

# A case study of Financial Performance Indicators and Critical Evaluation of Regional Rural Water Supply Scheme of Gadhada in Gujarat state Dr. Sapna S. Patel\*

#### Abstract:

Historically, drinking water supply in the rural areas in Gujarat has been outside the Government's sphere of influence. Community- managed open wells, private wells; ponds have often been the main traditional sources of rural drinking water. Government of India's effective role in rural drinking water supply sector started in 1972-73 with the launch of Accelerated Rural Water Supply Program (ARSWP). With the passage of time, the program was modified in 2009-10 and re-named as National Rural Drinking Water Programme with the national goal to provide every rural person with adequate safe water for drinking, cooking and other domestic basic needs on sustainable basis. The program has now been modified with major emphasis on ensuring sustainability of water availability in terms of potability, adequacy, convenience, affordability and equity while also adopting decentralized approach involving Panchayati Raj Institutions (PRIs) and community organisation.

This response received based on primary data collection on administering the questionnaire. The criteria used for the selection of these sampled villages and respondents were: the residents of the head, middle and tail end of the water supply scheme. The geographical coverage should be representative of the schemes. Based on these criteria of geographical region for a given scheme, the sample village list was prepared which fulfilled the criteria. From the sample villages, households were selected with a predetermined sample size for each village which was arrived at on the basis of the village population. A total of 479 households were selected for the interview in 12 villages under regional water supply scheme.

#### **INTRODUCTION:**

The State of Gujarat with a population of 6.04 crores (year 2011) is situated on the West Coast of India and has a geographical area of 1,96,000 sq. km (19.6 M. ha)<sup>1</sup>. The State has many geographical advantages, viz. 1,600 km long coastline, varied climatic conditions, highly skilled people, e.g. farmer, lively entrepreneurs and great diversity. In spite of these advantages, Gujarat is prone to disasters such as drought, cyclones, and earthquake situations. Gujarat state has common border with Rajasthan, Madhya Pradesh and Maharashtra states in North, East and South respectively and with Pakistan in the North West. For administrative purpose state has been divided into 26 District and 225 Talukas<sup>2</sup>.

<sup>\*</sup>Dr. Sapna S. Patel, Assistant Professor, M.K.Amin Arts & Science College and College of Commerce, Padra



Low and erratic rainfall results into scarcity of water in two- third area of the State. The average annual rainfall, confined to three months of the monsoon season, is 760 mm, which is highly variable both in space and time, the southern part receiving 2,500 mm of

rainfall while the northern portion including Kutch and the Saurashtra peninsula receiving rainfall of 300 to 450 mm<sup>3</sup>. Intra-state rivers are small with very low and highly variable flows. Every third year is a drought year in Saurashtra, North Gujarat and Kutch region. Monsoon waters are required to be stored in reservoirs for use in the lean nine months of the year. The limited utilizable ground water has been over exploited over the past 3 to 4 decades and ground water tables are presently depleting rapidly by as much as 3 meters every year in North Gujarat and Kutch regions. In addition, due to the long coastline and two gulfs, the state is faced with ingress of salinity, which results in water quality problem due to high salinity. The ground water in many areas contains harmful proportions of fluorides and nitrates and about 7,675 habitations in the state are facing water quality problems in terms of high fluoride, nitrate and salinity<sup>4</sup>.



#### Figure 1 Rivers of Gujarat

<sup>(</sup>Source: Patel M.S, 2007)



#### **Drinking Water Scenario of Gujarat**

Availability of water varies from region to region within the State. North Gujarat, Saurashtra and Kutch face water scarcity. Per capita fresh water availability is about 1,137 cubic meters per person per annum as against the national average of 1,878 cubic meters. Twenty six years were declared as drought years in the past 75 years. Annually, State Government spends about ₹125 to ₹150 crore on making emergency arrangement of drinking water to tide over the scarcity. People also spend about ₹700 to ₹800 crore on water and the social cost of paucity of water is estimated to be ₹2000 crore per annum. 74% percent of the present drinking water supply is being drawn from the ground water resources<sup>5</sup>.

