



# **Functionality Assessment of Household Tap Connection under National Jal Jeevan Mission - 2022**



**District Report: Pondicherry, Puducherry  
Survey Duration: February to March 2022**

## Contents

Abbreviations .....	3
Glossary .....	4
1. Factsheet.....	6
2. Context .....	8
2.1. District snapshot: Pondicherry .....	8
2.2. FHTC Assessment Objectives .....	9
2.3. Assessment Methodology .....	9
2.4. Sample Size .....	9
2.5. Sampling Methodology.....	10
2.6. Methodology for Water Quantity Measurement at Households .....	11
2.7. Methodology for Water Quality Measurement .....	11
2.8. Project implementation.....	12
2.9. Sample coverage .....	13
2.10. Sampled village and household profile .....	13
3. Findings.....	14
3.1. Functionality status of FHTC at household level.....	14
3.2. Quantity, Regularity, and Quality of Water.....	15
3.3. Average water supply days in a week.....	18
3.4. Household utilization of water for drinking and other activities .....	18
3.5. Status at HH level (Nh=1357) .....	18
3.6. Source sustainability at the village level .....	19
3.7. Water quality monitoring and surveillance in the villages .....	20
3.8. Status of JJM.....	20
3.9. Perception of HHs on Outcome Indicators.....	21
3.10. User satisfaction.....	22
4. Annexures .....	23
4.1. Summary of villages.....	23
4.2. Functionality – 55 LPCD vs regularity vs potability vs working tap connection .....	25
4.3. Villages not meeting the quality parameters .....	28

## Abbreviations

AWC	Aanganwadi Centre
FHTC	Functional Household Tap Connection
Gol	Government of India
GP	Gram Panchayat
HF	Health Facility
HH	Household
HGJ	Har Ghar Jal
JJM	Jal Jeevan Mission
LPCD	Litres per Capita per Day
MVS	Multi-village Scheme
NJJM	National Jal Jeevan Mission
RC	Residual Chlorine
O&M	Operation and Maintenance
OHT	Over Head Tank
PSU	Primary Sampling Unit
PWS	Piped Water Supply
SVS	Single Village Scheme
VAP	Village Action Plan
VWSC	Village Water and Sanitation Committee
WQMIS	Water Quality Monitoring and Information System

## Glossary

1. **Community** – Group of people living in one particular area or village/habitation
2. **Cross-sectional research** – A cross-sectional study is a type of research design in which data is collected from a relatively large and diverse group of people at a single point in time
3. **Drinking water source** – Groundwater (open well, borewell, tube well, handpump, spring, etc.)/ surface water (river, lake, pond, reservoir, etc.)/rainwater, available for drinking and domestic use
4. **Improved sources** – The following sources as considered improved by the National Family Health Survey definitions: Piped water into dwelling, yard/plot with a tap, piped water connected to public stand-posts, tube well or borewell, Hand pump, dug well–protected, Spring–protected, Rainwater, Water ATM/ Community RO plant/ Community Water Purification Plant (CWPP)
5. **Unimproved sources** – The following sources as considered unimproved by the National Family Health Survey definitions: Unprotected spring, unprotected dug well, cart with small tank / drum, Tanker/ truck, Surface water (river/ dam/ lake/ pond/ canal), and bottled water
6. **Functional Household Tap Connection (FHTC)** – A tap connection to a rural household for providing drinking water in adequate quantity of prescribed quality on regular basis.
7. **Functionality of FHTC** – Functionality of a tap connection is defined as having infrastructure, i.e., household tap connection providing water in adequate quantity, as presented:

Definitions	Fully-functional	Partially-functional	Non-functional
Quantity	$\geq 55$ LPCD	$> 40$ lpcd - $< 55$ LPCD	$< 40$ LPCD
Regularity	12 months or daily basis	9-12 months or $<$ daily basis	$< 9$ months or $<$ daily basis
Quality	Potable	Potable	Non potable

8. **Quantity (in litres)** of water received by households per person per day should meet the service level of 55 lpcd.
9. **Functionality Assessment** – An assessment of the functionality of rural household tap connections based on a sample survey
10. **Fully Regular** – Regularity of water is considered when a rural household receives water for 12 months on daily basis or as per schedule.
11. **Potability** – Potable water is water that is safe to be used as drinking water. Parameters of potable water are mentioned below:

Parameters for potable water tested in the survey	Unit	Acceptable Limit	Permissible Limit in the absence of alternative sources
i. pH (tested on site)	-	6.5 to 8.5	No relaxation
ii. Free residual chlorine (tested on site)	Mg/litre	0.2	1
iii. Turbidity	NTU	1	5
iv. Total hardness	Mg/litre	200	600
v. Total alkalinity	Mg/litre	200	600
vi. Chloride	Mg/litre	250	1000
vii. Ammonia	Mg/litre	0.5	No relaxation
viii. Phosphate	Mg/litre	0.3	1
ix. Iron (in hotspots only)	Mg/litre	1	No relaxation
x. Nitrate	Mg/litre	45	No relaxation
xi. Sulphate	Mg/litre	200	400
xii. Total dissolved solids	Mg/litre	500	2000

xiii.	Fluoride	Mg/litre	1	1.5
xiv.	Arsenic (in hotspots only)	Mg/litre	0.01	No relaxation
xv.	Bacteriological test for Total coliform bacteria and E. coli or thermotolerant coliform bacteria		Shall not be detectable in any 100 ml sample	

12. **Sampling** – Selection of a subset of individuals from within a statistical population to estimate water service delivery among the population. In the current study, households have been sampled to estimate the representation of the village and subsequently of the district as well as of the state.
13. **Types of schemes:** Following are the piped water supply schemes that were assessed
  - a. Mini-solar based piped water supply scheme in isolated/tribal hamlets
  - b. Single Village Scheme (SVS) in villages having adequate groundwater that needs treatment
  - c. Single village scheme (having adequate groundwater/ spring water/ local or surface water source of prescribed Quality)
  - d. Retrofitting of ongoing schemes taken up under erstwhile NRDWP for the last mile connectivity/ retrofitting of completed rural water supply schemes to make it JJM compliant
  - e. Multi-village PWS scheme - with water grids/ regional water supply schemes
14. **Village Action Plan (VAP)** – Plan prepared by Gram Panchayat and/ or its sub-committee, i.e., VWSC/ Paani Samiti/ User Group, etc. based on baseline survey, resource mapping and felt needs of the village community to provide FHTC to every rural household, treat the generated greywater and plan its reuse, undertake surveillance activities, etc. VAP also indicates the fund requirement and timelines for completion of work under the Mission and will be approved by the Gram Sabha. Irrespective of the source of funding, all drinking water-related works in the village are taken up based on the VAP.
15. **Source Sustainability** – includes measures such as aquifer recharge, rainwater harvesting, increased storage capacity of water bodies, reservoirs, de-silting, etc. improve the lifespan of water supply systems
16. **Har Ghar Jal (HGJ)** – An administrative unit wherein all HHs are provided with water supply through FHTCs is called “Har Ghar Jal”.
17. **Public Institutions** – The public institutions in the survey include Aanganwadi Centre (AWC), Health Facilities, Schools, Gram Panchayat, and government buildings.
18. **Working tap connection** – A tap connection supplied water at least one day in the week, preceding of survey
19. **Functional Scheme** – A scheme is said to be functional if it was reported to be working for all 12 months in a year.

