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**Provisioning Drinking Water in
Gujarat's Tribal Areas:
An Assessment**

Keshab Das



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Gujarat Institute of Development Research
Gota, Ahmedabad 380 060

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Abstract

Drawing upon both intensive and extensive field research, this paper assesses state provisioning of drinking water in 48 designated tribal talukas of 12 districts in the west Indian state of Gujarat, through the much-publicized Vanbandhu Kalyan Yojana (VKY) of the Tribal Development Department (TDD). Absence of comprehensive and accessible basic data on the programme remained a major constraint in following up implementation and ensuring corrective measures en route. Despite claims of transparency and efficiency, it was near impossible to obtain village wise and scheme wise financial information as the TDD, the originator of the VKY, did not possess relevant data on these. This lacunae was compounded by the overlapping of interventions and difficulty in rendering the relevant agency responsive. The programme's excessive dependence on groundwater, even in high-rainfall areas in south Gujarat, for drinking water purposes posed serious challenges in a state suffering steady decline in groundwater tables in several regions. Governance deficit was obvious at the village level where participation in Gram Sabhas was often low. An important dimension of quality of drinking water, as the field surveys revealed, had received the least attention in such state interventions. The effectiveness of the programme would critically depend on identifying and addressing its basic limitations.

Keywords : Vanbandhu Kalyan Yojana; Drinking water; Tribal areas; Gujarat; Governance; Participation

JEL Classification : R58; R28; R20; and Q25

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Provisioning Drinking Water in Gujarat's Tribal Areas: An Assessment

Keshab Das

Introduction

Accounting for 8.6 per cent of the total tribal population in India¹ the west Indian state of Gujarat is home to 29 Scheduled Tribes (STs) and five primate tribes. In terms of the share of tribal population to total population the top ten districts (Tapi included in Surat) dot the entire eastern part of the state. The districts with substantial tribal population include Dangs, Narmada, Dahod, Navsari and Bharuch. In the north, Sabarkantha has over one-fifth of its population as tribal, while as arid districts both Banaskantha and Kachchh have about 8 per cent tribal population.

With the introduction of the Tribal Sub-Plans (TSPs) at the national level since the Fifth Five Year Plan (1974-79) it was made imperative to identify Integrated Tribal Development Areas (ITDAs) in every state and implement special developmental schemes in these areas. The idea was to mainstream the tribal population so as to ensure their access to opportunities in the process of development and growth. In Gujarat, the TSP was implemented during the same period (1974-79) and the Sub-Plan Area (SPA) comprised 32 talukas located in seven districts of Gujarat. During the Sixth Five Year Plan, the Modified Area Development Approach (MADA) was adopted for smaller areas of tribal concentration, having population of 10,000 and above with 50 per cent or more as tribal. Further, during the Seventh Five Year Plan, smaller clusters of villages having population of 5,000 and above, of which 50 per cent were tribal were included under the TSP. As per the *Census of India 1991*, there were nine Integrated Tribal Development Projects (ITDPs) spread over 33 talukas, 16 pockets and four clusters covered under the TSP.

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¹ *Census of India, 2011* data extracted from *Demographic Status of Scheduled Tribe Population of India* at <http://www.tribal.nic.in/WriteReadData/userfiles/file/Demographic.pdf> (Accessed May 5, 2015).

Currently, in Gujarat, there are 12 Integrated Tribal Development Project Areas (ITDPA) viz., Palanpur, Khedbrahama, Dahod, Chhota Udepur, Rajpipla, Mandvi, Songadh, Vansada, Dangs, Bharuch, Valsad and Godhra. These 12 ITDPs include 43 talukas, 15 pockets and four clusters. Every ITDP has been awarded with a Project Administrator (PA) office, which administers and implements TSP schemes in the respective ITDP. The fund allocated under the TSP by the central government during the Eleventh Five Year Plan has been presented in Table 1. The share of Gujarat during this period has been about 9 per cent.

Table 1: Funds Allocated by Central Government through TSP, 2007-12 (Rs. in Lakh)

Year	Total Funds Released for TSP	Funds Allocated to Gujarat for TSP
2007-08	63,179.81	5,419.14 (8.6)
2008-09	63,135.29	4,571.43 (7.2)
2009-10	48,124.00	5,635.53 (11.7)
2010-11	90,169.67	8,126.00 (9.0)
2011-12*	78,859.95	6,650.00 (8.4)

Sources: Annual Report 2010-11 at <http://tribal.nic.in/writereaddata/mainlinkFile/File1288.pdf>. Ministry of Tribal Affairs. Government of India. (Accessed August 10, 2012).

Annual Report 2011-12 at <http://tribal.nic.in/writereaddata/mainlinkFile/File1391.pdf>. Ministry of Tribal Affairs. Government of India. (Accessed August 10, 2012).

*Note: *Amount up till January 31, 2012.*

Along with the national TSP, the state level Tribal Area Sub-Plan has been initiated in Gujarat since 1974. Funds allocated under TSP during the past three Five Year Plans have been detailed in Table 2. It is important to note that the share of TSP in the total plan funds has practically remained unchanged at a meager 0.1 per cent since the Ninth Five Year Plan onwards, even during the Eleventh Five Year Plan when VKY was being implemented.

Table 2: Expenditure Made under TSP during 1997-2013

Five Year Plan (Period)	State's Total Plan (Rs. Crore)	TSP Plan (Rs. Lakh)
9 th Five Year Plan (1997-02)	31,300	3866 (0.1 %)
10 th Five Year Plan (2002-07)	47,260	5935 (0.1 %)
11 th Five Year Plan (2007-12)	1,27,153	17,756 (0.1 %)
12 th Five Year Plan (2012-13)*	50,599	6613 (0.1 %)

Source: Tribal Sub Plan Annual Development Programme 2012-13, p. 187. (Official Document).

Notes: * Data given for the first year only.

Figures in parentheses are percentages to State's Total Plan figures.

Along with the TSP, the Government of Gujarat has developed a new model called 'Gujarat Pattern', which is now redesigned and named as 'New Gujarat Pattern'. Under this scheme, the state government allocates special funds for the ITDPAs. These funds are transferred to the Commissioner (Tribal Development) who, in turn, channels them to the district Project Administrators (PAs). Thus, every PA office gets its share of funds through which it can fund various schemes specific to the area. Details of provision and expenditure incurred under the Gujarat Pattern during 2006-12 have been provided in Table 3. The expenditure figures suggest full utilization of the funds granted.

Table 3: Details of Funds under Gujarat Pattern, 2006-12

(Rs. Crore)

Year	Provision	Grant	Expenditure (% of Grant)	Works Completed
2006-07	264.10	271.27	271.26 (99.99)	9021
2007-08	410.18	407.49	407.39 (99.71)	4072
2008-09	320.68	322.52	322.49 (99.99)	3596
2009-10	325.93	326.47	326.47 (100.0)	2939
2010-11	335.21	335.21	335.14 (99.98)	2189
2011-12	351.69	251.45	141.98 (56.53)	396

Source: Tribal Sub Plan: Annual Development Programme 2012-13. Tribal Development Department. Gandhinagar, 2012, p. 8.

The Drinking Water Component in the VKY: Aim and Status

During the Eleventh Five Year Plan period (2007-12), exclusively for the tribal areas the state government implemented a Rs. 15,000 crore package known as the Chief Minister's 10-Point Programme or the VKY. As per the official announcement, the objective of designing this scheme was to remove persistent poverty permanently along with ensuring social justice and installing civil infrastructure in the ITDA areas. The 10-Point Programme focuses on the integrated, holistic and inclusive development of tribal communities by touching their lives in core areas such as livelihoods, education, housing, health, drinking water, irrigation and access to basic amenities so that they could live a comfortable life.

According to the official position, during the Eleventh Five Year Plan period, the drinking water component under the VKY had been so designed as to cover *all* the ST households living in ITDAs with the provision of safe, assured and adequate potable water. It was visualized that at least one-fourth of the ST population should get access to piped (tap connectivity) water supply.²

The project was expected to cost Rs. 14.19 crore and work was proposed to begin from the Dangs district. The project was supposed to provide drinking water up to kitchen level within the beneficiary households. It also aimed at easing the task of the water supply department for collecting water charges; a new approach was being experimented within certain talukas. Instead of collecting the payments directly from the people, an attempt was to be made to involve dairy cooperatives developed by the TDD. The idea was to deduct water charges before the payment was made to the villagers for the milk deposited by them.³

However, even by the end of the Eleventh Plan, there remained a lot to be done on the drinking water front; the activities had not even approached anywhere near the target set. While at the TDD it was almost impossible

² CM's Ten-Point Programme, Tribal Development Department's official website, available at <http://www.vanbandhukalyanyojana.gujarat.gov.in/CM%20Ten%20Point%20Program.aspx>, (Accessed July 27, 2012).

³ See http://guj-tribaldevelopment.gov.in/cms.aspx?classification_id=22&content_id=49, Tribal Development Department, Official website (Accessed August 5, 2012)

to obtain basic data on even the list of villages covered under the drinking water programme of the VKY, the PA offices had hardly any role in the collection of water charges, as originally envisaged. Unlike other schemes of the state government, here, the TDD had been playing the role of a funding agency. Under the New Gujarat Pattern, the district level TSP offices allocated funds to the Gujarat Water Supply and Sewerage Board (GWSSB) and the Water Supply and Management Organisation (WASMO) to carry out programmes related to drinking water in these tribal talukas. From the allocations made during the last five years by various TSPs, the emphasis appeared to have been on providing water supply infrastructure in villages through various schemes like Mini Pipe Scheme (MPS), Rural Regional Water Supply Scheme (RRWS), Handpumps (HP), Reverse Osmosis (RO) Water Plants and other such schemes.