Availability of safe and assured drinking water in adequate quantity to rural people has been the priority of the State Government. As per instruction of the Government of India a survey was conducted in the year 2003-2004, total 34,845 habitations are found in the State in which 9,628 habitations are found re-emerged into NC (Not Covered-166) and PC (Partially Covered-9,462) category, including 7,675 quality problem (Fluoride- 4,187, Salinity- 2,508, Nitrate- 1,335, Others- 26, Odour -3, Repeated- 384) habitations. Failing rains, poor recharge and excess withdrawal makes the sources and system defunct<sup>6</sup>.

In Gujarat, the per capita water availability is considerably low and is likely to go down further by 2015. Therefore, the state needs to focus on the effective planning and management of its water resources. Urban water needs being higher than that in the rural areas and Gujarat being an urbanized state, the demand and supply ratio may get skewed in the future according to the government's own estimate<sup>7</sup>.



Graph 1 Water Availability in Gujarat

<sup>(</sup>Source: Mehta K, 2013)



Graph 1 clearly indicates that the state's per capita water availability in 2001 was 990 m<sup>3</sup>/annum against the country's 1,901 m<sup>3</sup>/annum. This is already considered as chronic water scarcity. The per capita water availability is estimated to go down to 738 m<sup>3</sup>/ annum by 2015 and 601 m<sup>3</sup>/ annum by 2025. In the current era, the per capita availability of water in north Gujarat, Saurashtra, Kutch, South and Central Gujarat is 343, 540, 730 and 1,880 m<sup>3</sup>/annum respectively (as per 2001 estimate, Department of Irrigation, Gujarat state)<sup>7</sup>.

According to the latest estimate by the state irrigation department, the annual availability of utilizable water resources in the state is about 50.10 billion cubic meters, out of which 38.10 billion cubic meters is surface water. The rest, i.e. 12 billion cubic meters, is available as ground water. As the average per capita availability of water in the state stands at around 900 cubic meters, Gujarat falls in the category of states facing water scarcity as per the norms laid by the UN. In the UN, there are 36 water scarce countries, in India, 22 states face water scarcity and in Gujarat, 10 districts are water scarce.<sup>7</sup>

#### **OBJECTIVES OF THE STUDY**

- 1. To examine reasons of satisfaction and dissatisfaction for Government water sources if any, between different scheme and geographical region.
- 2. To examine the proportion of respondents paying water charges for scheme, regions and economic activities.
- 3. To examine the proportion of respondents paying water connection charges for scheme, geographical region and economic activities.
- 4. To examine the proportion of respondents about affordability for water charges for scheme, geographical region and economic activities.
- 5. To examine the proportion of respondents satisfied about the 'water supply' and 'water charges' for scheme, geographical regions and economic activities.



6. To examine the proportion of respondents disagreeing to the payment of water charges for scheme, geographic regions and economic activities.

#### **Sample Selection Based on Population**

Sample selection was based on population wise distribution of villages of the scheme.

		Gadha	ada RRW	SS: Bhavna	agar	
Populatio n	Number of villages	Percen tage	Sampl ed HHs	Percent age	Total Actual Responde nts	Percenta ge
≤1000	4	33.33	30	25.00	120	25.05
1001 – 3000 –	4	33.33	40	33.33	159	33.19
>3000	4	33.33	50	41.67	200	41.75
Total	12	100	120	100	479	100

Table	•1	Population	wise	Distribution	of Sam	nled HHs	for	Gadhada	Scheme
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(Source: Prepared from responses)

#### Sample Selection Based on Geographical Region

Over and above population of villages sample selection was also based on geographical region.

			-	0				
Population	Head	Percentag e	Middle	Percentag e	Tail	Percentag e	Total	Percentag e
		Gadha	ada RR'	WSS : Bha	vnaga	ır		
$\leq 1000$	3	100	1	25.00	0	0.00	4	33.33
1001 -3000	0	0.00	2	50.00	2	40.00	4	33.33
>3000	0	0.00	1	25.00	3	60.00	4	33.34
Total	3	100	4	100	5	100	12	100

**Table: 2** Distribution of Sampled Villages Based on Geographical Region

(Source: Prepared from responses)

Table 1 and 2 describe the population wise distribution of sampled HHs and distribution of sampled villages based on geographical region of the RRWSS.