## 1. Factsheet

Table 1: District level factsheet

Indicators	State	District
<b>Functionality status of FHTC at households</b>		
Households (HHs) which received water through FHTC at least once in last 7 days (%)	100	100
Fully functional (%)	88	90
Partially functional (%)	12	9
Non-functional (%)	0	0
<b>Quantity of water received by households</b>		
Adequate quantity (>55 LPCD) (%)	100	100
Partially adequate quantity (> 40 LPCD - < 55 LPCD) (%)	0	0
Inadequate quantity (<40 LPCD) (%)	0	0
<b>Regularity of water received by households</b>		
Fully Regular Supply (as per schedule) (%)	99	100
Partially Regular Supply (not as per schedule) (%)	1	0
Irregular Supply (less than 9 months' supply) (%)	0	0
<b>Potable (Quality) water received by households</b>		
Potable (%)	89	91
Non-potable (%)	11	9
Residual Chlorine (RCL) detected with in permissible limits (%)	19	16
<b>Household level indicators</b>		
Households receiving water supply daily-7 days a week (%)	100	100
Daily HH requirement of water being met by FHTC (%)	95	97
Households reported FHTC as a primary source of drinking water (%)	96	95
Households purifying water before drinking (%)	65	66
Households paying water service delivery charges (%)	87	87
Households having coping mechanisms during scarcity (%)	25	28
Households aware of grievance redressal mechanism for reporting problems with FHTC (%)	88	91
Households reported incidence of water-borne diseases in the last year (%)	0	1
Households reported a reduction in time and effort in collecting water (%)	83	87
<b>Overall user satisfaction at the household level</b>		
Regularity (%)	93	91
Overall quality (%)	86	83

Indicators	State	District
<b>Village level indicators (based on village questionnaire)</b>		
Schemes reported to be functional (%)	69	69
Villages with groundwater resource (%)	60	68
Villages having groundwater recharge structure <sup>1</sup> (%)	4	4
<b>Water supply and storage status in villages</b>		
Average no. of times water is supplied in a day	3	3
Villages having OHT/ Sump for storage of water (%)	93	92
<b>Water quality monitoring and surveillance in the villages</b>		
Villages with Field Test Kits (%)	22	21
Villages in which bacteriological test was done in last 1 year by VWSC/ Pani Samiti (%)	29	31
Villages reported to have a mechanism for chlorination (%)	57	57
<b>VWSC/Pani Samiti and PWS signage in villages</b>		
Village reported having presence of VWSC/ Pani Samiti (%)	41	31
Villages in which VWSC/ Pani Samiti is responsible for Operation & Maintenance of PWS schemes (%)	21	18
Villages in which persons are trained to use Field Test Kits (%)	17	17
Villages in which signages about JJM were observed (%)	1	2
<b>Operation and maintenance at village</b>		
Villages levying water service delivery to households (%)	89	90
Convergence of JJM activities with other schemes in the villages (%)	9	8
Villages having skilled manpower for Operation & Maintenance of PWS schemes (%)	39	42
Community monitoring of water wastage in villages (%)	35	35

<sup>1</sup> Out of villages who reported to have groundwater source (N<sub>v</sub>=81)



## 2. Context

Jal Jeevan Mission (JJM) was launched on the 15th of August 2019 with the objective to provide functional household tap connections (FHTCs) to all rural households.

Figure 1: Har Ghar Jal - Objective, Vision, & Outcome



In accordance with the overall objectives as specified in the Operational Guidelines for the implementation of the NJJM, GoI carried out a sample survey to assess the functionality of household tap connections. As part of this endeavour, NJJM, GoI engaged HTA Kantar Public to conduct the 'Functionality Assessment' of the household as well as public institution/ buildings such as schools, anganwadis, gram panchayat buildings, public health facilities, and wellness centers in all the rural districts for the fiscal year 2021-22.

### 2.1. District snapshot: Pondicherry

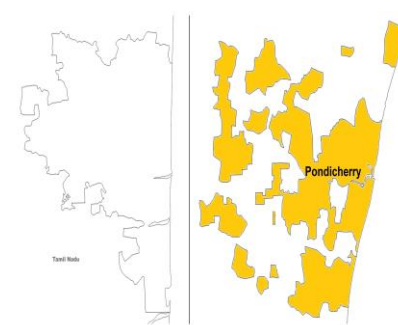
District Pondicherry of Puducherry has a population of 4,34,236. The district has 2 blocks. Out of 188 villages in the district, 49 are SC dominated and None are ST dominated villages. The district lies in Eastern Coastal Plains and Hills and receives an annual rainfall of 1355ml.

Presented here are district level information collated from the DDWS-IMIS:

Figure 2: District IMIS Status & Map

#### IMIS status:

- 188 (100% of all) villages are Har Ghar Jal
- 0 (0% of all) villages are Non-Har ghar Jal
- Non-SC/ST dominated district
- Non JE/AES
- Yes—History of water contamination
- 187 (99% of all) villages with PWS more than 20 FHTC





## 2.2. FHTC Assessment Objectives

Figure 3: Objectives of Functionality of Tap Connections



## 2.3. Assessment Methodology

A cross-section research design has been used for this functionality assessment study. Quantitative data were collected from villages and households across all states/UTs using the CAPI (Computer Assisted Personal Interviewing) mode. The survey includes two components, village, and household.

Figure 4: Survey Components & Respondents



## 2.4. Sample Size

The sample size was calculated to provide estimates with a 95% confidence interval (CI) and 5% margin of error (MoE) after incorporating the correction factor for a finite population considering the total number of geographic units having FHTCs.

- Village sample is estimated to be representative at the state level
- HH sample estimated to be representative at the district level

- Number of Har Ghar Jal (HGJ) villages were proportionately sampled at the district level
- All PWS schemes (up to 4) were covered per village. Per scheme approximately 9 (3 each from the head, middle, and tail HHs) or 18 households (6 each from head, middle, and tail HHs) were sampled to achieve the desired sample at the district level.

## 2.5. Sampling Methodology

As per the design, all villages having a PWS scheme with 20 or more functional household tap connections were included in the sample frame. The probability proportionate to size (PPS) method was used for village selection in each district. The steps for random selection of villages using PPS are as presented:

Figure 5: Steps for Village Sampling



The key considerations for the village and household sampling were:

Figure 6: Sampling Considerations – Village & Households



The record of all district-wise village replacements is maintained and reported as part of the annexure.

## 2.6. Methodology for Water Quantity Measurement at Households

Figure 7: Steps for Measuring Flowrate from Supply-tap at HHs



The flow rate of the water supply was measured using a container with gradual markings (either 5 litres or 1 litre, based on the flow of the tap) and a stopwatch/timer-watch. The process followed is as described in Figure 7.

In the case of households where the FHTC is connected directly with the storage tank, the following steps were adopted to measure the quantity:

- Assessor first asked and recorded length, breadth, and height.
- Assessor dipped a 5 feet long rod, marked the level of the water table, and calculated the volume – length x breadth x-height of water.
- Next the assessor opened the valve of the connection and allowed the water to flow inside the storage for 10 minutes.
- After 10 mins, the valve was closed, and the assessor again dipped the rod and recorded the new height of the water inside the tank. Based on this new 'height' and the CAPI calculated the changed volume.
- The difference in the volume of water in 10 minutes divided by 10 provided the flow rate of the water supply per minute.