Scope, Objectives and Approaches

The central purport of this study has been to assess the status, functioning and challenges facing broad-basing access to drinking water in tribal areas of Gujarat as policy initiatives through the VKY have been undertaken. As the drinking water component of the VKY is closely intertwined with and operated through the existing state institutions as the GWSSB and WASMO it is difficult to attribute the performance, impressive or otherwise, to the VKY, exclusively.

The study mainly focuses on the issue of broad basing access to drinking water to such population who are settled in mountainous and often forested regions in sparsely spread habitations. With the coexistence of the supply and demand driven approaches to drinking water in the state, it is often a challenge to take recourse to multiple options of source and distribution in these areas. The study, hence, looks into the existing arrangements in both infrastructure and institutions in provisioning drinking water. An additional dimension has been to appreciate views, opinions and suggestions from inhabitants themselves. Details collected on sources of water, use pattern and hygienic behavior have been supplemented with information on functioning of local institutions and popular participation as a vital process in registering voice actually if and as it takes place on ground.

As the first step to initiate the field survey, an indispensable requirement was to obtain a list of village or habitation level information showing different drinking water schemes undertaken or being undertaken under the VKY and otherwise. The number of households and the number of ST households, if not any other details, in each of these villages were crucial to decide the sampling frame and even to determine the logistics of the study. Following several requests and trips to the D-SAG office in Gandhinagar - that was officially entrusted with the responsibility of coordinating with GIDR on the study – it was indicated that the TDD did not have any such data on the drinking water component of the VKY, a programme it had launched. Finally, following the inability of the D-SAG office to help in any way regarding the basic data, that implied losing huge amount of time, it was suggested that the relevant data might be available with the two implementing agencies, namely, the GWSSB and WASMO.

Despite sustained perusal to obtain the disaggregated data (since October 2010, vide letter No. PB-4/Moni.cell/VKY/TP Monitoring/3154; dated 4/10/2010) nothing was forthcoming from the implementing agencies or the D-SAG. The survey had to be delayed in these unfortunate circumstances. After long drawn attempts, finally the basic dataset at the district level was provided by the GWSSB office in Palanpur on February 16, 2012. The survey in Banaskantha was completed on the basis of this dataset. Once this survey exercise was over, the GIDR team was informed by the D-SAG office that the survey based on GWSSB/WASMO's basic data might not be considered valid as those villages might not be falling under the VKY. It was learnt later that only those villages in which schemes have been implemented by WASMO and GWSSB under the New Gujarat Pattern (i.e., funded through the PA's office) were the villages that came under the VKY. Had this been informed during the several enquiries and visits made to the D-SAG starting October 2010 (when the first letter was sent in this matter), the survey would have been finished much earlier.

Nevertheless, keeping the importance of the enquiry, the GIDR team made trips to all the PA offices in 12 districts, met district level PA office staff and gathered the disaggregated dataset. The sample villages and talukas for survey were drawn from this dataset although a lot of time had been lost just to access the basic data that could not be provided through the D-SAG office. The mismanagement of the programme was palpable.

Sample Selection: Table 4 provides the list of sample villages and their population profile showing the share of ST population. Map 1 highlights the talukas designated as ‘tribal’ in the state. It is obvious that the tribal belt runs from north to south on the entire eastern stretch. Further, Map 2 presents the geographical location of sample talukas and villages chosen therefrom.⁴ From the total of 43 designated tribal talukas in the 12 districts of Gujarat two talukas per district were chosen for the study. Further, from each selected taluka two villages were chosen for detailed survey. In the process, a total of 48 villages were selected from 23 tribal talukas (as Ahwa was the *only* taluka in Dangs, four villages were chosen for survey from this district) of the 12 districts.

Map 1: Tribal Talukas of Gujarat as Identified under the VKY

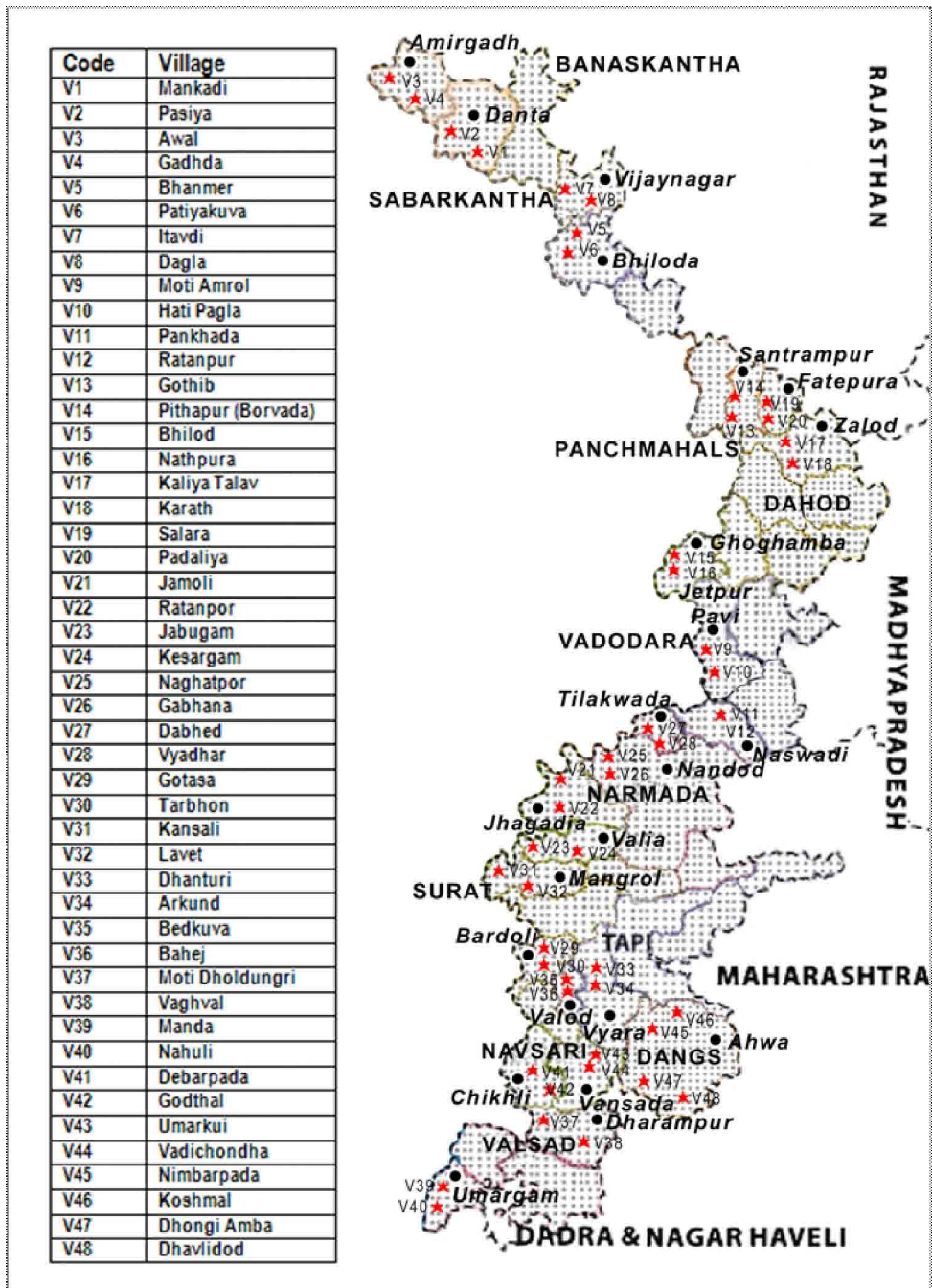


Source: Modified based on map at www.mapsofindia.com

Note: The tribal belt is depicted as the dotted portion on the entire right fringe.

⁴ In 2013, three new districts were formed in this part of the state. These are Aravali (carved out from Sabarkantha district), Mahisagar (carved out from Panchmahals and Kheda districts) and Chhota Udaipur (carved out from Vadodara district). While these three new districts have been shown in Map 1, these names are not shown in Map 2 as these districts were formed after the surveys for the study were completed.

Map 2: Tribal Talukas and Villages of Gujarat as Sampled for the Study



Source: Modified based on relevant portion carved out from Map 1.

Note: Bold dots represent sample talukas and stars represent sample villages.

Table 4: Sample Talukas and Villages with Total and ST Population

Region	District	Taluka	Village	Total Population	ST Population (%)
North	Banaskantha	Danta	Mankadi	2090	26.84
			Pasiya	548	100
		Amirgadh	Awal	2552	19.04
			Gadhda	1342	41.80
	Sabarkantha	Bhiloda	Bhanmer	2669	99.77
			Patiyakuva	693	100
Vijaynagar		Itavdi	1915	90.44	
Central	Vadodara	Pavi Jetpur	Moti Amrol	5120	96.25
			Hati Pagla	286	94.40
		Naswadi	Pankhada	231	100
			Ratanpur	1537	97.91
	Panchmahals	Santrampur	Gothib	4107	74.65
			Pithapur (Borvada)	433	98.61
		Ghoghamba	Bhilod	2732	18.66
			Nathpura	817	78.94
	Dahod	Zalod	Kaliya Talav	501	98.80
			Karath	11687	89.72
		Fatepura	Salara	6539	96.91
			Padaliya	773	67.40
South	Bharuch	Jaghadia	Jamoli	310	100
			Ratanpor	2197	72.59
		Valia	Jabugam	3290	96.26
			Kesargam	413	88.61
	Narmada	Nandod	Naghatpor	2115	99.48
			Gabhana	796	89.32
		Tilakwada	Dabhed	487	84.39
			Vyadhar	1404	96.08
	Surat	Bardoli	Gotasa	433	99.48
			Tarbhon	2665	82.14
		Mangrol	Kansali	745	100
			Lavet	1960	98.78
	Tapi	Vyara	Dhanturi	1377	100
			Arkund	326	100
		Valod	Bedkuva	3248	96.95
			Bahej	270	100
	Valsad	Dharampur	Moti Dholgungri	1718	100
			Vaghval	868	99.88
		Umergaon	Manda	5587	79.17
			Nahuli	1507	77.90
Navsari	Chikhli	Debarpada	4774	96.54	
		Godthal	1398	100	
	Vansda	Umarkui	2875	99.69	
		Vadichondha	716	100	
Dangs	Ahwa	Nimbarpada	336	100	
		Koshmal	582	99.82	
		Dhongi Amba	1105	100	
		Dhavlidod	1785	99.71	

Source: District Project Administrator Offices, D-SAG.

