around 8 kms towards the south and south east of the village . The conditions are so acute in the interior villages that it was cited by a person from the village of *Balera Kankan*[11] , who makes the 8 km trip to *Savalor* daily, that even a one day lag between trips could make his household totally bereft of any water.

The maintenance of the sources is frequently linked to the non-operational status with regards the erratic power supply when related questions are asked . However the level of maintenance was deemed to be unsatisfactory as per the villagers. Since the last few years cleaning of the well has not been undertaken leading to the poor water quality as was communicated in the village group discussions.

The villagers considered it appropriate to contribute towards construction and up keep of drinking water sources managed by the community. The rules and proportion of contribution they felt, should be appropriately laid down by the village elders and all shall abide by it. Largely, they were in favour of equal contribution from all beneficiary households. The villagers were sensitive to the aspects of inability of some house holds to pay and the need to co-opt them in some fashion.

To the south of the village of *Savalor* exists another village of *Nvorion ki Dhani* .The motor on the community well here, has not been working since many months and the villagers from this place also resort to *Savalor* for getting their drinking water, among the other Dhanis and villages. The pressure on the village due to this type of malfunction in the "nearby systems" is imaginable. This also brings out the importance of the systems being in operational condition not only for needs of the "host" village, but also for the pressure that comes on the other settlements given the selected / limited water sources[12].

The village of *Savalor,* though, is in a relatively better position than other villages of the region, due to the pattern of settlement, the distance is still reason for concern[13]. Quality of water was also deemed to be poor in terms of it being brackish, though consumable by humans after crude filtering at the household level[14] .

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[11]For the residents of the village of *Balera Kankan*, trips to *Nimbari* which is located at a distance of 15 kms are also very frequent, again here the villagers with camels have an advantage The respondent from the village of *Balera Kankan, Bhuleram Bhil* , said that he could get only eight to ten matkas (70 lts) of water in two trips with one more member of his family . Other members of the family go to *Nimbari* for fetching an equal amount of water (take the camel owned by the family as they make only one trip), the total family size of *Bhuleram Bhil* being six members

[12]Around 5 kms west to the village of Savalor exists another village of Dudwa , though relatively well off like the village of Savalor, this village also suffers from the same pressures from other settlements, that are dependent on the village, for their drinking water needs

[13] The dhani pattern of settlement is common to the entire district but in most places even concentrated settlements would not have made much of difference in the drinking water availability situation.

[14]Water testing has been undertaken in this village on a regular basis, as per the information derived from the village group discussions.

Sanitation:

Though a significant number of respondents said that having proper latrines was important for cleanliness and hygiene (though lower in ranking when compared to baser practice like washing of hands after defecation and before meals) , very few agreed to the aspect of contributing in this kind of intervention, and of these , most were for labour contribution only.

Village : Surate Ka Tala
Tehsil: Chohtan

Village Profile

Located at a distance of 50 kms from the district headquarters Barmer, is the village of Surate Ka Tala. Accessible only via a hilly terrain , it is located at a distance of 5 kms from the nearest road. There are no proper roads leading to the village which is essentially a settlement on a sandy plateau. The number of households in the village are 73, the total population being 450. The total cattle population is around 3500 and the main occupation is animal husbandry, as is common to many parts of the district of Barmer.

Sector Status

The village seems to have received a step motherly treatment from the government as per the perceptions of the community.The only government intervention in the village, in any sector is in the form of a primary school. It is not connected to water supply schemes and has no power supply as is the case with many of the interior villages.The village has only one drinking water source which is a community well, not subject to proper upkeep and in very poor condition. The well is around fifty years old and has a very low water yield.The villagers have to traverse up to 12 kms (village of Esrol) to get water and in some cases(in summers), temporary migration to settlements located 30 kms from the village is also observed.

Camels are used for water extraction as the water level is more than 300 feet deep in the community well. Those who do not have camels, pay for their services if they prefer this service, than drawing out water themselves from depths exceeding three hundred feet. The ratesfor use of another person's camel are Rs 5 for one pull yielding around 15 litres of water (one standard animal hide container). The camels are used only in the early mornings and late evenings, to limit exertion when the heat is on full blow. The village also has a handpump which has been non-operational for the last five years.