The water flow rate was not measured for village-level public institutions.

## 2.7. Methodology for Water Quality Measurement

Water quality was tested for all public institutions available in the villages, including schools, anganwadis, gram panchayat buildings, public health facilities, and wellness centers, and at the selected households. Two types of quality tests were carried out – a) spot test for pH and free residual chlorine, and b) water sample was collected and transported to labs for testing against 13 quality parameters (total 15) as specified in Figure 8.

Figure 8: On-site & Laboratory Based Quality Test



JJM, with the support of the BMI Division of ICMR, enabled a new interface on the WQMIS portal for “Functionality Assessment (FA) User” to enable seamless harmonization of water sample registration, sample submission for testing, and sharing of results as per the applicable quality parameters.

## 2.8. Project implementation

An overview of the project implementation is as presented:

Figure 9: Broad project implementation framework



A total of 6 teams (comprising 6 supervisors, 36 assessors, and 6 water collection assistants) were recruited, trained, and deployed to complete the survey across the UT of Puducherry. One survey team covered approximately 2 – 3 districts. The state-wise team deployment and fieldwork dates were as presented:

**Table No. 1: State-wise team deployment and data collection start & end dates**

State	Teams deployed	Start date	End date	Total data collection days
Puducherry	6 Teams	2/26/2022	3/9/2022	12 Days

A four-tier quality control (QC) system was put in place. At the ground level, the data collection exercise was done using a computer-aided Personal Interview (CAPI) application which contained all logic and skip-checks inbuilt. Also, 5% of the total samples were accompanied by the supervisors. Sub-targeted QC was done by the state field managers (5%) and the central project management team (5%). Apart from this, the central research team monitored the data trend and as per requirement debriefed data collection teams to improve quality.

## 2.9. Sample coverage

**Table No. 2: Sample covered**

District	Targeted sample		Achieved sample		
	Village	HH	Village	HH	Public Institutions
<b>Pondicherry</b>	<b>120</b>	<b>1,350</b>	<b>120</b>	<b>1,357</b>	<b>225</b>
<b>Puducherry</b>	<b>150</b>	<b>1,863</b>	<b>150</b>	<b>1,872</b>	<b>242</b>

## 2.10. Sampled village and household profile

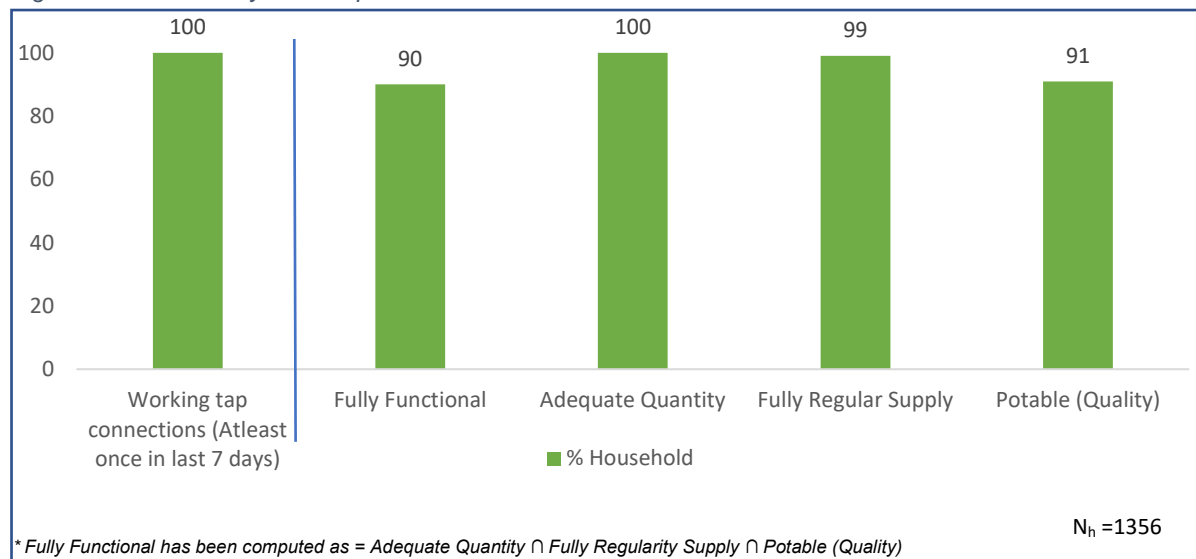
SAMPLED VILLAGES	SAMPLED HOUSEHOLDS
<ul style="list-style-type: none"> <li>Total no. of villages covered in the district – 120</li> <li>Percentage of SC dominated villages covered in the district is 24% (which is equal to the state average, i.e., 24%)</li> <li>Percentage of ST dominated villages covered in the district is 0% (which is equal to the state average, i.e., 0%)</li> <li>Higher proportion of <b>pump operator</b> interviewed at the village level</li> <li><b>Yes</b>, the district reported to have any historical incidence of water contamination</li> </ul>	<ul style="list-style-type: none"> <li>Total no. of households covered in the district – <b>1,356</b></li> <li>Proportion of General - 45%, SC 26%, ST% 2, OBC 27% households</li> <li><b>42%</b> of the FHTC connections are under the name of a female member</li> <li>Average household size – 5</li> <li><b>&gt;75%</b> positive user experience in 5/5 measures</li> </ul>

### 3. Findings

#### 3.1. Functionality status of FHTC at household level

##### A. Overall Functionality\* (in %)

Figure 10: Functionality of HH tap connection



It has been found that 100 percent of the sampled HHs (N=1,356) had working tap connections (i.e., received water at least once in last 7 days). Nine out of ten (90 percent) HHs had fully functional tap connection (i.e., HHs receiving adequate quantity of prescribed quality of water on a regular basis).

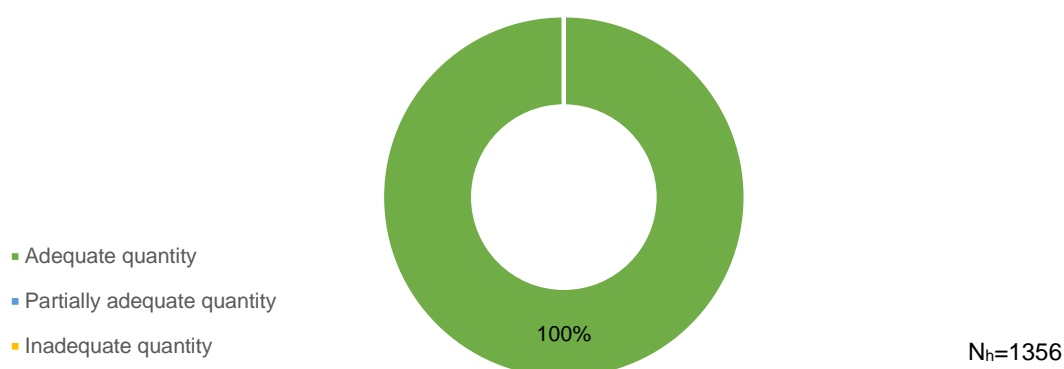
### 3.2. Quantity, Regularity, and Quality of Water

Under JJM, functionality is defined as having infrastructure, i.e., household tap connection providing water in adequate quantity (55 LPCD or more) of prescribed quality on regular basis (every day or as decided by GP and/ or its sub-committee) with adequate pressure. It will also include long-term source and system sustainability. Presented here are the findings in this respect.