From each taluka only those villages are considered which were funded under New Gujarat Pattern by the PA offices for drinking water schemes. Out of this sample of VKY 'project' villages two villages per taluka were selected on the basis of ST population, drinking water schemes implemented and number of households in the village. It was decided to survey about 30 households (identified on pro-rata community basis) from every village for canvassing the detailed household schedules. Finally, following scrutiny of the quality of data obtained, schedules filled in for a total of 1452 households were considered. In addition to the surveys using structured questionnaires, discussions were held with informed villagers, functionaries of both village institutions and PA offices.

Two sets of survey schedules were designed in keeping with the scope and objectives of the study. While certain information on basic infrastructure, amenities, population and local institutions would relate to the selected villages, there were issues in use of water, hygienic practices and interface with the local water institutions by the individual households which needed to be captured.

Infrastructure for and Supply of Drinking Water in Tribal Project Districts

Although the VKY has been conceptualised and managed by the TDD, the drinking water component eventually involved taking active support from the GWSSD and the WASMO. While the former is responsible for providing the required stock of water to the villages, WASMO is responsible for supplying water within the village. Hence, WASMO becomes an implementing agency while GWSSB has the dual roles of a funding agency and an implementing agency. The GWSSB looks after formulating and implementing schemes (like Mini Pipe Scheme or Regional Water Supply Scheme) in rural areas.

Usually the gram panchayat and taluka panchayat (based on the discussions held at Pani Samitis and gram sabhas) are involved in formulating schemes related to providing drinking water to villages. However, in case of the VKY, the schemes were formulated and implemented by the GWSSB officials who had undertaken base line surveys to ascertain requirement of water by village and the overall tribal regions of the state.

The special provision of drinking water under the VKY in the 12 districts with identified tribal population has to be viewed in light of the existing supply facilities and sources available in the localities. As an attempt at stock taking, taluka level data were collected from the GWSSB showing coverage of villages by different drinking water schemes as also infrastructure. With a fairly well-developed regional water supply infrastructure in most parts of the state it was expected that all the 12 districts would have large proportion of villages depending upon these schemes. However, whether most such villages covered under the regional water supply schemes have access to the resource is a matter of scrutiny. The status of water infrastructure as well as water reaching villages in the specific tribal talukas in comparison to the district as a whole are indications of the achievement of state intervention in this crucial sector of drinking water concerning health, hygiene and livelihood.

In Tables 5 to 7 taluka level data on coverage of villages by water schemes and infrastructure have been provided. The information has been compiled in a manner as to compare the position of tribal talukas with that of the non-tribal talukas as also the respective overall region. It is interesting to note that for the regional water supply schemes (RWSS), the extent of coverage does not indicate that all villages are accessing water. This suggests merely that either these villages (not accessing water through RWSS) depend upon handpumps or other sources not part of the VKY schemes.

In north Gujarat (Table 5), Banaskantha district, with two tribal talukas, has over 80 per cent villages covered by the RWSS, although the actual percentage of villages accessing water is around 38 per cent. Hence, taking all the water infrastructure and schemes into account, of the total 250 villages in the two tribal talukas 129 villages (about 52 per cent) do not have access to the state provision of drinking water.

Sabarkantha district has four tribal talukas having 510 villages. It is clear that here, unlike in Banaskantha, the dominant form of state drinking water infrastructure remains handpumps, accounting for above 65 per cent of villages under this scheme. While individual pipe schemes are found in 19 per cent of all tribal villages in the district, RWSS covers 15.5 per cent of the villages, of which only 37 per cent of these actually access water through this scheme. Here again, 50 villages in the tribal talukas do not have access to any source of drinking water provided through the state.

Incidentally, for the whole district, 369 villages fall outside accessing the state water provision paraphernalia.

For the tribal talukas of north Gujarat region as a whole, only 107 villages (forming just about 14 per cent of all the 760 tribal villages) access the RWSS. Handpumps remain the dominant source accounting for about 46 per cent of villages in the region. Further, there are no other schemes including the open well scheme and mini pipe scheme in the region. The coverage figures indicate poor provisioning of drinking water in these tribal villages.

Of the central Gujarat districts (Table 6), Vadodara has four tribal talukas with the maximum number (706) of villages compared to any of the 12 districts in the state with tribal population. Given difficult terrain in most of these tribal areas, it is easy to find that RWSS hardly covers villages here, the proportion being just about 2 per cent of all villages in the four talukas. Handpumps (50 per cent), individual pipe schemes (25 per cent) and mini pipe/other schemes (22 per cent) are found in the remaining villages to address the need for drinking water in the region. Irrespective of the efficiency of the variety of systems of water supply in these talukas, what is important to note is that there is not a single village that is not served by any state drinking water scheme.

In Panchmahals district, about 45 per cent of villages (150 out of 336) access drinking water through RWSS while over 47 per cent of villages are covered under the handpump scheme. However, there have been quite a few villages in these tribal talukas which are covered under more than one of the state drinking water schemes.

All the talukas in Dahod district are designated as tribal and a total of 693 villages exist. It may be noted that most villages (over 71 per cent) have access to drinking water through handpumps. The next two important sources are individual pipe schemes and RWSS, which cover 99 and 89 villages, respectively. This also is a district where various schemes appear to have covered all the villages in terms of being sources of drinking water provided by the state.

Table 5: Drinking Water Facility in Villages by Taluka, North Gujarat

Taluka	Number of Villages	Villages Covered under Different Drinking Water Schemes							
		Completed Regional Schemes				Villages Covered under Individual Pipe Scheme			
		Covered villages	Villages accessing water	Villages not accessing water voluntarily	Villages where water has not reached	Villages covered under Handpump Scheme	Villages covered under Open Well Scheme	Villages covered under Mini Pipe/ Other Scheme	
Banaskantha District									
Amirgadh	69	55	24	31	0	0	14	0	0
Danta	181	152	54	80	18	29	0	0	0
<i>Tribal All</i>	250	207 (82.8)	78 (37.7)*	111 (53.6)*	18 (8.7)*	29 (11.6)	14 (5.6)	0 (0.0)	0 (0.0)
<i>Non Tribal (10)</i>	994	672 (67.6)	415 (61.6)	257 (38.2)	0 (0.0)	322 (32.4)	0 (0.0)	0 (0.0)	0 (0.0)
Total	1244	879 (70.7)	493 (56.1)*	368 (41.9)*	18 (2.0)*	351 (28.2)	14 (1.1)	0 (0.0)	0 (0.0)
Sabarkantha District									
Bhiloda	165	63	28	35	0	31	71	0	0
Vijaynagar	85	0	0	0	0	12	73	0	0
Khedbrahma	133	16	1	15	0	24	93	0	0
Meghraj	127	0	0	0	0	30	97	0	0
<i>Tribal All</i>	510	79 (15.5)	29 (36.7)*	50 (63.3)*	0 (0.0)*	97 (19.0)	334 (65.5)	0 (0.0)	0 (0.0)
<i>Non Tribal (9)</i>	842	569 (67.6)	270 (47.4)	299 (52.5)	0 (0.0)	205 (24.3)	88 (10.4)	0 (0.0)	0 (0.0)
Total	1372	648 (47.2)	299 (46.1)*	349 (53.9)*	0 (0.0)*	302 (22.0)	422 (30.8)	0 (0.0)	0 (0.0)
<i>North Gujarat Tribal All</i>	760	286 (36.8)	107 (37.4)*	161 (56.3)*	18 (6.3)*	126 (16.6)	348 (45.8)	0 (0.0)	0 (0.0)

Source: GWSSB, Gandhinagar.

Notes: Figures in parentheses (excepting those marked with *) are percentages to respective 'Number of Villages' totals.

* Bracketed figures are percentages of the 'Covered villages' in Column 3.

In Column 1, figures in parentheses show the number of talukas in that category.