No water testing initiatives have been undertaken in this village for more than two years, as per the information from the village group discussions. The status of maintenance is self explanatory when we look at the above cited instance of the use-less handpump in the village.

Though the panchayat members responded in favour of community participation, it was more for the contribution they hoped it would generate from the government, than their capacity to participate in the form of labour, management and/ or money. The panchayat members were consulted pertaining to the selection of location for prospective wells and hand pumps, the JEN comes to the village once in a month or two months when on a visit to the nearby village of Esrol, which is covered under a regional water supply scheme. As in many cases in the district, the panchayat members here agreed to have been consulted by the departmental officers regarding interventions in their region. Lack of information and capacity towards a management and contribution mechanism lead to a very non-committal response regarding various impediments visualised , towards contribution issues.

Sanitation

The need for private or community latrines was not felt . Regarding hygiene practices, washing of hands (by sand or water) before meals and after defecation was considered to be of prime importance.

District Ajmer

1. Introduction

District Ajmer, located in central Rajasthan, has an area of 8,481 sq kms, which is 2.5% of the total area of the state. The district has a total population of 17,23,081 (3.9% of the State population), out of which approximately 15% are Scheduled castes / Scheduled tribes (SC/ST). For the purpose of rural drinking water and sanitation sector, the district has been divided into two rural divisions; Ajmer and Beawar. Agro-climatically, the district is classified under the zone of "semi-arid eastern plains". Topographically, the district comprises primarily of undulating low hills and plains.

2. Water resources- an overview

The district has an average annual rainfall of 25.9 cms. The ground water potential of the underlying metamorphic aquifers is reported to be poor to moderate. The quality of water in these aquifers is very poor, with very high fluoride levels in more than half the district. However, good quality, confined aquifers are reported to be interspersed among the poor quality aquifers in the various parts of the district.

The level of ground water development in the district is 72.8%, with Jawaja and Pisangan blocks of the district classified as over exploited blocks with the level of ground water development over 100% of the total utilisable recharge. The ground water level has shown an average decline of 3.5 metres per annum over a period of twelve years (1984-96). The surface water sources are very few and are largely ephemeral in nature.

3. Coverage under rural drinking water supply

The district has 985 habitations, with all of them reportedly covered under a government installed different drinking waters schemes. Given the poor water quality, the coverage is augmented by regional water supply scheme under the Bisalpur project. The primary survey results also indicate a high level of coverage with a drinking water source for every 48 households. There are no records of the percentage of fully covered and partially covered habitations. As per the primary survey results, 36.8% of the total respondents are receiving less than the requisite 40 lpcd of water and thus, fall in the partially covered category. The basic coverage indicators for the district, as per the primary survey results are as follows:

Table 3.1: Status as per coverage indicators

Indicators	*Findings*
No of households served by a source	48
Average distance to the source in metres.	155
Average no of trips per household per day	8
Per capita water availability >40 lts per day (as % of respondents)	63.2%
Per capita water availability < 40 lts per day[1] (as % of respondents)	36 8%

Source : Primary household survey, 1998

The average distance traversed to collect water is reported to only 155 metres, which is considerably lower than the norm of 1.6 kms[2]. On an average eight trips a day are made to collect the requisite quantity of drinking water[3].

The phenomenon of poor status of the SC/ST settlements, which were not classified as main habitations relative to those classified as main habitations was prevalent in district Ajmer also. During the primary survey, it was usually found that the SC/ST settlements within a village were located furthest from the relatively better quality aquifers.

4. Drinking water sources and water availability

With regards to the drinking water sources, handpumps are the most prevalent source of drinking water in the district, covering 80.3% of the total habitations. The spread of PHED provided drinking water sources across the two rural divisions in the district may be noted as follows:

Table 4.2: Drinking water sources (in terms of number of habitations)

Rural Division Beawar

Main habitations	*Piped*	*P&T*	*RWSS*	*TSS*	*HP*	*JJY*	*Total benefited habitations*
450	14	30	2	2	403	1	450

Rural Division Ajmer

Main habitations	*Piped*	*P&T*	*RWSS*	*TSS*	*HP*	*JJY*	*Total benefited Habitations*
535	28	63	43	12	387	2	535
985	42	93	45	14	791	3	985