#### A. Water quantity measured as LPCD (Litres per Capita per Day)

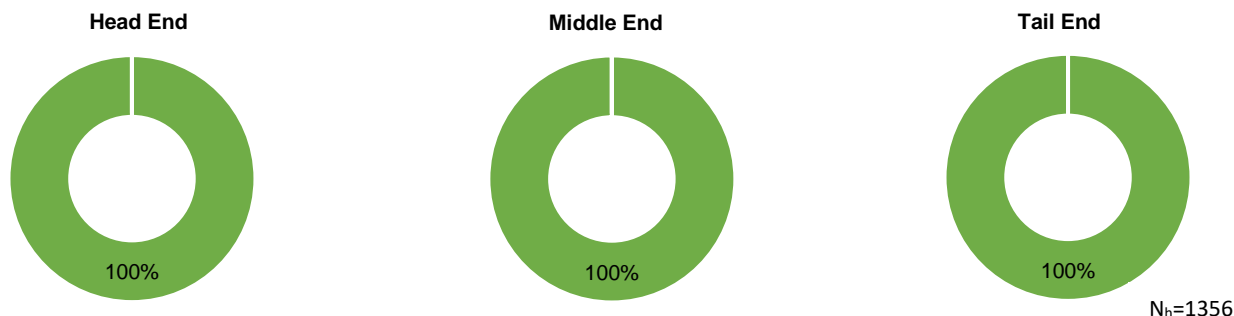
**100% HHs** reported receiving adequate quantity of water

Figure 11: Quantity of water received by households



#### Quantity of water received across head, middle, and tail end HHs

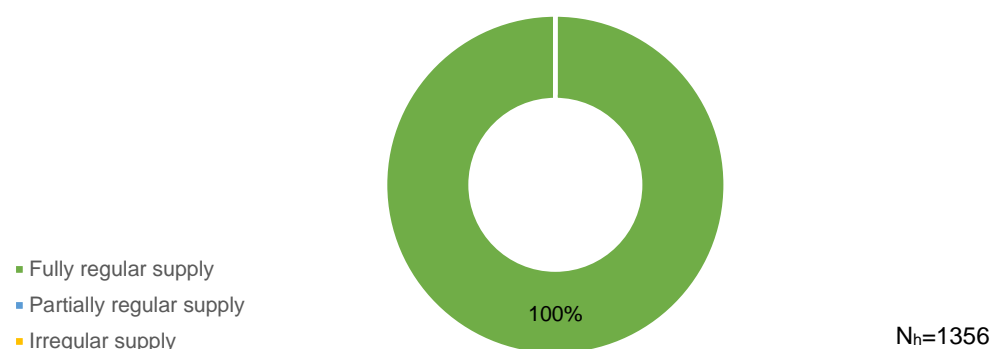
Figure 12: Quantity of water received across head, middle and tail end households



#### B. Regularity of water supply to households

**99% HHs** receive a regular supply of water (as per agreed schedule)

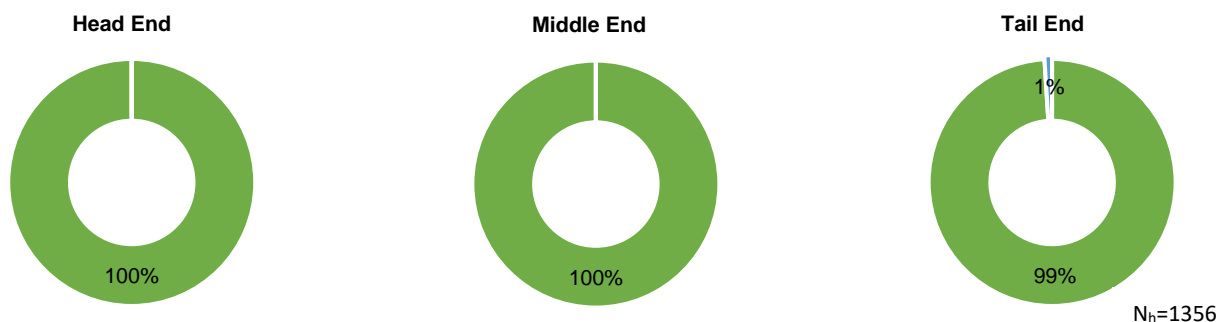
Figure: Regularity of water received by households





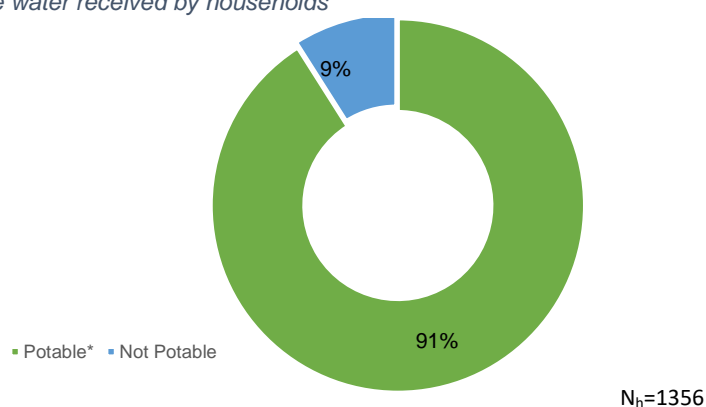
### Regularity of water received across head, middle, and tail end

Figure 13: Regularity of water received across head, middle and tail end households



### C. Water quality – Potability

Figure 14: Potable water received by households



\*Potable water has been considered basis testing of water samples through laboratory tests for physical, chemical, and bacteriological as given in Table 4 parameters (within acceptable/ permissible range) and onsite testing of pH. The details of laboratory test are mentioned in the table given above in the glossary.

Table No. 3: Village quality parameters reported within permissible range (% sample within permissible range)

Quality Parameters (NV=120)	Water Samples Tested from Public Institutes			
	Anganwadi Centre	Health Facility	Schools	Others
pH (on-site)	94	91	95	97
Turbidity	100	100	100	100
Total Hardness	100	100	100	100
Total Alkalinity	100	100	100	100
Chloride	100	100	100	100
Ammonia	Not tested			
Iron	98	100	100	90
Nitrate	100	100	100	100
Sulphate	98	100	98	100
Total Dissolved Solids	100	100	100	100
Bacteriological Test	98	100	100	100
Fluoride	No history			
Arsenic (In Hotspots)	No history			

**Table No. 4: Household water quality parameters reported within permissible range (in % sample within permissible range)**

Quality Parameters	No of samples tested	% Households
pH (on-site)	1356	95
Turbidity	1198	98
Total Hardness	1239	100
Total Alkalinity	1196	100
Chloride	1238	100
Ammonia	Not tested	
Iron	1232	99
Nitrate	1241	100
Sulphate	1242	98
Total Dissolved Solids	1241	100
Bacteriological Test (Absence)	1215	100
Fluoride	No history	
Arsenic	No history	

### **Safeguarding piped water supply for unforeseen bacteriological contamination- Presence of Residual Chlorine (RC)**

The Residual Chlorine (RC) in the Pondicherry district was found in 16% samples. The remaining 16% of the samples had no RC. It may be mentioned that 100% of water samples passed the bacteriological contamination test but to assure the protection against bacteriological contamination, addition of RC is must in PWS system.