In the beneficiaries of the Gadhada RRWSS in Bhavnagar number of households selected for interviews was 479. As above, households were selected from all the sampled villages i.e. 30 households from the villages having a population of less than1000 (4



villages), 40 households from those villages having population between 1001 and 3000 (4 villages) and 50 households from the villages having a population of more than 3000 (4 villages). It is observed that the highest percentage is 41.75% of respondents are from villages having population greater than 3000. Three of the sampled villages lie in the head region of the water supply scheme; four are in middle while five villages have been selected from the tail end of the scheme. It is observed that almost the same percentages of villages (33.33%) are selected for all 3 population slots.

#### Taluka wise Distribution of Sample Households

Taluka wise distribution of sampled households for selected RRWSS is presented.

Taluka	Total No. of Villages	Percentag e	No. of Sampled Villages	Percentage	Sampled Responden ts	Percentage
		Gadha	da RRWSS :	Bhavnagar		
Gadhad a	67	100.00	12	100.00	479	100.00

**Table: 3** Taluka wise Distribution of Sampled Households

(Source: Prepared from responses)

Table 3 presents the details about talukas covered under the selected RRWSS. The number of villages were selected out of total benefited villages and number of respondents selected from each of the selected village. As explained in table 1 and 2 the selection of village was based on the region from headwork of the respective RRWSS and the selection of number of respondents was based on the total population of the selected village. The table 3 further provides the details about the taluka from where these respondents are selected. In case of Gadhada RRWSS, a total number of 479 beneficiaries from 12 villages were selected out of 67 villages. These are 21.32% of the total respondents.

#### **RESPONDENT PROFILE**

#### Sample Coverage

The selections of villages were done, to not only cover the geographical extents of the scheme but were also planned to cover villages having different demographic compositions and falling under different geographic region of the Head, Middle and Tail end of the scheme.



I able :	:4 Geog	raphical	Region v	vise Dist	tributioi	1 of Res	spondents		
Dopulation	He	ead	Mic	ldle	Τa	ail	Total		
Population	pulation $\begin{array}{c c c c c c c c c c c c c c c c c c c $						f	%	
		Gadh	ada RRV	VSS: Bh	avnaga	r			
≤ 1000	90	100.0 0	30	18.87	0	0.00	120	25.05	
1001 -3000	0	0.00	79	49.69	80	34.78	159	33.19	
> 3000	0	0.00	50	31.45	150	65.22	200	41.75	
Total	90	100	159	100	230	100	479	100	

(Source: Prepared from responses)

### Graph: 2 Sample Coverage





## WATER CHARGES

The questions related to existence of payment of water charges, amount paid, as water charges, water connection charges, affordability, satisfaction about water supply and charges



and disagreement about payment of water charges. The following para presents analysis of the responses to the questions.

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Water	He	ead	Mid	ldle	Tε	uil	То	tal
Charges	f	%	f	%	f	%	f	%
		Gadha	ada RRV	VSS: Bh	avnagar			
Yes	83	92.22	147	92.45	165	71.74	395	82.46
No	4	4.44	9	5.66	61	26.52	74	15.45
No Responses	3	3.33	3	1.89	4	1.74	10	2.09
Total	90	100	159	100	230	100	479	100

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able: 5	water	Charges	Payment	IOT	Getting	water	Under R	KW 33

(Source: Prepared from responses)

Table 5 presents payment or otherwise of water charges by the respondents. In the huge outstanding and non- payment of dues reported by GWSSB, when respondent households were asked about the water charges 82.46% reported paying water charges to the Panchayat or the Water committee in, Gadhada scheme. When the status of payment of water charges is examined geographic region wise the response is found highest for payment of water charges for region of Gadhada scheme. The facts revealed from the data collection contradict information obtained from the various officials, field workers and NGOs<sup>8</sup>.

When status of the water charges payment was observed according to the economic activities, it is revealed that majority of respondents have paid water charges.

AC	livities									
Connection Charges	Busines s men	%	Regula r Servic es	%	Daily Wager s	%	Farmer s	%	Total	%
		Gad	lhada R	RWSS	S: Bhav	nagar				
Yes	21	95.4 5	24	85.7 1	92	71.8 8	258	85.7 1	395	82.4 6
No	0	0.00	4	14.2 9	31	24.2 2	39	12.9 6	74	15.4 5
No Responses	1	4.55	0	0.00	5	3.91	4	1.33	10	2.09

 Table:6
 Water Charges Payment for Getting Water Under RRWSS: Economic Activities



Connection Charges	Busines s men	%	Regula r Servic es	%	Daily Wager s	%	Farmer s	%	Total	%
Total	22	100	28	100	128	100	301	100	479	100

(Source: Prepared from responses)

The highest percentage of respondents paying water charges were observed for businessmen in Gadhada scheme. Average amount paid per year: The next question inquired about amount of water charges paid per year by each household. Table 7 presents the Mean, Mode, Maximum amount and Minimum amount paid by the respondents.