Source : PHED Ajmer, 1998

[1] Only 0 5% of the surveyed respondents said that they purchased water for drinking purposes

[2] In 93% of the cases the distance to the main drinking water source was less than 200mts

[3] Nearly 64% of the respondents made more than 8 trips per day for collecting water

As per the primary survey results, the total number of sources in a village per-se is not an issue of concern as on an average eight to ten drinking water sources are present in a village. 82.8% of the respondents reported a dependence on a government source for their drinking water requirements. From amongst the total dependence on government sources, the dependence on handpumps is the highest with 88.8% of the respondents accepting the use of handpumps. The figures derived from the primary survey, reflect that 10.6% of the total respondents are dependent on private wells.

5. Traditional sources

The traditional sources in the area are primarily dugwells. The dependence on these traditional wells, in terms of percentage of total wells in use, is very low because of the poor quality of water in these sources. The receding ground water level has progressively made these wells go dry, specially in the summer months.

6. Defunct sources

As per the observations of the primary survey, 7.2% of the total number of departmental sources are not operational in the surveyed villages. These comprise primarily of handpumps that have gone dry owing to drop in the ground water level.

7. Quality of water

The district of Ajmer is classified as "severely fluoride affected area" in the departmental records. Nearly 53% of the total habitations have a fluoride content of more than 1.5 ppm (parts per million) in the ground water. This problem is marginally diluted by the facet of inter-dispersal of few good quality aquifers among the poor quality ones.

As per most of the respondents, the water that is sweet to taste and appears clean is accepted as potable. Due to the presence of a number and variety of sources, most of the respondents did not distinguish between safe water for human and safe water for animal consumption.

Testing interventions are carried out by the division level staff and the samples are tested in the PHED district laboratory. The follow up to these tests, was found to be lacking as per the responses drawn in most of the surveyed villages.

8. Various programmes and schemes

Handpumps are the main source of drinking water servicing the rural population in the district. During the last year in the Beawar rural division alone, 272 handpumps, out of a total existing number of 403, have been provided

644 villages in the district have been identified as fluoride affected. A project costing Rs. 20.84 crores had been sanctioned for providing safe drinking water in selected villages in the year 1994. The expenditure as on the 1st of March 1998 on the project is 11.64 crores and 62 villages had been benefited by April 1998. As per a PHED survey, 399 villages are to be covered under additional schemes. The fact that 337 of these are not main habitations, shows some recognition

of the presence of poor quality aquifers in the settlements that are not classified as main habitations within the villages.

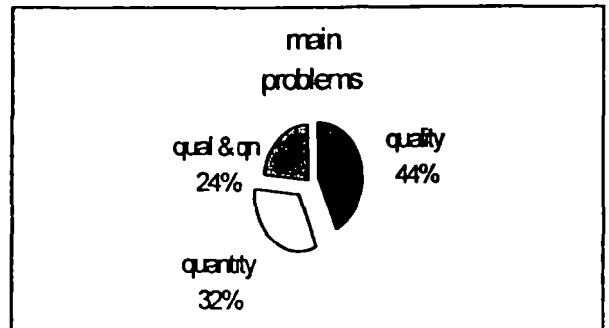
9. Operation and maintenance

The water releases in the case of piped schemes is one hour in the morning throughout the year. For P&T schemes also, the supply hours are the same. However, in the case of some schemes it is a total of 48 hours spread out over the four scarcity months (April to July).

In tune with the general sentiments expressed by the PHED officials in other districts, lack of resources and low incentives not commensurate with the heavy task load for the field level staff were identified as the main impediments to adequate operation and maintenance. Absence of co-operation from the panchayat and the community was also deemed to be a reason for poor operation and maintenance.

10. Problems pertaining to drinking water supply

With regards the main problems in the sources of drinking water, the most significant problem was that of the poor quality of water followed by inadequate quantity of drinking water. It is important to note that poor quality and inadequate quantity of water have a high degree of correlation, as there are lesser number of good quality sources to satisfy people's demands. The following table summarises the primary survey findings regarding the problems related to drinking water sector:



Main problems with regards drinking water
qual & qn quality and quantity

Table 10.1: Problems related to drinking water sector (*figure as percentage of respondents*)

Main Problems	*Findings*
Quality	44%
Quantity	32%
Quality and Quantity	24%
Drinking water Sources	
Maintenance, set up and improper use	65%
natural	35%

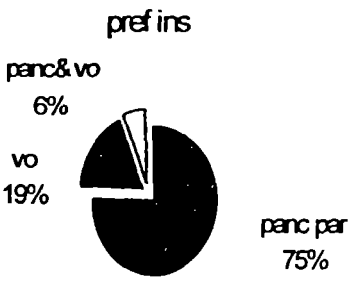
Source : Primary household survey, 1998.