Table 6: Drinking Water Facility in Villages by Taluka, Central Gujarat

Taluka	Number of Villages	Villages Covered under Different Drinking Water Schemes									
		Completed Regional Schemes		Villages covered under Individual Pipe Scheme		Villages covered under Handpump Scheme		Villages covered under Open Well Scheme		Villages covered under Mini Pipe/ Other Scheme	
		Covered villages	Villages accessing water	Villages not accessing water voluntarily	Villages where water has not reached	Villages covered under Individual Pipe Scheme	Villages covered under Handpump Scheme	Villages covered under Open Well Scheme	Villages covered under Mini Pipe/ Other Scheme		
Vadodara District											
Pavi Jetpur	212	14	14	0	0	66	100	1	31		
Nasvadi	217	0	0	0	0	68	104	5	40		
Chh. Udepur	144	0	0	0	0	20	97	0	27		
Kwant	133	0	0	0	0	23	53	0	57		
<i>Tribal All</i>	706	14	14 (100.0)*	0	0	177	354 (50.1)	6	155 (22.0)		
		(2.0)		(0.0)*		(25.1)		(0.8)			
<i>Non Tribal (8)</i>	842	294 (34.9)	198 (67.3)	9	9	433 (51.4)	108 (12.8)	1	6 (0.7)		
Total	1548	308 (19.9)	212 (68.8)*	9	9	610 (39.4)	462 (29.8)	7	161 (10.4)		
			(28.2)*	(2.9)*				(0.5)			
Panchmahal District											
Santrampur	152	113	99	14	0	9	29	0	1		
Ghoghamba	95	0	0	0	0	26	69	0	0		
Kadana	132	53	51	2	0	8	61	0	10		
<i>Tribal All</i>	336	166 (49.4)	150 (90.4)*	16	0	43	159 (47.3)	0	11		
			(9.6)*	(0.0)*		(12.8)		(0.0)			
<i>Non Tribal (8)</i>	865	415 (48.0)	317 (76.4)	98	0	165 (19.1)	227 (26.2)	0	15		
			(23.6)	(0.0)		(19.1)		(0.0)	(1.7)		
Total	1201	581 (48.4)	467 (80.4)*	114	0	208 (17.3)	386 (32.1)	0	26 (2.2)		
			(19.6)*	(0.0)*				(0.0)			
Dahod District#											
Jhalod	150	28	22	0	6	26	96	0	0		
Fatepura	96	72	67	0	5	0	24	0	0		
Dahod	85	0	0	0	0	30	55	0	0		
Garbada	34	0	0	0	0	19	15	0	0		
Dhanpur	90	0	0	0	0	6	84	0	0		
Limkheda	152	0	0	0	0	15	137	0	0		
Dev Bariya	86	0	0	0	0	3	83	0	0		
Total	693	100 (14.4)	89 (89.0)*	0 (0.0)*	11 (11.0)*	99 (14.3)	494 (71.3)	0	0 (0.0)		
			(5.7)*	(3.9)*		(18.2)		(0.3)			
<i>Central Gujarat Tribal All</i>	1735	280 (16.1)	253 (90.3)*	16	11	319	1007 (58.0)	6	166 (9.6)		

Source and Notes: Same as in Table 5. # All are tribal talukas

As one considers all the tribal talukas in the central Gujarat region, the scenario of drinking water provisioning in the villages is as disturbing as the same in the north Gujarat belt. Of the total 1735 tribal villages in the central Gujarat region, only 253 (about 15 per cent) villages have been accessing the RWSS. The high dependence on handpumps (58 per cent of the tribal villages in the region) reveals the unreliable nature of drinking water supply here as this exerts pressure on the declining groundwater tables in this region. Moreover, other alternative systems of drinking water have a limited presence in the central Gujarat region.

As presented in Table 7, the several districts in south Gujarat are no better off in terms of drinking water provisioning in the tribal villages. This is despite better rainfall and existence of perennial rivers in this region. In Bharuch district there are only two tribal talukas which are mainly covered by the individual pipe schemes and mini pipe schemes. Similarly, handpumps also serve over 20 per cent of villages. The presence of RWSS is practically negligible; this is attributable to the terrain and pattern of habitations in this region.

Like Bharuch, all the talukas in Narmada district have been classified with tribal status having a total of 552 villages. About 68 per cent of all the villages have been covered under the individual pipe schemes. Handpumps are found in 92 villages whereas 54 villages are covered by the mini pipe scheme. Only a small proportion (6 per cent) of villages has access to the RWSS. Assuming that every village has been covered under one scheme or the other, all the villages seem to have access to drinking water as provided by the state.

Table 7: Drinking Water Facility in Villages by Taluka, South Gujarat

Taluka	Number of Villages	Villages Covered under Different Drinking Water Schemes									
		Completed Regional Schemes				Villages covered under Individual Pipe Scheme			Villages covered under Open Well Scheme		Villages covered under Mini Pipe/ Other Scheme
		Covered villages	Villages accessing water	Villages not accessing water voluntarily	Villages where water has not reached	Villages covered under Individual Pipe Scheme	Villages covered under Handpump Scheme	Villages covered under Open Well Scheme	Villages covered under Mini Pipe/ Other Scheme		
Bharuch District											
Jhagadia	164	7	4	3	0	52	43	0	62	0	62
Valia	95	0	0	0	0	47	11	0	37	0	37
Tribal All	259	7 (2.7)	4 (57.1)*	3 (42.9)*	0 (0.0)*	99 (38.2)	54 (20.8)	0 (0.0)	99 (38.2)	0 (0.0)	99 (38.2)
Non Tribal (6)	398	287 (72.1)	144 (50.2)	147 (51.2)	0 (0.0)	93 (23.4)	8 (2.0)	0 (0.0)	10 (2.5)	0 (0.0)	10 (2.5)
Total	657	294 (44.7)	144 (49.0)*	150 (51.0)*	0 (0.0)*	192 (29.2)	62 (9.4)	0 (0.0)	109 (16.6)	0 (0.0)	109 (16.6)
Narmada District#											
Tilakwada	97	31	31	0	0	66	0	0	0	0	0
Nandod	196	0	0	0	0	166	13	0	17	0	17
Dediapada	166	0	0	0	0	74	65	0	27	0	27
Sagbara	93	2	2	0	0	67	14	0	10	0	10
Total	552	33 (6.0)	33 (100.0)*	0 (0.0)*	0 (0.0)*	373 (67.6)	92 (16.7)	0 (0.0)	54 (9.8)	0 (0.0)	54 (9.8)
Surat District											
Bardoli	82	0	0	0	0	74	8	0	0	0	0
Mangrol	91	16	9	7	0	53	18	0	4	0	4
Mandvi	134	6	6	0	0	64	30	0	34	0	34
Umarpada	63	0	0	0	0	43	11	0	7	0	7
Mahuva	69	0	0	0	0	60	9	0	0	0	0
Tribal All	439	22 (5.0)	22 (100.0)*	7 (31.8)*	0 (0.0)	294 (67.0)	76 (17.3)	0 (0.0)	45 (10.3)	0 (0.0)	45 (10.3)
Non Tribal (4)	283	129 (45.6)	92 (71.3)	30 (23.3)	0 (0.0)	154 (54.4)	0 (0.0)	0 (0.0)	2 (0.7)	0 (0.0)	2 (0.7)
Total	722	151 (20.9)	114 (75.5)*	37 (24.5)*	0 (0.0)*	448 (62.0)	76 (10.5)	0 (0.0)	47 (6.5)	0 (0.0)	47 (6.5)

contd...

Valsad District										
Dharampur	107	6	6	0	0	0	59	37	0	5
Umbergaon	50	40	40	0	0	0	10	0	0	0
Pardi	76	14	14	0	0	0	52	10	0	0
Kaprada	128	5	5	0	0	0	46	69	0	8
Tribal All	361	65 (18.0)	65 (100.0)*	0 (0.0)*	0 (0.0)*	0 (0.0)*	167 (46.3)	116 (32.1)	0 (0.0)	13 (3.6)
Non Tribal (1)	89	49 (55.0)	43 (87.8)	6 (12.2)	0 (0.0)	0 (0.0)	40 (44.9)	0 (0.0)	0 (0.0)	0 (0.0)
Total	450	114 (25.3)	108 (94.7)*	6 (5.3)*	0 (0.0)*	0 (0.0)*	207 (46.0)	116 (25.8)	0 (0.0)	13 (2.9)
Tapi District#										
Vyara	148	54	48	6	0	0	49	36	0	9
Valod	40	0	0	0	0	0	35	3	0	2
Songadh	167	0	0	0	0	0	84	70	0	13
Uchchhal	39	39	39	0	0	0	0	0	0	0
Nizar	51	45	39	6	0	0	6	0	0	0
Total	445	138 (31.0)	126 (91.3)*	12 (8.7)*	0 (0.0)*	0 (0.0)*	174 (39.1)	109 (24.5)	0 (0.0)	24 (5.4)
Navsari District										
Chikhli	87	13	12	1	0	0	67	7	0	0
Bansda	95	38	36	2	0	0	27	30	0	0
Tribal All	182	51 (28.0)	48 (94.1)*	3 (5.9)*	0 (0.0)*	0 (0.0)*	94 (51.6)	37 (20.3)	0 (0.0)	0 (0.0)
Non Tribal (3)	192	68 (35.4)	34 (50.0)	34 (50.0)	0 (0.0)	0 (0.0)	124 (64.6)	0 (0.0)	0 (0.0)	0 (0.0)
Total	374	119 (31.8)	82 (68.9)*	37 (31.1)*	0 (0.0)*	0 (0.0)*	218 (58.3)	37 (9.9)	0 (0.0)	0 (0.0)
Dangs District#										
Ahwa	311	112	112	0	0	0	137	6	35	21
Total	311	112 (36.0)	112 (100.0)*	0 (0.0)*	0 (0.0)*	0 (0.0)*	137 (44.1)	6 (1.9)	35 (11.3)	21 (6.8)
South Gujarat Tribal All	2549	428 (16.8)	410 (95.8)*	25 (5.8)*	0 (0.0)*	0 (0.0)*	1338 (52.5)	490 (19.2)	35 (1.4)	256 (10.0)

Source and Notes: Same as in Table 5. # All are tribal talukas

In Surat district 439 villages are spread in five tribal talukas. With the limited presence of RWSS and even mini pipe schemes, the dominant system of water provision in these villages is clearly the individual pipe schemes those cover over 67 per cent of villages in these talukas. It also appears that almost all villages have been provided with some scheme or the other for obtaining drinking water. Excepting for Valsad taluka, the other four talukas in Valsad district have tribal status and these have 361 villages. Here independent pipe scheme covers 46 per cent of villages while handpumps - the next important source - are found in about 32 per cent villages. Over 18 per cent of villages are covered by the RWSS. All the five talukas of Tapi district have tribal status and there are 445 villages in all. It appears that the water supply infrastructure in the district has been divided almost entirely divided between independent pipe schemes, RWSS and handpumps, covering about 39 per cent, 28 per cent and 25 per cent of the villages, respectively. Mini pipe schemes are found in about 5 per cent of villages.