Table: / Average	Amount of wa	ter Charges P	ald per i ear pe	er nousenoit
Water Charges	Head (₹)	Middle (₹)	Tail (₹)	Total (₹)
(	Gadhada RRWS	SS: Bhavnaga	r	
Mean	146	197	222	194
Minimum	18	100	10	10
Maximum	600	750	500	750
Mode	200	200	200	200

Table: 7 Average Amount of Water Charges Paid per Year per Household

(Source: Prepared from responses)

Table 7 indicates the average water charges paid along with minimum and maximum amount paid for Head, Middle and Tail regions for all four schemes. The average amount paid is found to be highest for Gadhada scheme, where for tail region the mean was as high as ₹222 per annum per household. The maximum amount paid is also found to be highest for Gadhada scheme for middle region at ₹750 per annum per household. Gadhada schemes amount paid by tail region is the highest.

Table 8 presents the frequency distribution for amount of water charges paid, according to economic activities and geographic region for each of the scheme.

Amount(	Bus	sinessn	nen		Regula Service	r s	Dai	ly Wa	gers	F	Farmer	s	Total
₹)	Hea d	Middl e	Tail	Hea d	Middl e	Tail	Hea d	Middl e	Tail	Hea d	Middl e	Tail	
			(	Gadh	ada RI	RWS	S: B	havnag	ar				
0-100	0	3	2	1	1	1	2	3	5	26	6	13	63

Table:8Amount of Water Charges Paid per Year per Household: Economic Activities



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Amount(	Bu	sinessr	nen		Regula Service	r s	Dai	Daily Wagers Farmers Tota			armers		
₹)	Hea d	Middl e	Tail	Hea d	Middl e	Tail	Hea d	Middl e	Tail	Hea d	Middl e	Tail	
101-200	3	4	5	4	6	5	12	41	20	33	72	89	294
201-300	0	1	2	0	1	3	0	3	6	0	5	12	33
301-400	0	0	0	0	0	0	0	0	0	0	0	1	1
401-500	0	0	0	0	0	1	0	0	0	1	0	0	2
501-600	1	0	0	0	0	0	0	0	0	0	0	0	1
601-700	0	0	0	0	0	0	0	0	0	0	0	0	0
701-800	0	0	0	0	1	0	0	0	0	0	0	0	1
Total	4	8	9	5	9	10	14	47	31	60	83	11 5	395

(Source: Prepared from responses)

From the table 8 it can be observed that for all the schemes the highest numbers of respondents are paying water charges in the range of  $\gtrless 101 - \gtrless 200$ . This is also apparent from the Table 7, where through 'mode' it is indicated that for the scheme and within that for all the regions maximum respondents are paying up to  $\gtrless 200$  only. Maximum respondents are farmers. Out of 247 respondents only 1,840 are paying the water charge and therefore, the amount paid for water charges (Table 9) relates to only 1,840.

Scheme	Businessmen	Regular Services	Daily Wagers	Farmers	Total
Gadhada	200	236	206	185	194
Total	169	159	163	172	167

Table: 9 Mean of Water Charges Paid According to Economic Activities

(Source: Prepared from responses)

Water connection charges at the time of connection: In addition to the payment of water charges, a further inquiry was also made about payment or otherwise of the water connection charges.

Table :10Status for Payment of Water Connection Charges: Geographic Region wise

Connection	Head		Mic	ldle	Т	`ail	Total				
Charges	f	%	f	%	f	%	f	%			
Gadhada RRWSS: Bhavnagar											
Yes	75	83.33	145	91.19	154	66.96	374	78.08			
No	7	7.78	8	5.03	54	23.48	69	14.40			



Connection	H	ead Middle		Т	Tail	Total		
Charges	f	%	f	%	f	%	f	%
No Responses	8	8.89	6	3.77	22	9.57	36	7.52
Total	90	100	159	100	230	100	479	100

(Source: Prepared from responses)

The table 10 reveals information about respondents who paid water connection charges for four schemes individually with its classification according to geographic region. It is observed that majority of respondents have paid the water connection charges. Highest percentage of respondents paying water connection charges were observed for Gadhada scheme in Middle region (91.19%). On the whole it is observed that highest percentage (78.08%) of respondents of Gadhada scheme have paid water connection charges.