65% of the respondents opined that inadequate maintenance and improper use of the drinking water sources were responsible for some of the sources lying inoperational. Thus, the focus on provision of handpumps as the main drinking water source needs to be complemented with

adequate towards the maintenance of these sources[4].

11. Community and panchayat participation

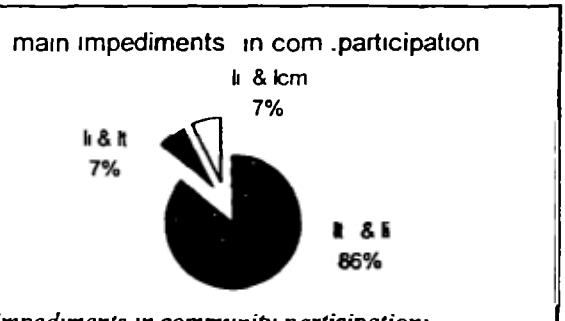
In half of the surveyed villages, the contribution of panchayats towards drinking water sector were deemed to be significant by respondents. Most of the respondents accepted that they were consulted regarding drinking water interventions in their village, but felt that actions were not taken according to the opinions voiced by them. All the surveyed respondents could identify a particular departmental official who was in touch with the village regarding drinking water and associated services.



Preference of institutions for upkeep of drinking water and sanitation services
panch& vo : panchayat and voluntary organisations
vo : voluntary organisations
panch par : user groups with panchayat participation

The user groups with panchayat participation were identified as the most preferred option for upkeep of drinking water and sanitation services, while none of the respondents felt that a government department/ agency was most appropriate for upkeep and maintenance.

Most of the respondents preferred the institution of a contribution mechanism under which the user groups are given the authority to collect the funds, with a condition that there should be transparency in the use of community contributions. Lack of information regarding the institution and working of such a system were considered to be the main impediment in the orientation of community towards participation.



Main impediments in community participation:

Lack of transparency (lt) in the use of collected funds and the lack of information (li) were the major impediments In tune with these the lack of an appropriate mechanism (lcm) was also cited as an impediment

The respondents also felt that there was a need for disseminating training at community level with respect to the maintenance and repair of especially handpumps.

81% of the respondents claimed that they had contributed towards capital costs for construction of a community drinking water source, which is a noteworthy fact when seen in context of negligible contributions for the same in other districts of the state.

[4]This is commensurate with the fact that most of the maintenance problems are recorded under the handpump schemes

In contrast to this, only 36% of the respondents claimed that they had made some contribution towards the maintenance of drinking water sources, which was contrary to the importance accorded to maintenance related problems by the community.

12. Rural sanitation

As in the other districts, rural sanitation is not a significant sector in Ajmer, either in terms of coverage or in terms of being a felt need. Only 12% of the surveyed households reported an ownership of a private latrine, while no community facility was reported to be provided in any of the surveyed villages.

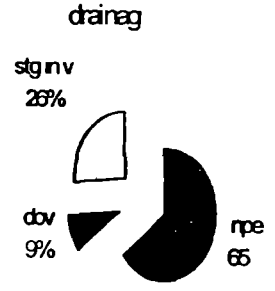
None of the respondents expressed willingness to contribute in any form, monetary or labour, for the provision of sanitary facilities and felt that it was the duty of the government to make provision for these facilities. Some observations about rural sanitation may be noted as follows:

Table 12.1: Rural sanitation (Figures in percentage of respondents)

Parameter	*findings*
Sanitation facility (private)	12%
Sanitation facility (community)	Non Existent
Provision of the facility should be made by	Government
Willingness to pay for sanitation (monetary)	Non Existent
Cleanliness near drinking water sources of acceptable standards	93.1%

Source : Primary household survey, 1998

65% of the surveyed villages reported lack of a proper drainage[5] mechanism for the waste water in the village. In addition to this, 26% of the respondents complained of stagnation of the waste water in the village. Most of the respondents recognised that stagnation of waste water could lead to a spread of water borne diseases.