Another south Gujarat district, Navsari has 182 tribal villages spread in two talukas. The main facility for providing drinking water in these tribal talukas has been the individual pipe schemes accounting for about 52 per cent of the villages. These are followed by RWSS and handpump schemes which together supplement to the water supply targets in the tribal talukas. The pattern is not very different at the district level as well.

Interestingly, the Dangs district is coterminous with the Ahwa taluka implying there is no second taluka in this entirely tribal taluka/district. As may be seen from the table individual pipe scheme and RWSS cover as much as 80 per cent of the total of 311 villages. It may be noted that this is probably the only taluka/district where 35 villages are covered under the open well scheme for drinking water purposes. Handpumps are hardly found in these villages although mini pipe scheme covers only about 7 per cent of villages.

Taking into account all the tribal villages in the south Gujarat region, it is surprising to note that even here just about 16 per cent (410 out of 2549) villages have been accessing drinking water through the RWSS. While about 53 per cent tribal villages were covered under the individual pipe scheme, only 19 per cent had access to handpumps.

Socio-economic Profile of Sample Households

Based on data collected through the village schedules on various infrastructure and amenities available, inter alia, the fairly good access to electricity in these villages is a matter to note. While schools at the primary and secondary level existed in most of these villages, health facilities through PHCs, in particular, were not quite commonly observed. The detailed survey of sample households brought out that across the talukas in all the regions (north, central and south) almost all respondents lived in their own houses. However, in terms of the type of these houses, in 11 talukas in both central and south Gujarat, at least three fourths of structures were kutcha; the occurrence was more pronounced in talukas such as Ahwa, Bansda, Nandod and Santrampur. Further, in 12 talukas, over three fourths of houses had mud as the floor material. As typically tribal homesteads are kept very clean the living environment in and around the dwellings remained hygienic. What is noteworthy is that in all talukas most (varying between 70 and 90 per cent) of the houses had electricity connection and, moreover, in most sample villages the supply of electricity was for above 12 hours in a day.

The population of villages, as expected, predominantly belonged to the Scheduled Tribes (STs) although in certain instances there were a good number of households from Scheduled Castes (SCs) and Other Backward Castes (OBCs). The sample households in the villages in Amirgadh and Danta in Banaskantha district had almost around 30 per cent of OBC families. Similarly in Ghoghamba (Panchmahals) over one fourth of the sample households belonged to OBCs and other social groups. In Jhalod and Fatepura, close to one fifth of sample households were SCs and OBCs. While Amirgadh had the lowest proportion (41 per cent) of ST households amongst those surveyed in the taluka, there were 15 talukas with above 90 per cent ST population. These numbers also suggest that the so-called 'tribal' villages have been accommodating various non-tribal social groups. The average household size ranged between 4.32 in Valia (Bharuch) to 6.63 in Danta (Banaskantha), although about 5 seemed to be the typical family size in these areas.

Land as an important income-earning asset often determines the socio-economic base of a tribal household. It is likely that the landholding size varies widely across regions and between households influencing the

livelihood options and economic capabilities available to the household members. In the sample households across the 23 tribal talukas, the incidence of landlessness was observable in all talukas except Vijaynagar. However, it was acute in Jhagadia, Valia and Bardoli where above 80 per cent of sample households did not possess land. In Mangrol (52 per cent) and Nandod (30 per cent) there were several landless households. In terms of the size of landholding, expectedly, notable variations existed between talukas, although the smaller size predominated. In most talukas, landholding size upto 2 acres accounted for above three-fourths of landed households; these talukas are Bhiloda, Vijaynagar, Santrampur, Ghoghamba, Jhalod, Bardoli, Umbergaon and Chikhli. Poor irrigation facilities in most part of tribal Gujarat could be exemplified through the fact that in at least 18 talukas (of the 23) less than 50 per cent of land was irrigated and, importantly, these included four talukas (Fatepura, Nandod, Dharampur and Ahwa) with less than 10 per cent land having access to any form of irrigation.

Possession of livestock by households in tribal areas remains an important source of livelihood security. Information was collected regarding the livestock resource through the household surveys in the 43 talukas. It was observed that there existed strong preference for both bovines and ruminants. Although the figures varied extensively across talukas and by animal, cows, buffaloes and bullocks were found in large proportion of households; this indicated the important role bovines played in the rural economy in the state. However, there were at least two talukas, namely, Umbergaon and Valia, where the share of households possessing bovine animals was amongst the lowest. Of the ruminants, goats seemed to be preferred over sheep and, particularly, in Danta, Jhalod, Fatepura and Bhiloda the proportion of households possessing them was high. Similarly, poultry was commonly found in many sample households although the share was high in Danta, Vyara, Ahwa, Valod and Valia. The possession of a variety of livestock and often in good number underlines the fact of additional requirement of potable water for their sustenance and productivity.

Given the resource endowments at both the household and natural contexts the major sources of household income are derived from the activities concerning land, livestock and other subsidiary and typically low-income occupations. Field information on the main categories of occupations in the sample households suggested that cultivation and farm labour dominated the occupation profile in almost all the talukas. The low incidence of non-

farm activities and also regular employment indicated the deeply agrarian nature of the local economies in these tribal talukas. This also acts a pointer to the increased dependence upon water, surface as well as underground, in these areas.

The income derived from the major forms of occupation, typically farm based, would depend upon the productivity as also prices. It is interesting to observe that the concentration of the average monthly per capita expenditure (MPCE) per sample household by taluka was around the range of Rs. 1111-5000. It may be underscored that the median MPCE is much above the rural MPCE for Gujarat state, the latest figure for which is Rs. 1110 (NSSO, 2011).

Sources and Pattern of Use of Potable Water

Of the various sources of water available in the tribal regions, for drinking and cooking purposes, sample households indicated a clear preference for dependence upon groundwater as drawn through tubewells, handpumps and open wells. These sources, arguably, exert tremendous pressure on the depleting reserve of the same. As per Table 8, talukas where above three-fourths of households depended upon tubewells, handpumps and wells numbered as high as 14 out of the 23 talukas.

Table 8: Sources of Water for Drinking and Cooking Purposes

Taluka	Source					
	1	2	3	4	5	6
Amirgadh	10 (16.4)	25 (41.0)	9 (14.8)	13 (21.3)	-	4 (6.6)
Danta	11 (18.3)	7 (11.7)	13 (21.7)	29 (48.3)	-	-
Bhiloda	-	-	49 (81.7)	11 (18.3)	-	-
Vijaynagar	1 (1.7)	-	36 (60.0)	23 (38.3)	-	-
Pavi Jetpur	2 (3.3)	7 (11.7)	38 (63.3)	13 (21.7)	-	-
Nasvadi	4 (6.6)	1 (1.6)	56 (91.8)	-	-	-
Santrampur	-	-	42 (70.0)	18 (30.0)	-	-
Ghoghamba	4 (6.6)	2 (3.3)	34 (55.7)	21 (34.4)	-	-
Jhalod	4 (6.7)	3 (5.0)	35 (58.3)	16 (26.7)	2 (3.3)	-
Fatepura	-	-	52 (86.7)	8 (13.3)	-	-
Jhagadia	3 (4.8)	6 (9.7)	30 (48.4)	6 (9.7)	-	17 (27.4)
Valia	4 (6.7)	5 (8.3)	41 (68.3)	1 (1.7)	-	9 (15.0)
Nandod	-	4 (6.7)	55 (91.7)	1 (1.7)	-	-
Tilakvada	-	-	59 (98.3)	1 (1.7)	-	-
Bardoli	17 (28.3)	22 (36.7)	12 (20.0)	9 (15.0)	-	-
Mangrol	3 (5.0)	17 (28.3)	40 (66.7)	-	-	-
Dharampur	3 (4.8)	9 (14.3)	15 (23.8)	32 (50.8)	4 (6.3)	-
Umbergaon	-	-	53 (91.4)	5 (8.6)	-	-
Vyara	9 (15.0)	8 (13.3)	39 (65.0)	4 (6.7)	-	-
Valod	-	11 (18.3)	46 (76.7)	3 (5.0)	-	-
Chikhli	3 (5.0)	6 (10.0)	33 (55.0)	18 (30.0)	-	-
Bansda	7 (11.7)	14 (23.3)	31 (51.7)	8 (13.3)	-	-
Ahwa	-	-	45 (36.6)	78 (63.4)	-	-

Source: Field Survey.

Notes: Figures in brackets are proportion to respective total sample households.

Codes for sources: Tap within house premises-1, Tap outside house premises/standpost-2, Tubewell/handpump-3, Well-4, Tank or pond-5, River-6

In fact, in talukas such as Bhiloda, Santrampur, Fatepura, Tilakvada, Umbergaon and Ahwa households entirely depended on these groundwater sources for their potable water needs. In a few talukas, where the RWSS or mini pipe schemes have been active or access to surface water is possible, households have diversified sources of drinking water. For instance, households in Bardoli (65 per cent), Amirgadh (57 per cent), Bansda (35 per cent) and Danta (30 per cent) depended to a considerable extent upon water supplied through taps or standposts for drinking and cooking purposes. Interestingly, in Jhagadia and Valia talukas 27 per cent and 15 per cent of sample households, respectively, indicated that they collected water

from the Narmada river to address their daily requirement of potable water. It may be mentioned here that water from the open/unprotected sources such as wells and river could be contaminated as the so-called 'protected' public sources which are ill-maintained or left unclean.