The Residual Chlorine in piped water supply is one of the most important preventive actions to assure quality of water against bacteriological contamination from source to consumption. The presence of residual chlorine within permissible limits is indicator of well-maintained and healthy piped water supply system.

It is advised that behavioural change communication campaigns on appropriate dosage of residual chlorine is held in all villages and monitoring system for chlorine dosing is established. The FTK must have residual chlorine testing facility for effective WQM&S.

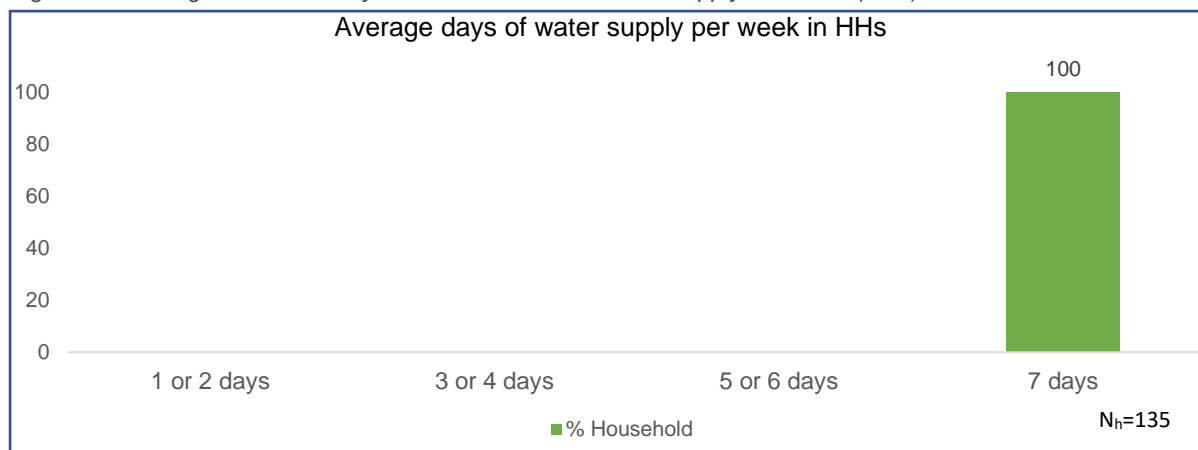
### **Comment on functioning of District Lab:**

The district lab tested water samples for 9 water quality parameters. 1,581 water samples were submitted, and 1,378 water samples were tested, and reports made available. The turnaround time for testing was more than 48 hours in most cases.

The labs did not have any issue with testing the number of water samples submitted nor had any issues with human resource, reagents etc.

### 3.3. Average water supply days in a week

Figure 15: Average number of days households receive water supply in a week (in %)

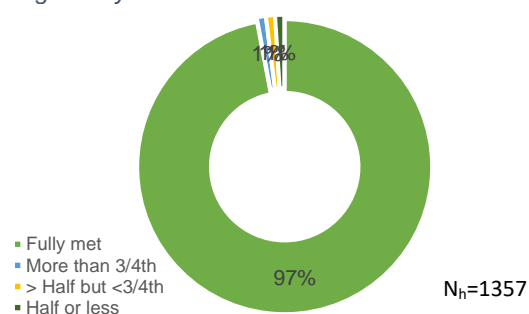


### 3.4. Household utilization of water for drinking and other activities

#### Fulfilment of requirement

**97% HHs** reported that their daily requirement of water is being met by FHTCs

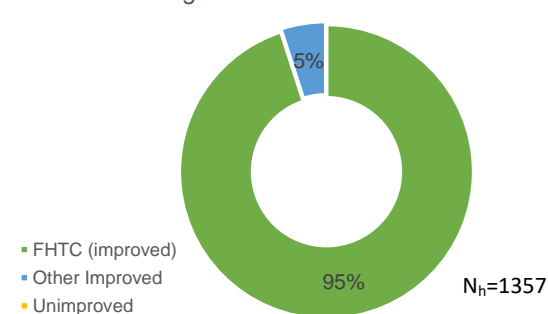
Figure 17: Daily household's requirement of water being met by FHTC



#### Primary source of drinking water

**95% HHs** reported HH tap connection as their primary source of drinking water

Figure 18: Households reported FHTC as primary source of drinking water



### 3.5. Status at HH level (N<sub>h</sub>=1357)

% HHs purifying water before drinking	% HHs paying water service delivery charges	% HHs with booster pumps	% HHs having coping mechanism during scarcity
66%	87%	19%	28%
% HH aware of grievance redressal mechanism for reporting problems with FHTC	Channel for registering grievance (N <sub>h</sub> =1357*)	Key problems for reporting grievances (N=1357)	% Reported complaints resolved (N <sub>h</sub> =68)
91%	Pump-operator	Bad quality	26%

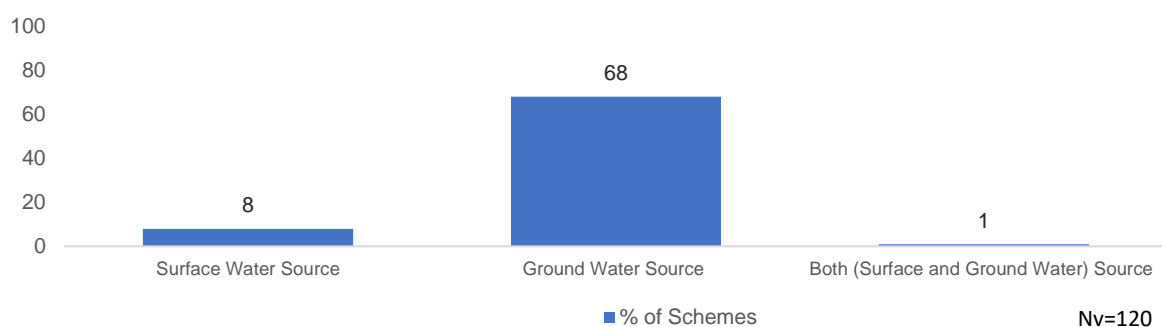
\*HHs who reported complaints in last 1 year

### 3.6. Source sustainability at the village level

#### Schemes based on surface and ground water

8% of schemes are reported to be based on surface water and 68% ground water.

Figure 19: Schemes based on water source in village

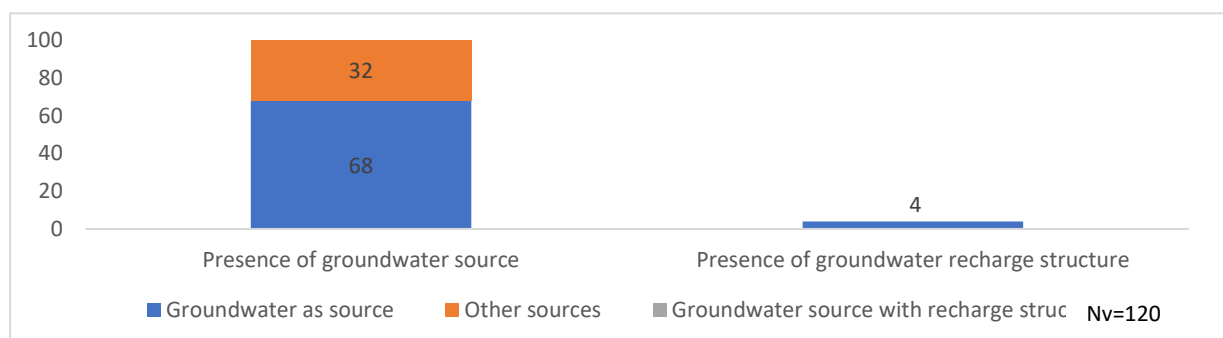


\*'Surface Water Source' is Stream, Spring, Glacier, River, lake, pond etc. and Groundwater Source is open well, borewell, tube well, handpump, spring, etc