In case of Gadhada scheme highest proportion of businessmen have paid. When status of the water connection charges payment or otherwise was examined according to the economic activities, it is revealed that majority of respondents have paid the water connection charges.

Connection Charges	Busine ss men	%	Regula r Servic es	%	Daily Wager s	%	Farmer s	%	Total	%	
Gadhada RRWSS: Bhavnagar											
Yes	20	90.9 1	21	75.0 0	87	67.97	246	81.7 3	374	78.0 8	
No	0	0	4	14.2 9	29	22.66	36	11.9 6	69	14.4 0	
No Responses	2	9.09	3	10.7 1	12	9.38	19	6.31	36	7.52	
Total	22	100	28	100	128	100	301	100	479	100	

Table:	11Status	for Payment	of Water	Connection	Charges:	Economic	Activity v	wise
		2			0		<i>.</i>	

(Source: Prepared from responses)

Affordability of water charges: The table 12 describes whether charges are affordable or not. The payment or non- payment of charges has various reasons. The economic capacity is but only one of the various aspects which determine whether a person would pay or not.



Other than that, willingness to pay irrespective of the amount levied plays a key role in determining whether water charges are paid or not.

I able:	IZ AIIO	Jidaonny	or wat	er Charg	es: Geog	дгарше к	egion w	Ise				
Charges	H	ead	Mi	ddle	Т	ail	Total					
Affordable	f	%	f	%	f	%	f	%				
Gadhada RRWSS: Bhavnagar												
Yes	67	74.44	98	61.64	106	46.08	271	56.58				
No	7	7.78	21	13.21	49	21.32	77	16.08				
No	16	17 78	40	25.16	75	32 60	131	27.34				
Responses	10	17.70	40	23.10	15	52.00	131	27.34				
Total	90	100	159	100	230	100	479	100				

Table: 12 Affordability	v of Water Charges	Geographic Region wise
	y of water charges.	Ocographic Region wise

(Source: Prepared from responses)

The table 12 presents the responses about affordability of the water charges. About 20% of respondents are silent about opinion for affordability. followed by Gadhada (56.58%) where non-response is about 27%

Charges affordable	Busines s men	%	Regular Service	%	Daily Wager s	%	Farme rs	%	Total	%	
	Gadhada RRWSS: Bhavnagar										
Yes	18	81.82	19	67.8 6	56	43.7 5	178	59.1 4	271	56.5 8	
No	3	13.64	6	21.4 3	29	22.6 6	39	12.9 6	77	16.0 8	
No Responses	1	4.55	3	10.7 1	43	33.5 9	84	27.9 0	131	27.3 4	
Total	22	100	28	100	128	100	301	100	479	100	

Table: 13 Affordability of Water Charges: Economic Activity wise

(Source: Prepared from responses)

Table 13 presents the responses for the affordability of the water charges with reference to economic activities. However, Gadhada scheme 81% of the respondents conveyed their affordability. In Gadhada scheme, level of non-response was high for daily wagers (34%). However, the point to be noted is, that the higher number of businessmen respondents conveyed their non-affordability for payment of water charges.



Satisfaction with the 'water supply' and 'water charges' payment: This question examines the status of respondents about satisfaction or otherwise for with 'water supply' and 'water charges' paid.

 Table: 14 Satisfaction with the Water Supply and Water Charges Payment: Geographic Region wise

Water Supply	Н	ead	Mi	ddle	Ta	ail	Total					
Satisfactory	f	%	f	%	f	%	f	%				
	Gadhada RRWSS: Bhavnagar											
Yes	72	80.00	126	79.25	127	55.22	325	67.85				
No	8	8.89	24	15.09	75	32.61	107	22.34				
No Responses	10	11.11	9	5.66	28	12.17	47	9.81				
Total	90	100	159	100	230	100	479	100				

(Source: Prepared from responses)

The table 14 presents the responses about this. It is observed that 67.85% of the respondents are satisfied 22.34% no satisfied with water supply in relation to water charges for Gadhada scheme. Thus, it is seen in general that majority of the respondents in head, middle and tail region studied are satisfied with the level of water supply and water charges they pay for the same.