The drainage mechanism in the region

dov — *drains outside village*
stg in v — *stagnates within the village boundary*
npe — *no proper exit*

[5]The cleanliness around the drinking water sources was rated as good (93.1%) though the drainage was rated to be poor

13. Conclusions

The departmental records reflect a complete coverage of the main habitations under rural drinking water schemes. But, the distinction between "fully covered" and "partially covered" habitations is missing from the departmental records. Also, the status of habitations other than the main habitations is not known.

The primary survey highlights that about 37% of the households are receiving less than 40 lpcd of water and thus, are only "partially covered" under a drinking water scheme. The situation of the households residing in habitations which are not classified as main habitations is worse as these habitations have poorer quality groundwater aquifers.

Despite the district being afflicted with a water quality problem, with a high level of fluoride content in about half of the ground water aquifers, handpumps remain the most predominant source of drinking water in the district. The primary survey results also reflect a high degree of dependence on handpumps with 89% of households accepting their use.

Although, reportedly there are a number of sources in the villages (eight to ten on an average), yet inadequate quantity of potable water is an issue of concern for a 56% of the households. This is owing to the fact that there are very few sources supplying potable water to meet the demands of the whole village.

The department is carrying out quality tests on the samples of groundwater collected from the different villages, but the follow up to these tests is reportedly missing as per the surveyed respondents. Also, the sweet taste and clean appearance of water were adequate for the local community to consider the water to be potable.

User Groups with panchayat participation were identified as the best institution for the upkeep and maintenance of schemes, provided there is a transparency in the management of funds. The willingness among the local community to contribute is evident in the fact that most of the households have already, at some point of time, contributed for the construction of a drinking water source or its maintenance.

Rural sanitation is not a priority sector, either from the government's or people's point of view. The demand for more potable drinking water sources over-rides the sanitation issue in the district. As a result the community is not willing to make any contribution, either monetary or labour, for the provision of sanitation facilities in the district.

In conclusion it may be said that the district Ajmer is very badly afflicted by the water quality problem which also expresses itself in the form of shortage of adequate quantity of safe drinking water. A proper follow up on the quality tests is extremely important in the district and it is essential to educate the local community regarding the quality issue. There is a greater need to pay attention to habitations other than the main habitations, as they are more acutely afflicted with the quality problem. It is also important that the departmental records reflect the coverage status of all types of habitations in the district so that future planning of interventions can be carried out in accordance with the intensity of problems in an area.

Annexure I

Village case studies

Village : Sargaon
Block : Jawaja

Village profile

The village of Sargaon is located in the Jawaja block of the Ajmer district under the Beawar rural division of the Ajmer circle PHED. The population of the village is 2000 spread across 500 households . The number of castes in the village are eight, spread across an equal number of settlements. The cattle population in the village is approximately 1500. The scheduled castes inhabit four of the village settlement areas and the other four are inhabited by the *Mehras(2) , Jat and Gujjar* populations . The main occupation for the Scheduled castes here is leather works and the main occupation for the others is spread out across farming and wage labour.

There is a clear segmentation in the income groups of the community , the scheduled castes involved in wage labour earn up to Rs. 3000/- per month and the ones involved in daily wage labour or farming have an average per month income not exceeding Rs.2000/- in most cases.

Sector Status

There are a total of 12 drinking water sources in the village , which include 2 private wells, nine handpumps and one panghat. Out of the 8 handpumps 2 are located towards the centre and southern end of the village are out of order while one handpump has high fluoride content in its water. There is a proposed piped water scheme in the village , which is yet to materialise.

The main problems pertaining to drinking water in the region is the distance that has to be traversed to get potable drinking water and the poor quality of water in many settlements.[6]However some sources have good water , this shows the importance of site selection for establishment of sources in the village as within a village good and bad quality aquifers may be found. The Scheduled caste settlements towards the centre and southern end of the village are in particular , badly hit by the drinking water problem, given that the sources nearby are in operational condition. The average distances traversed to reach the water sources vary from 30 metres to around 300 metres for most of the settlements.