#### Villages reported having presence of a groundwater source

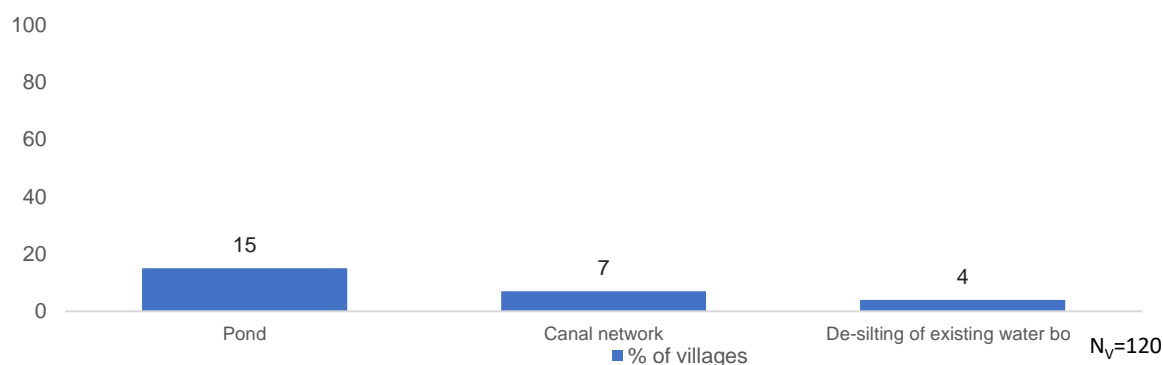
**68% of villages** reported the presence of groundwater sources like improved dug wells and borewells, and 4% were supported by recharging structures.

Figure 20: Villages reported the presence of groundwater sources and among those how many reported to have a recharge structure



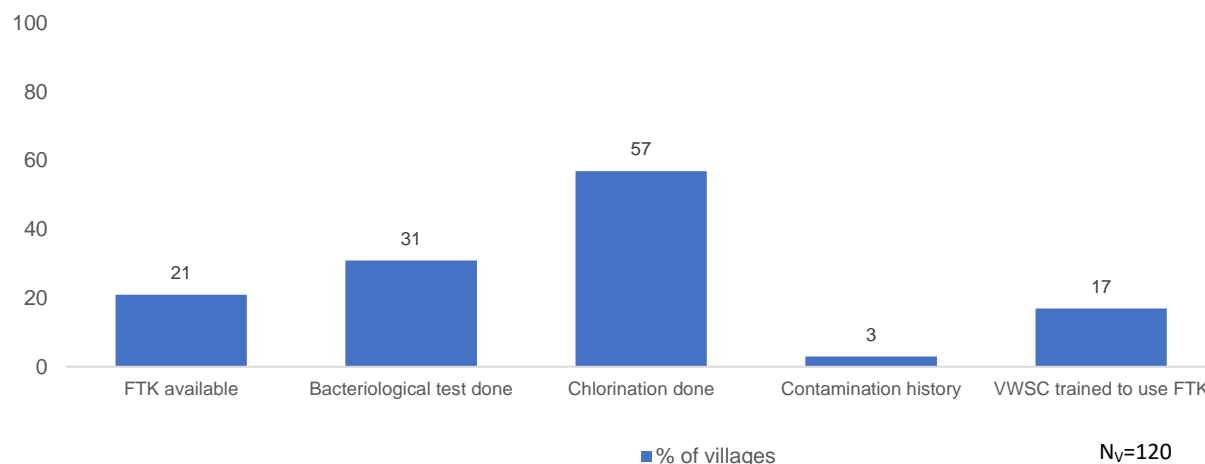
#### The top 3 other source sustainability measure taken by villages

Figure 21: Villages reported having taken other source sustainability measure



### 3.7. Water quality monitoring and surveillance in the villages

Figure 22: Water quality monitoring and surveillance by villages



### 3.8. Status of JJM

#### A. VWSC/Pani Samiti and PWS signage in villages (N<sub>v</sub>=120)

Presence of VWSC/Pani Samiti	VWSC/Pani Samiti responsible for O&M	% Villages – VWSC/PO trained to use FTKs	% Villages in which signages about JJM was observed
31%	18%	17%	2%

#### B. Water supply, storage and operation & maintenance at village level (N<sub>v</sub>=120)

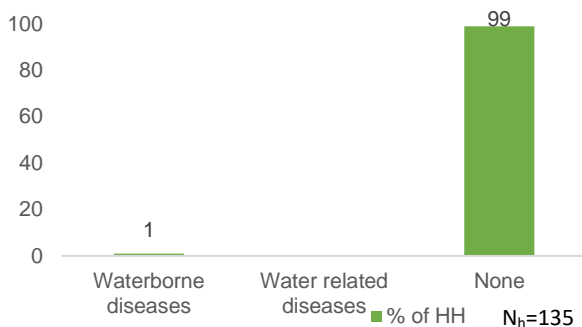
Average no. of supply in a day	% Villages levying water service delivery to HH	% Villages having skilled manpower for O&M for PWS	% Villages where signage was observed
3	90%	42%	2%
% Villages having OHT/ Sump	% Villages having faced O&M challenges	Primary points for reporting grievances	Key problems for reporting grievances
92%	2%	PHED	Pipeline leakage

### 3.9. Perception of HHs on Outcome Indicators

#### a. Health

##### Incidence of water borne diseases at HH level in last one year as reported

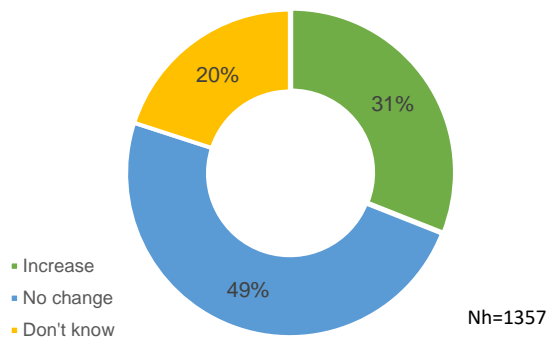
Figure 23: Household reported incidence of water borne diseases in last one year



#### b. Economic Income

##### Change in employment days since FHTC programmes/schemes

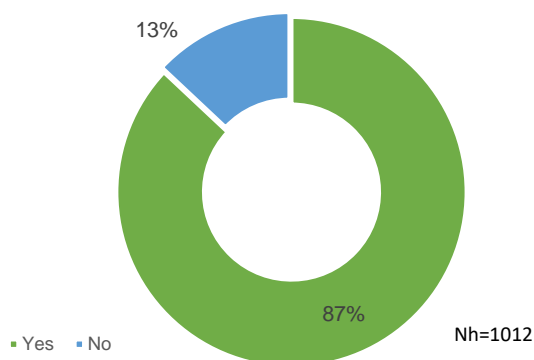
Figure 24: Household reported a change in employment days since FHTC programmes /schemes