Functioning, Maintenance and Problems Concerning the Provisioning of Water

Major aspects of the provisioning, supply and access to drinking water as experienced by the sample households have been discussed in this subsection. These relate to the availability of water, functioning of the taps, quality of water and participation by the households in the governance of water supply at the village level.

Table 9 puts together a few aspects of the status of tap water connection to households. The substantial variation in the proportion of households with tap connection could be surmised by the finding that talukas such as Amirgadh (72 per cent) and Tilakvada (65 per cent) are well served compared to the talukas of Vijaynagar (nil) and Bhiloda (3 per cent) with practically no such facility available. It is, nevertheless, obvious that much of the provision of household tap connection in all the tribal talukas has been undertaken through government initiatives. However, irrespective of the poor coverage by tap connections, the actual use of the taps has been uneven across the talukas. In certain talukas, for instance, Bhiloda, Tilakvada, Umbergaon, Fatepura, Ahwa and Nandod either these were not in use at all or only a few houses used the taps. This calls for deeper enquiry as it is indicative of the inadequacy of the efforts *only* to provide households with taps through which water did not flow. The table further shows that in most cases availability of water was mostly for just about 2 hours a day; the somewhat better performance (over 12 hours a day) could be seen in Mangrol. With this information, it becomes clear that the drinking water supply through household tap connection has not only been limited in coverage, but also has delivered too little in terms of actual availability at the household level. This requires close examination and much greater efforts to ensure adequate potable water supply to households in these tribal talukas.

Table 9: Status of Tap Connection in Sample Households

Taluka	Connected with tap	State provided	Tap in Use	Regularity of Water Availability	
				Average days in week	Average hours per day
Amirgadh	44 (72.1)	33 (75.0)	33 (75.0)	6.76	1.31
Danta	19 (31.7)	19 (100.0)	18 (94.7)	6.33	0.98
Bhiloda	2 (3.3)	2 (100.0)	-	-	-
Vijaynagar	-	-	-	-	-
Pavi Jetpur	20 (33.3)	18 (90.0)	8 (40.0)	7.00	1.88
Nasvadi	8 (13.1)	8 (100.0)	8 (100.0)	5.50	2.62
Santrampur	5 (8.3)	3 (60.0)	-	-	-
Ghoghamba	6 (9.8)	6 (100.0)	6 (100.0)	7.00	1.50
Jhalod	10 (16.7)	9 (90.0)	7 (70.0)	3.29	1.29
Fatepura	7 (11.7)	5 (71.4)	-	-	-
Jhagadia	10 (15.9)	10 (100.0)	8 (80.0)	5.50	1.02
Valia	9 (15.0)	9 (100.0)	8 (88.9)	7.00	7.50
Nandod	31 (51.7)	25 (80.6)	6 (19.4)	7.00	2.33
Tilakvada	39 (65.0)	38 (97.4)	-	-	-
Bardoli	35 (58.3)	26 (74.3)	35 (100.0)	7.00	6.46
Mangrol	24 (40.0)	23 (95.8)	13 (54.2)	7.00	12.38
Dharampur	26 (41.3)	23 (88.5)	13 (50.0)	6.31	5.46
Umbergaon	16 (26.7)	16 (100.0)	-	-	-
Vyara	25 (41.7)	25 (100.0)	15 (60.0)	7.00	4.87
Valod	10 (16.7)	10 (100.0)	7 (70.0)	7.00	12.29
Chikhli	12 (20.0)	10 (83.3)	7 (58.3)	7.00	1.79
Bansda	31 (51.7)	30 (96.8)	21 (67.7)	6.57	1.71
Ahwa	43 (35.0)	40 (93.0)	2 (4.7)	4.50	2.00

Source: Field Survey.

Note: Figures in parentheses are percentages to the respective total number of sample households.

With the unreliable and inadequate tap water supply even during the normal months of the year, the excessive dependence upon groundwater for much of the drinking and domestic water requirements in almost all talukas has also implied that during summer months the scarcity of water would be acute. In fact, as respondents reported, all the talukas had been suffering decline in water tables particularly during the summer period. Apart from deficit in water for human consumption, water for the livestock had been scarce and caused much difficulty for their health and survival. The additional problem of frequent power failure during summer also adversely affected chances of withdrawing groundwater as required.

As regards the quality of water most respondents, excepting in Tilakvada and Vyara, perceived it to be potable so that it could be used for drinking, cooking and other domestic purposes. However, as is well known the quality of water can only be tested through scientific processes and human perception could be severely misleading.

With the general view that water for drinking was of good quality most respondents were convinced that the water would not be a cause of ailments of any sorts; this proportion of households with favourable opinion remained high varying between 83 and 98 per cent. However, a few respondents across the 23 talukas did refer to the water leading to such ailments as kidney stone, diarrhoea, vomiting, joint pain and even fever.

Awareness about Alternative Sources and Participation in Decision Making

With concerns remaining about overexploitation of groundwater for drinking and domestic uses, it was important to obtain an idea regarding if the residents had awareness about the potential of alternative sources of water which would not only save the groundwater but also be possible to be collected and preserved to tide over the shortage at least during the summer phase. It was surprising that only a few respondents in certain talukas had heard of or generally known of traditional water harvesting systems (TWHS) as a potential local source of water. Talukas where above one fourth of respondents knew of TWHS included Danta, Dharampur, Bansda and Nasvadi. However, as one enquired if respondents also were aware about the benefits of TWHS the positive responses thinned. It is important to recognize here that TWHS as an alternative or as a dependable supplementary source of water for domestic use has hardly found a mention in state initiatives in ensuring drinking water security in these tribal talukas, some of which, in fact, receive good rainfall.

Even as it is amply clear that the drinking water situation in the villages of these tribal talukas has been far from satisfactory, questions were asked regarding the nature and extent of participation of villagers in the local decision making process. On being asked if they *attended* the Gram Sabhas - the much-hailed forum for democratic and collective information sharing and decision making – a fairly large proportion of respondents replied in the negative. The most cited reasons for not attending Gram Sabhas were the following: i. Unavailable due to work or illness; ii. Not informed by the

Gram Panchayat; and iii. Migration for work. Further, those who attended were asked about their role and nature of participation in Gram Sabhas in matters related to drinking water. As the responses made it clear, Gram Sabhas *per se* had not been facilitating healthy participation in decision making processes. The fact that many felt left out and marginalized so as not to participate in the decision making process in matters relating to drinking water mere attending the Gram Sabha was meaningless. As was the case, the panchayat members and the sarpanch had the final word and dominated such supposedly 'democratic' meetings. The governance deficit at the local level is a disturbing aspect as it curtails options for contributions to policy as well as considering efficient and workable alternatives in augmenting the availability of potable water.

Hygienic Practices

Beyond the issues in availability of water for domestic use awareness about and perusal of hygienic practices have been considered important to ensure a healthy lifestyle. Water remains one of the vital elements in conducting hygienic practices at both the personal and household level. In order to obtain an idea about the hygienic practices followed concerning food and drinking water a set of questions was asked during the household surveys. Almost all sample households across the 23 talukas stated that cooked food was kept covered almost as a common practice at the household. Similarly, use of a filter device to draw clean potable water was reported by most households in all talukas with a somewhat lower proportion noted in Umbergaon, Amirgadh and Vyara. However, it is the method of drawing water from the storage vessel that has implications for the cleanliness and contamination of the water. In the survey, it was observed that a large proportion of households in almost all the talukas had the practice of drawing water dipping a vessel which was also used for drinking. This suggests a greater need for undertaking activities in imparting information, education and communication (IEC) towards following better hygienic practices for the villagers.

An area of gross neglect in matters of maintaining a hygienic living environment in the villages relate to the manner of disposal of solid and liquid waste. Given that very little attention has been paid to this dimension by the state, both in terms of creating facilities exclusively meant for this purpose and even generating awareness amongst the local community to

use those, indiscriminate waste disposal practices are common experiences in rural areas all over the state, not just confined to the tribal talukas. As the survey revealed, the most commonly reported practice of disposal of solid waste was dumping in the courtyard. This indicates that hardly any facility of common dumping was available in these villages where panchayats did not appear to have addressed this issue at all. The manner of disposal of waste could be a potential source of diseases and unhygienic living environment.

The scenario is no better when one looks at the manner of disposal of liquid waste by the sample households across the 23 tribal talukas. The dominant practice, immensely unhygienic, indicated was throwing the waste on the street. In certain cases where the homestead was closer to farms liquid waste was made to flow there.

Even the limited discussion on the data collected on hygienic practices affirms the poor living environment in the survey areas. Inaction by the local state in addressing issues in IEC for healthier sanitation practices as well as safe disposal of solid and liquid waste could be pointed out as a key factor in perpetuating the risk of diseases and morbidity in the tribal talukas.

Functioning of and Views on Water Supply Schemes in Villages

As has been made clear in the previous chapters, the schemes concerning drinking water as designed under the VKY were often indistinguishable from the existing systems or infrastructure. Hence, a series of questions asked about the general awareness about aspects of the drinking water schemes and even opinion about their performance and improvement elicited responses those were *likely* to be concerning the schemes under the VKY; however, in the absence of adequate information forthcoming from the official sources this was the best that could be done.

Awareness about Schemes and Their Functioning: As was surmised from the detailed data collected regarding the awareness of schemes and their functioning, the proportion of respondents knowing that their village and/or household has been served by a state provision of drinking water varied between about 97 per cent in Nasvadi and merely 17 per cent in Bhiloda. This affirmed that the drinking water component under the VKY had not received adequate attention by the villagers. It could be that the initiatives

could be no different from the usual efforts made through the GWSSB or WASMO.