The main problem pertaining to the in operational sources was put across as lack of maintenance. The villagers have put across money in some cases towards community based upkeep and maintenance of source. The amount which was put across in willingness to contribute towards capital/ construction costs and maintenance cost was proportional high for the maintenance cost if we consider only the monetary terms. This re-emphasizes the predominant feeling that poor

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[6] In some villages the water quality in selected sources has been found to be so poor that it is almost poisonous In the village of Sardhana (Jawaja block) the community well with poisonous water was filled up to prevent any accidental consumption The villagers have to travel through uncomfortable terrain to get to potable drinking water sources, in this village

maintenance is a major impediment towards improvement of the drinking water situation in the village. The issue regarding the mechanism for management of the drinking water systems, was respondent to in favour of the community based organisations with assistance from the voluntary sector.

The contribution of the government was felt important in an community intervention, specially in terms of finances. As in most cases the provision of community and private toilets was deemed to a public good. However if the monetary contribution towards provision of these was by the government the villagers were willing to contribute labour .

Sanitation

The village has a natural slope and a *kaccha nalli* which takes the waste water from the village outside the village. However some parts of the village are plagued by accumulation of dirty water and the predominant suggestion that came up, emphasized on proper *nallis* in the village for drainage. This issue of the importance of a proper drainage system in the village was manifested in the recognition of the need for cleanliness around the main drinking water sources.

As regards the issue of practices considered most important to hygiene, the dominant responses were for washing of hands with water before meals and after defecation as in most cases for the District and state . The aspects of cleanliness around the drinking water sources and proper drainage were also significant, as per the number of responses, more importantly, they were priority options wherever all the four were responded to .

Village : Ravala Baria
Block : Masuda

Village Profile

The village of Ravala Baria is located in the Masuda Block of the District of Ajmer. Towards the north of the village is a denuded hill . The village has a total human population of 750 spread across 150 households and a cattle population of 250. It is spread across 13 settlements and has four major castes, namely : *Mehrat, Rawat, Raigar and Bhangi*. The occupational pattern is skewed in favour of agriculture and wage labour, some people are in salaried service as well.

Sector Status

The total number of drinking water sources in the village number 11 out of which 7 are handpumps and the rest private wells . Two hand pumps are totally in operational due to lack of maintenance . The rest of the sources on an average have poor quality of water in terms of bad taste owing to high fluoride content. Due to the terrain being hilly the distances traversed to reach the used drinking water source vary from 50 to 700 mts. Since the settlement pattern is so scattered the wait in ques for the limited drinking water sources in summers takes up considerable time. The SC *dhani* located towards the north central area of the village has one handpump which is particularly bad in quality of water yielded.. A second handpump is proposed in the area. The use of private wells for the entire community is limited , however in times of summer access is granted, on grounds of many of the other sources (handpumps) running dry, due to the water level going down. Three other handpumps are proposed in the north west, north east & central east of the village, with "expected" departmental assistance. The dominant responses about suitable mechanisms refer to the user group managed as the most preferred one. The contribution towards maintenance of handpumps is forthcoming @Rs 15 (on an average from the respondents willing) pm. This is a recognition of the fact that the upkeep and maintenance of handpumps is considered vital by the community regarding the status of drinking water facilities in the village, apart from the improvement in quality of water available. The contribution towards capital costs for new constructions was also forthcoming , though the relative emphasis was more-o-less equal vis-a-vis maintenance and up keep , the issue of quality water sources and assurance in site selection, of such new sources towards good quality came out as an important issue. The village does not have a natural slope to lead the waste water generated outside the village thus the aspect of proper drainage and cleanliness around the drinking water sources and need for a drainage system, featured as a major responses.

Sanitation

Community and private latrines were considered of significance as an exception to the regional trend where, the tendency is that " would not mind , if provided by the government". Here the tendency is that " is important and would contribute"(but the government needs to support the intervention). The respondents also elaborated on the kind of arrangements, like availability of electricity , water and specifying locations for the community toilets...showing their interest in such facilities. Most of the respondents preferred community toilets outside the village/ settlement area, another reflection of preferred hygienic practices, in the form of "defecation outside settlement areas" .