#### c. Drudgery

##### Reduction in time and effort in collecting water

Figure 25: Households reported reduction in time and effort in collecting water



## 3.10. User satisfaction

Table No. 5: User satisfaction - more than 75% happy with FHTC services			
S. No.	Parameter (N <sub>h</sub> =1357)		In %
1	Regularity		91
2	Overall quality		83
3	Colour		83
4	Taste		83
5	Odour		86

Note:

Base (N<sub>v</sub>)=120 means all villages sampled and covered in Pondicherry district

Base (N<sub>H</sub>)=1357 means all households sampled and covered across the 120 villages in Pondicherry district

Base (N<sub>H</sub>)=1357 means all households where female members used to fetch water before HH tap connection



## 4. Annexures

### 4.1. Summary of villages

<b>Table No. 6: Village summary</b>						
<b>S.No.</b>	<b>Name of sample village</b>	<b>Sample HHs</b>	<b>Actual sample HHs (achieved)</b>	<b>No. of scheme</b>	<b>No of source of surface water</b>	<b>No of source of Ground water</b>
1	Total	1350	1477	139	67	186
2	Mettu Theru	9	10	1		
3	Nettapakkam	9	10	1		5
4	Bahour	9	10	1		5
5	Mannadipet	18	19	1	4	2
6	Sompet	18	19	1	4	2
7	Abishegapakkam	18	19	1		4
8	Kalithirthalkuppam East	9	10	1		1
9	Poornankuppam	18	19	2		5
10	Kanniakoil	9	10	1		1
11	Moorthykuppam	9	10	1	2	2
12	Pudukuppam	9	10	1	1	
13	Manavelly	9	10	1		
14	Chinnakaraiyambuttur	9	10	1		
15	Karaiyambuttur	9	10	1		1
16	Panayadikuppam	9	10	1		1
17	Seliamedu	9	10	1		
18	P.S.Palayam	18	19	1		1
19	Silkaripalayam	9	10	1		2
20	Vadhanur	18	19	2		3
21	Manalipet	18	19	1		3
22	Manapattu	9	10	1		1
23	Varkalpet	18	19	1		
24	Thiruvandar Koil	9	10	1		
25	Thirubuvanai	9	10	2		1
26	Tribuvanaipalayam	9	10	1		
27	Madagadipet	9	10	1		
28	Madagadipetpalayam	9	10	1		
29	Nallur	9	10	2	1	2
30	Nallur-Kuchipalayam	9	10	2	1	2
31	Pidarikuppam	9	10	1		2
32	K.R.Palayam	18	19	1		3
33	Kunichempet	18	19	4		4
34	K.Manavelly	9	10	1	1	2
35	Kaikalapet	18	19	1		2
36	Kodathur	36	37	1	1	4
37	Suthukeny	9	10	1		
38	Katteri	18	19	0		3
39	Lingareddipalayam	9	10	1		3
40	Sellipet	9	10	1		2
41	Sorapet	9	10	1		4
42	Vinayagampet	9	10	1	2	2
43	Karasur	9	10	2	10	3
44	Sedarapet	9	10	2	5	5
45	Thondamanatham	9	10	2	2	5
46	Thuthipet	9	10	1	1	
47	Pillaiyarkuppam	9	10	2	4	4
48	Koodapakkam	9	10	1	3	3
49	Uruvaiyar	18	19	2	3	

<b>Table No. 6: Village summary</b>						
<b>S.No.</b>	<b>Name of sample village</b>	<b>Sample HHs</b>	<b>Actual sample HHs (achieved)</b>	<b>No. of scheme</b>	<b>No of source of surface water</b>	<b>No of source of Ground water</b>
50	Thirukanji	18	19	1		1
51	Mangalam	9	11	2	5	
52	Keezsathamangalam	9	10	3	2	2
53	Anandhapuram	18	19	0		
54	Pangur	9	10	2	1	
55	Edayarpalayam	9	10	1		1
56	Thavalakuppam	27	28	1		1
57	Kaduvanur	9	10	1		1
58	Manamedu	9	10	1		1
59	Kuruvnatham	9	10	1		4
60	Chinna Arachikuppam	9	10	1		
61	Karikalampakkam	27	28	1		
62	Pillaiyarkuppam	18	19	1		1
63	Valluvarmedu	9	10	1		
64	Eripakkam	9	10	1		4
65	Pudhupattu (Eripakkam Old Pet)	9	10	1		1
66	Kariyamanickam	9	10	1		1
67	Maducarai East	9	10	1		2
68	Embalam	9	10	1		2
69	Korkadu	18	19	1		3
70	Pudukuppam	9	10	1		2
71	Kizhur	9	10	0	1	
72	Nonankuppam	9	10	1		3
73	Odaively	18	19	1		2
74	Korkumedu	9	10	2		1
75	Nanamedu	9	10	1		1
76	Nallavadu	9	10	1		
77	Pudukuppam	9	10	1		
78	Thimmanaikenpalayam	18	19	0	1	
79	Soriyankuppam	9	10	1		
80	Kudiyiruppalayam	9	10	1		3
81	Sarkasimedupet	9	10	1		1
82	Aladimedu	9	10	1		1
83	Eatchangadu (Eswarikuppam)	9	10	1		
84	Pannithittu	18	19	1		1
85	Koravallimedu	9	10	1	2	
86	Andharasikuppam	9	10	1		1
87	Pandasozhanur	9	10	1		2
88	Vadukuppam	9	10	1		1
89	Molapakkam	9	10	1		
90	Sooramangalam	18	19	1		1
91	Kuruvanpet	9	10	1		
92	Pudukuppam	9	10	1		
93	Thirukkanur	18	19	2	2	1
94	Poraiyur	9	10	1		
95	Kirumampakkam	18	19	1		1
96	Ariankuppam East	9	10	1		5
97	Villianur	9	10	1		1
98	Kottaimedu	9	10	2	1	
99	Ariyapalayam	9	10	1		

<b>Table No. 6: Village summary</b>						
<b>S.No.</b>	<b>Name of sample village</b>	<b>Sample HHs</b>	<b>Actual sample HHs (achieved)</b>	<b>No. of scheme</b>	<b>No of source of surface water</b>	<b>No of source of Ground water</b>
100	Kanuvapet	9	10	1		3
101	Sulthanpet	9	10	1		4
102	Kurumbapet	9	11	1		5
103	Bahour	9	10	2		1
104	Kakkaynathoppu	9	10	2		1
105	Ariankuppam	9	10	2		3
106	Veerampattinam	9	10	1	4	
107	Authuvaikalpet	9	10	1		
108	Manavely South	9	10	1	2	4
109	Muthupillaipalayam	9	11	1		
110	G.N.Palayam	9	10	1		3
111	Odiampet East	9	10	1		1
112	Uthiravaginipet	9	10	1		2
113	Ariankuppam Part2	9	10	1		2
114	Ariankuppam Part3	9	10	1		2
115	Ariankuppam Part4	9	10	1		
116	Thavalakuppam Part2	9	10	1		
117	Kalitheerthalkuppam West	9	10	1	1	
118	Sulthanpet North	9	10	1		4
119	Villianur West	9	10	1		2
120	Ariyur North	9	14	1		
121	Villianur Central	9	10	1		1