Respondents' knowledge, even of a basic nature, regarding the technical aspects of the water supply provision was important to note as that would reflect the efforts made by the concerned government functionaries to familiarize local inhabitants about the possible solutions to handling any minor problems in the system, be it non-functioning of a handpump or leakage in a pipe or broken washers. In certain talukas (as represented by the sample villages) a large proportion of households was familiar with the basic techniques/steps of sorting out a problem with the available drinking water supply infrastructure. For instance, in talukas as Amirgadh, Valia, Tilakwada and Vyara more than 80 per cent of sample respondents stated to have been familiar with the technical aspects of the drinking water schemes. However, in talukas such as Bhiloda (12 per cent) and Fatepura (20 per cent) the awareness level was very low. This points to the poor or no efforts were made to ensure a meaningful participation of the local community in the process of implementing the drinking water schemes/programmes.

The practice of paying water charges was not quite common in the survey areas. While at one level many respondents were not even aware that a certain water tariff needed to be paid for the use of public facilities many others had not paid the same for several years. The proportion of respondents having some idea about or actually paid such tariff was generally low across the sample talukas. Importantly, the proportion was below even 10 per cent in Bhiloda, Vijaynagar, Santrampur, Jhagadia, Mangrol, Umbergaon, Vyara, Valod, Chikhli and Bansda. Even when water charges were reported to have been paid, mostly those related to use of handpumps. It needs to be emphasized that the payment shown under handpumps related to shared bearing of costs of repair and maintenance as and when the contraption had failed. These payments were made collectively and on voluntary basis and have no reference to formal water tariffs as levied by the state. Practically no attention has been paid regarding the collection of water charges as was originally planned under the VKY.

Quite similar to the respondents limited involvement in the payment of water charges, there was practically very little awareness amongst the sample households regarding the stages of implementation, including contributions

(financial and/or labour, depending upon the system in question) to be made towards using drinking water systems, especially, that under the sector reforms or Swajaldhara (SRS) programme. However, the survey data revealed that most respondents did not have an idea regarding such methods/processes of implementation, which was often construed under the demand driven systems at least, as reflecting popular participation in the use and maintenance of drinking water infrastructure set up in the villages. However, only in case of handpumps, there appeared to be some degree of awareness by a relatively large proportion of sample households in a few talukas, namely, Bhiloda, Nasvadi and Fatepura.

When it comes to community participation in maintaining the drinking water supply infrastructure the responses indicating responsibility taken up by sample households presents a mixed picture. While the proportion of responsible respondents was as high as over 95 per cent in talukas as Nasvadi, Tilakvada and Nandod, in Bhiloda the proportion was less than 17 per cent. However, as handpumps remained the ubiquitous source of drinking water in tribal areas popular concern regarding the maintenance, repair and overall upkeep of the systems could be observed.

Users Perspectives on the Schemes: Questions regarding respondents' views about the major aspects of functioning of the drinking water schemes and infrastructure were asked in order to elicit a realistic assessment of the users at the village level. As may be seen in Table 10, respondents had expressed their opinion regarding issues in execution of the schemes, quality of work and utilization of funds for the same.

Table 10: Respondents' Opinion about Aspects of Functioning of the Drinking Water Schemes

Taluka	Response	Execution				Quality of Work				Fund Utilization			
		1	2	3	4	1	2	3	4	1	2	3	4
Amirgadh	54 (88.5)	41 (75.9)	3 (5.6)	10 (18.5)	-	10 (18.5)	30 (55.6)	6 (11.1)	8 (14.8)	12 (22.2)	32 (59.3)	10 (18.5)	-
Danta	34 (56.7)	34 (100.0)	-	-	-	27 (79.4)	-	-	7 (20.6)	3 (8.8)	28 (82.4)	3 (8.8)	-
Bhiloda	10 (16.7)	10 (100.0)	-	-	-	9 (90.0)	-	-	1 (10.0)	4 (40.0)	6 (60.0)	-	-
Vijaynagar	19 (31.7)	18 (94.7)	1 (5.3)	-	1 (5.3)	18 (94.7)	-	-	-	2 (10.5)	16 (84.2)	1 (5.3)	-
Pavi Jelepuri	51 (85.0)	49 (96.1)	-	2 (3.9)	2 (3.9)	47 (92.2)	1 (2.0)	1 (2.0)	1 (2.0)	4 (7.8)	32 (62.7)	12 (23.5)	3 (5.9)
Nasvadi	60 (98.4)	57 (95.0)	-	3 (5.0)	3 (5.0)	54 (90.0)	2 (3.3)	1 (1.7)	1 (1.7)	5 (8.3)	54 (90.0)	-	1 (1.7)
Santrampur	34 (56.7)	33 (97.1)	-	1 (2.9)	-	29 (85.3)	-	5 (14.7)	2 (5.9)	2 (5.9)	24 (70.6)	8 (23.5)	-
Ghoghamba	45 (73.8)	37 (82.2)	-	4 (8.9)	4 (8.9)	40 (88.9)	-	1 (2.2)	8 (17.8)	25 (55.6)	11 (24.4)	1 (2.2)	-
Jhalod	47 (78.3)	47 (100.0)	-	-	-	47 (100.0)	-	-	-	2 (4.3)	17 (36.2)	28 (59.6)	-
Fatepura	47 (78.3)	45 (95.7)	1 (2.1)	1 (2.1)	2 (4.3)	38 (80.9)	-	7 (14.9)	7 (14.9)	7 (14.9)	28 (59.6)	12 (25.5)	-
Jhagadia	30 (47.6)	30 (100.0)	-	-	-	27 (90.0)	-	3 (10.0)	-	-	26 (86.7)	4 (13.3)	-
Valia	51 (85.0)	50 (98.0)	-	1 (2.0)	-	49 (96.1)	1 (2.0)	1 (2.0)	1 (2.0)	-	41 (80.4)	9 (17.6)	1 (2.0)
Nandod	58 (96.7)	54 (93.1)	1 (1.7)	3 (5.2)	8 (13.8)	43 (74.1)	-	7 (12.1)	3 (5.2)	3 (5.2)	55 (94.8)	-	-
Tilakvada	59 (98.3)	57 (96.6)	1 (1.7)	1 (1.7)	1 (1.7)	57 (96.6)	-	1 (1.7)	1 (1.7)	2 (3.4)	53 (89.8)	1 (1.7)	3 (5.1)
Bardoli	46 (76.7)	46 (100.0)	-	-	-	46 (100.0)	-	-	-	3 (6.5)	18 (39.1)	25 (54.3)	-
Mangrol	55 (91.7)	52 (94.5)	3 (5.5)	-	-	52 (94.5)	2 (3.6)	1 (1.8)	2 (3.6)	2 (3.6)	39 (70.9)	14 (25.5)	-
Dharampur	31 (49.2)	24 (77.4)	1 (3.2)	-	6 (19.4)	25 (80.6)	-	6 (19.4)	9 (29.0)	17 (54.8)	5 (16.1)	-	-
Umbergaon	41 (68.3)	34 (82.9)	6 (14.6)	-	1 (2.4)	34 (82.9)	5 (12.2)	-	-	19 (46.3)	18 (43.9)	2 (4.9)	2 (4.9)
Vyara	50 (83.3)	48 (96.0)	2 (4.0)	-	2 (4.0)	45 (90.0)	3 (6.0)	-	-	7 (14.0)	34 (68.0)	9 (18.0)	-
Valod	53 (88.3)	52 (98.1)	1 (1.9)	-	3 (5.7)	47 (88.7)	2 (3.8)	1 (1.9)	1 (1.9)	13 (24.5)	35 (66.0)	5 (9.4)	-
Chikhli	36 (60.0)	34 (94.4)	1 (2.8)	-	1 (2.8)	26 (72.2)	-	-	-	14 (38.9)	15 (41.7)	5 (13.9)	2 (5.6)
Bansda	37 (61.7)	33 (89.2)	3 (8.1)	1 (2.7)	1 (2.7)	34 (91.9)	-	2 (5.4)	9 (24.3)	27 (73.0)	1 (2.7)	-	-
Ahwa	78 (63.4)	75 (96.2)	1 (1.3)	2 (2.6)	-	57 (73.1)	-	5 (6.4)	30 (38.5)	40 (51.3)	4 (5.1)	4 (5.1)	-

Source: Field Survey.

Codes: Execution: Good-1, Do not know-2, Average-3, Poor-4

Quality of Work: Bad-1, Good-2, Do not know-3, Average-4

Fund Utilization: Aware of GWSSB-1, Do not know-2, Aware that Gram Panchayat manages-3, Aware that Taluka Panchayat manages-4

So far as execution of the schemes is concerned the overwhelming response has been positive indicating popular satisfaction over the schemes. While largely favourable response had come forth about their views on the overall quality of work, a few respondents did refer to the deficiencies in the quality of work. These included irregularities in the supply of water, leakages in the water tanks fallen into disrepair, pipelines not connected to the tanks built two years back, defunct motors and broken platforms for handpumps. In certain instances, the respondents felt that these could partly be due to the incompetence of the contractors whom the work was given and also because of the irresponsiveness of functionaries of the local offices in attending to complaints regarding the drinking water infrastructure as problems in handpumps, motors, pipelines or tanks.

However, their knowledge and opinion about fund utilization might not be a reliable basis to judge the efficiency of financial aspects of the schemes. In fact, as may be observed from the responses, in a large number of cases across the talukas, respondents did not have any information about the manner and extent of utilization of funds. Only in certain talukas, for instance, Jhalod and Bardoli, a larger proportion of respondents was aware that the funds for the drinking water schemes were routed through and managed by the gram panchayat. If transparency at the local level was a concern, then there was the need to revamp the information system that could be accessed by the villagers openly and without restrictions of any kind.