 
 Table: 15
 Satisfaction with the Water Supply and Water Charges Payment: Economic Activity wise

Connection Charges	Busine ss men	%	Regula r Servic es	%	Daily Wagers	%	Farme rs	%	Total	%	
	Gadhada RRWSS: Bhavnagar										
Yes	17	77.2 7	18	64.2 9	71	55.4 7	219	72.7 6	325	67.8 5	
No	4	18.1 8	7	25	37	28.9 1	59	19.6 0	107	22.3 4	
No Responses	1	4.55	3	10.7 1	20	15.6 2	23	7.64	47	9.81	
Total	22	100	28	100	128	100	301	100	479	100	

(Source: Prepared from responses)

The table 15 reveals the information about satisfaction classifying the data according to economic activities. Highest proportion of farmers (72.76%) followed by regular services



(64.29%), daily wagers (55.47%) and businessmen (77.27%) are satisfied. The proportion of non-response is highest for daily wagers and lowest for regular services. Thus, it is seen in general that majority of the respondents businessmen, regular services, daily wagers and farmers are satisfied with level of water supply and charges they pay for the same.

Disagreement with payment of water charges: The next question related to the respondents disagreeing to the payment of water charges. As discussed in the preceding para as the level of satisfaction was high, the disagreement level was observed to be quite low. For this question the level of non-response was observed to be about 14%.

Disagree with	He	ad	Middle		Т	ail	Total				
Payment	f	%	f	%	f	%	f	%			
Gadhada RRWSS: Bhavnagar											
Yes	11	12.22	43	27.04	39	16.96	93	19.42			
No	61	67.78	107	67.30	150	65.22	318	66.39			
No Responses	18	20.00	9	5.66	41	17.83	68	14.20			
Total	90	100	159	100	230	100	479	100			

Table: 16 D1s	agreement to	r Payment o	of Water	Charges:	Geographic	Region	wise
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(Source: Prepared from responses)

The table 16 reveals that only 19.42% disagreed with payment of water charges for Gadhada scheme. Thus, on the whole it can be said that most of the respondents agree with payment of water charges.Table 17 tabulates the disagreement with payment of water charges with economic activities. In case of Gadhada scheme 22.73% of businessmen disagreed with the payment of water charges.

	Table: 17	Disagreement	for Payment of	of Water Char	ges: Economic	Activity wise
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Connection Charges	Busine ss men	%	Regula r Servic es	%	Daily Wagers	%	Farmer s	%	Total	%
		(	Gadhada	ı RRW	SS: Bha	ivnaga	r			
Yes	5	22.7 3	3	10.7 1	23	17.9 7	62	20.6 0	93	19.4 2
No	13	59.0 9	20	71.4 3	84	65.6 2	201	66.7 8	318	66.3 8
No Responses	4	18.1 8	5	17.8 6	21	16.4 1	38	12.1 2	68	14.2 0



С	connection Charges	Busine ss men	%	Regula r Servic es	%	Daily Wagers	%	Farmer s	%	Total	%
Т	otal	22	100	28	100	128	100	301	100	479	100

(Source: Prepared from responses)

#### **TESTING OF HYPOTHESES**

The objectives of the study are to examine the extent of satisfaction of respondents to performance of Regional Rural Water Supply Scheme and to reduce the problems related to water supply. For the discrete statistics the collected data are classified based on geographic region, for the scheme, i.e., Head, Middle, Tail and the frequency and percentage analysis is applied to the same. More over the data are also classified according to the economic activities and the frequency and percentage analysis is applied to the same. In the second part of the analysis hypotheses testing is carried out.

#### CONCLUSION

As the study relates to the analysis of the financial performance indicators, based on the hypotheses testing it is observed that scheme has its own characteristics. Also, the distance from the main point of the scheme matters which is terms as head, middle and tail regions. The testing of hypotheses indicates that the there exists a significant difference between the region regarding the status of payment of water charges, water connection charges, affordability for payment of water charges as well as the satisfaction with reference to water supply and water charges. Hence, based on this finding it may be linked to the scheme characteristics and the geographical region. This study focuses mainly financial aspects. Another study can be taken up including quality and other aspects.

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