An overall impression about the current position of drinking water supply in sample villages could be had from Table 11. As regards the adequacy of water available the proportion of respondents expressing satisfaction varied widely across talukas. However, talukas where only less than one-third of respondents did find the supply adequate were Bhiloda and Vijaynagar. There were seven talukas where over half the respondents reported the availability of water below their minimum requirements. As far as regularity in water supply was concerned the situation appeared better in nine talukas where more than three-fourth of respondents had no issues about the timing of water supply. However, talukas where irregular supply was a serious concern were Bhiloda, Vijaynagar, Dharampur and Ahwa. Responses to the question of access to drinking water varied across talukas although Bhiloda and Vijaynagar emerged as facing a crisis-like situation. Perceptions about the quality of water suggested that most respondents agreed that the water supplied was of good potable quality. However, in the absence of chemical and bacteriological tests of water it would be difficult to establish its quality.

Table 11: Views Regarding Current Position of Drinking Water Supply in Sample Villages

Taluka	Adequacy	Timeliness	Access	Quality				
				1	2	3	4	5
Amingadh	46 (75.4)	45 (73.8)	47 (77.0)	50 (82.0)	-	-	4 (6.6)	-
Danta	28 (46.7)	27 (45.0)	27 (45.0)	32 (53.3)	-	-	2 (3.3)	-
Bhiloda	10 (16.7)	10 (16.7)	10 (16.7)	10 (16.7)	-	-	-	-
Vijaynagar	16 (26.7)	16 (26.7)	16 (26.7)	15 (25.0)	1 (1.7)	-	-	1 (1.7)
Pavi Jetpur	48 (80.0)	44 (73.3)	43 (71.7)	48 (80.0)	1 (1.7)	2 (3.3)	-	-
Nasvadi	60 (98.4)	60 (98.4)	58 (95.1)	60 (98.4)	-	-	1 (1.6)	-
Santrampur	29 (48.3)	30 (50.0)	29 (48.3)	33 (55.0)	1 (1.7)	-	-	-
Ghoghamba	39 (63.9)	38 (62.3)	38 (62.3)	39 (63.9)	1 (1.6)	1 (1.6)	1 (1.6)	1 (1.6)
Jhalod	42 (70.0)	44 (73.3)	42 (70.0)	43 (71.7)	1 (1.7)	3 (5.0)	-	-
Fatepura	45 (75.0)	46 (76.7)	46 (76.7)	46 (76.7)	-	1 (1.7)	-	-
Jhagadia	28 (44.4)	28 (44.4)	29 (46.0)	30 (47.6)	-	-	-	-
Valia	50 (83.3)	50 (83.3)	50 (83.3)	48 (80.0)	-	2 (3.3)	-	1 (1.7)
Nandod	56 (93.3)	56 (93.3)	56 (93.3)	59 (98.3)	-	-	-	-
Tilakvada	56 (93.3)	56 (93.3)	55 (91.7)	58 (96.7)	-	1 (1.7)	-	-
Bardoli	46 (76.7)	46 (76.7)	46 (76.7)	45 (75.0)	1 (1.7)	-	-	-
Mangrol	52 (86.7)	52 (86.7)	52 (86.7)	54 (90.0)	-	-	1 (1.7)	-
Dharampur	24 (38.1)	24 (38.1)	24 (38.1)	24 (38.1)	-	-	3 (4.8)	-
Umbergaon	36 (60.0)	36 (60.0)	36 (60.0)	36 (60.0)	1 (1.7)	4 (6.7)	-	-
Vyara	46 (76.7)	46 (76.7)	45 (75.0)	47 (78.3)	2 (3.3)	1 (1.7)	-	-
Valod	53 (88.3)	53 (88.3)	53 (88.3)	53 (88.3)	-	-	-	-
Chikhli	36 (60.0)	36 (60.0)	36 (60.0)	36 (60.0)	-	-	-	-
Bansda	34 (56.7)	33 (55.0)	33 (55.0)	36 (60.0)	-	1 (1.7)	-	-
Ahwa	41 (33.3)	42 (34.1)	40 (32.5)	69 (56.1)	-	5 (4.1)	-	-

Source: Field Survey.

Codes: Human drinking, cooking and domestic use-1, Domestic use other than drinking and cooking-2, Unsuitable for any purpose-3, Do not know because no supply of water till today-4, Water from handpump has iron content -5.

Soliciting popular suggestions towards improving drinking water supply in tribal areas yielded pursuing two main actions. One, efforts to provide water on a regular basis and reducing wastage through vigilance were considered an important step in addressing the drinking water problem in the talukas. The other major suggestion was about meticulous collection of people's contribution and depositing the amount with the gram panchayat. The fund thus collected could be of use in the smooth administration of the drinking water schemes.

Concluding Observations

The central objective of this study had been to examine the status, functioning and constraints facing policy initiatives in broad-basing access to safe drinking water amongst the tribal regions of Gujarat. Even as the state government efforts at provisioning drinking water in all parts, that eventually covered the tribal tracts, have existed, under the Eleventh Plan, the TDD designed and initiated the VKY for the tribal population to launch a series of special policy measures including those concerning drinking water supply. The initiatives took recourse to the four distinct schemes, namely, the RWSS, mini piped water scheme, the handpumps and those under the sector reforms or Swajaldhara programme.

In terms of basic infrastructure in the tribal areas the ownership of homestead, access to electricity, approach roads and schools by a large number of inhabitants was a positive feature of these regions. However, in the entire tribal belt as spread in the northern, central and southern regions of the state, the RWSS and individual pipe schemes were accessed by about 15 per cent and 35 per cent of the villages, respectively. Handpumps remained the major source of drinking water in about 37 per cent of total villages. If one considers the three specific schemes, namely, handpumps, individual pipe scheme and mini pipe water scheme these account for over 80 per cent of all tribal villages in the north, central and south regions, in terms of provisioning drinking water supply. It is important to note that all these depend significantly on the groundwater.

As has been consistently recognised, the crucial challenge facing the state efforts at broad-basing access to drinking water remains the governance of groundwater. While geo-hydrological factors could, uncritically, be shown as hindrances to drinking water access across space in the tribal areas, management of available resources in terms of conserving and enhancing supply has been a serious concern. It is well recognized that excessive dependence upon groundwater has implications for sustainability of energy resources as also cost. That both the supply and demand driven approaches have hardly invested efforts towards conservation of water - as through promoting/rejuvenating and modernizing (through scientific means, where required) water harvesting systems - remains a vital issue for policy attention in tribal areas.

The other issue that merits immediate attention is the role of local institutions in contributing to the decision-making processes in drinking water related infrastructure and distribution approaches. The fact that there was very little participation by the local inhabitants of the villages in fora such as Pani Samitis and Gram Sabhas while discussing drinking water problems (and solutions) there is a definite need to review the processes of designing and implementing drinking water schemes in tribal regions. Much needs to be done in addressing the institutional lacunae in ensuring popular participation in all matters concerning drinking water provisioning and access.

Another dimension of drinking water provisioning relates to the dimension of water quality, which, as the field surveys laid bare, had received the least attention in such state interventions. In the absence of scientific testing (both chemical and bacteriological tests) of water supplied popular opinion cannot be accepted as the base to determine the potability of water. This calls for intensive policy efforts at setting up water quality testing facilities in the regions in question and also to ensure that the local people have the wherewithal to actually access the service.

There had been problems regarding group panchayats being a reason for certain villages (away from the village where the panchayat is located) failing to register their voice concerning several constraints facing availability and quality of drinking water. Moreover, within a village, secondary habitations also faced similar challenges as, typically, much of the policy action in drinking water would take place in the main village.

A particularly confounding aspect of the drinking water provisioning in tribal areas relates to the lack of clarity in the role and responsibility of at least the three agencies of the state, namely, the GWSSB, WASMO and TDD. Little systematic data are available even to show the list of villages in these tribal areas where drinking water schemes have been implemented under the VKY 10-point programme. Despite claims of transparency and efficiency, it was near impossible to obtain village wise and scheme wise financial information as the TDD, the originator of the VKY, did not possess relevant data on these. It is unclear as to the overlapping of the drinking water schemes in these villages and calls for scrutiny of claims of achievement.

It may be underscored that the governance of the drinking water under the VKY needs to be closely examined before arriving at any definitive view regarding its success or otherwise. It would be premature to speak of replicability of this as a 'model' elsewhere in India.

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The major areas of research at the Institute are the following:

1. Natural Resources Management, Agriculture and Climate Change

Research under this area concerns the broad realm of environment and development. Studies have focused on economic viability, equity, environmental impact assessment and institutional mechanisms. Issues in common property land resources, land use and water harvesting have been researched extensively. Implications of climate change risks for Asia and the adaptation and mitigation strategies at the local levels have begun to be studied.

2. Industry, Infrastructure and Trade

The main themes include policy dimensions concerning the micro, small and medium enterprises, industrial clusters and intellectual property rights. Studies on basic infrastructure and linkages between infrastructure and regional growth have also been carried out. Trade and development and finance are new areas of interest.

3. Employment, Migration and Urbanisation

Studies under this theme relate to employment, labour, diversification of economic activities and migration. International migration has emerged as an additional theme along with urban services and aspects of urban economy and governance.

4. Poverty and Human Development

Issues examined include access, achievement and financing of education and health sectors. Studies on poverty relate to conceptual and measurement aspects, quality of life, livelihood options and social infrastructure. There is an increasing interest in understanding urban poverty, rural-urban linkages and issues in microfinance.

5. Regional Development, Institutions and Governance

Recent studies enquire into regional underdevelopment and the dynamics of local level institutions. Tribal area development mainly relating to livelihood promotion and human resource development has been a focus area. Recent analyses have also looked into Panchayati Raj Institutions, Forest Rights Act, MGNREGA and Right to Education Act.

Much of the research informs national and regional policies. The Institute also undertakes collaborative research and has a network with governments, academic institutions, international organisations and NGOs. A foray into specialized training and doctoral programme has just been made.



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