#### 4.2. Functionality – 55 LPCD vs regularity vs potability vs working tap connection

<b>Table No. 7: Functionality of HH tap connection</b>						
<b>S. No.</b>	<b>Village</b>	<b>Fully Functional* (% HH)</b>	<b>Adequate Quantity (% HH)</b>	<b>Fully Regular Supply (% HH)</b>	<b>Potable (Quality) (% HH)</b>	<b>Working tap connections (%HH)</b>
1	Total	90	100	99	91	100
2	Mettu Theru	100	100	100	100	100
3	Nettapakkam	100	100	100	100	100
4	Bahour	100	100	100	100	100
5	Mannadipet	100	100	100	100	100
6	Sompeta	100	100	100	100	100
7	Abishegapakkam	0	100	100	0	100
8	Kalithirthalkuppam East	100	100	100	100	100
9	Poornankuppam	44	100	94	50	100
10	Kanniakoil	100	100	100	100	100
11	Moorthykuppam	100	100	100	100	100
12	Pudukuppam	0	100	100	0	100
13	Manavely	100	100	100	100	100
14	Chinnakaraiyambuttur	100	100	100	100	100
15	Karaiyambuttur	100	100	100	100	100
16	Panayadikuppam	100	100	100	100	100
17	Seliamedu	0	100	100	0	100
18	P.S.Palayam	100	100	100	100	100
19	Silkaripalayam	100	100	100	100	100
20	Vadhanur	100	100	100	100	100
21	Manalipet	94	100	94	100	100
22	Manapattu	100	100	100	100	100
23	Varkalpet	50	100	100	50	100

<b>Table No. 7: Functionality of HH tap connection</b>						
<b>S. No.</b>	<b>Village</b>	<b>Fully Functional* (% HH)</b>	<b>Adequate Quantity (% HH)</b>	<b>Fully Regular Supply (% HH)</b>	<b>Potable (Quality) (% HH)</b>	<b>Working tap connections (%HH)</b>
24	Thiruvandar Koil	100	100	100	100	100
25	Thirubuvanai	100	100	100	100	100
26	Tribuvanaipalayam	100	100	100	100	100
27	Madagadipet	100	100	100	100	100
28	Madagadipetpalayam	100	100	100	100	100
29	Nallur	100	100	100	100	100
30	Nallur-Kuchipalayam	100	100	100	100	100
31	Pidarikuppam	100	100	100	100	100
32	K.R.Palayam	100	100	100	100	100
33	Kunichempet	100	100	100	100	100
34	K.Manavely	100	100	100	100	100
35	Kaikalapet	100	100	100	100	100
36	Kodathur	89	100	89	100	100
37	Suthukeny	100	100	100	100	100
38	Katteri	100	100	100	100	100
39	Lingareddipalayam	89	100	100	89	100
40	Sellipet	100	100	100	100	100
41	Sorapet	100	100	100	100	100
42	Vinayagampet	67	100	100	67	100
43	Karasur	0	100	89	0	100
44	Sedarapet	0	100	100	0	100
45	Thondamanatham	100	100	100	100	100
46	Thuthipet	100	100	100	100	100
47	Pillaiyarkuppam	100	100	100	100	100
48	Koodapakkam	89	100	89	100	100
49	Uruvaiyar	100	100	100	100	100
50	Thirukanji	94	100	100	94	100
51	Mangalam	100	100	100	100	100
52	Keezsathamangalam	100	100	100	100	100
53	Anandhapuram	100	100	100	100	100
54	Pangur	100	100	100	100	100
55	Edayarpalayam	100	100	100	100	100
56	Thavalakuppam	96	100	96	100	100
57	Kaduvanur	100	100	100	100	100
58	Manamedu	100	100	100	100	100
59	Kuruvinatham	100	100	100	100	100
60	Chinna Arachikuppam	33	100	100	33	100
61	Karikalampakkam	100	100	100	100	100
62	Pillaiyarkuppam	94	100	100	94	100
63	Valluvarmedu	33	100	100	33	100
64	Eripakkam	100	100	100	100	100
65	Pudhupattu (Eripakkam Old Pet)	100	100	100	100	100
66	Kariyamanickam	100	100	100	100	100
67	Maducarai East	100	100	100	100	100
68	Embalam	100	100	100	100	100
69	Korkadu	94	100	100	94	100
70	Pudukuppam	0	100	100	0	100
71	Kizhur	100	100	100	100	100
72	Nonankuppam	100	100	100	100	100
73	Odaively	100	100	100	100	100
74	Korkumedu	89	100	100	89	100
75	Nanamedu	100	100	100	100	100
76	Nallavadu	78	100	100	78	100
77	Pudukuppam	100	100	100	100	100
78	Thimmanaikenpalayam	100	100	100	100	100
79	Soriyankuppam	100	100	100	100	100
80	Kudiyiruppalayam	100	100	100	100	100
81	Sarkasimedupet	100	100	100	100	100

Table No. 7: Functionality of HH tap connection						
S. No.	Village	Fully Functional* (% HH)	Adequate Quantity (% HH)	Fully Regular Supply (% HH)	Potable (Quality) (% HH)	Working tap connections (%HH)
82	Aladimedu	100	100	100	100	100
83	Eatchangadu (Eswarikuppam)	56	100	100	56	100
84	Pannithittu	100	100	100	100	100
85	Koravallimedu	100	100	100	100	100
86	Andharasikuppam	100	100	100	100	100
87	Pandasozhanur	100	100	100	100	100
88	Vadukuppam	100	100	100	100	100
89	Molapakkam	100	100	100	100	100
90	Sooramangalam	100	100	100	100	100
91	Kuruvanpet	100	100	100	100	100
92	Pudukuppam	100	100	100	100	100
93	Thirukkanur	100	100	100	100	100
94	Poraiyur	100	100	100	100	100
95	Kirumampakkam	100	100	100	100	100
96	Ariankuppam East	100	100	100	100	100
97	Villianur	100	100	100	100	100
98	Kottaimedu	78	100	100	78	100
99	Ariyapalayam	100	100	100	100	100
##	Kanuvapet	100	100	100	100	100
##	Sulthanpet	78	100	100	78	100
##	Kurumbapet	60	100	100	60	100
##	Bahour	100	100	100	100	100
##	Kakkaynathoppu	100	100	100	100	100
##	Ariankuppam	100	100	100	100	100
##	Veerampattinam	100	100	100	100	100
##	Authuvaikalpet	56	67	100	78	100
##	Manavelly South	67	100	100	67	100
##	Muthupillaipalayam	100	100	100	100	100
##	G.N.Palayam	100	100	100	100	100
##	Odiampet East	100	100	100	100	100
##	Uthiravaginipet	100	100	100	100	100
##	Ariyankuppam Part2	100	100	100	100	100
##	Ariyankuppam Part3	100	100	100	100	100
##	Ariyankuppam Part4	100	100	100	100	100
##	Thavalakuppam Part2	100	100	100	100	100
##	Kalitheerthalkuppam West	100	100	100	100	100
##	Sulthanpet North	100	100	100	100	100
##	Villianur West	100	100	100	100	100
##	Ariyur North	100	100	100	100	100
##	Villianur Central	100	100	100	100	100

\* Functionality has been computed as = Quantity  $\cap$  Regularity  $\cap$  Potability (Excluding on site tested Residual Chlorine)

## 4.3. Villages not meeting the quality parameters

Table No. 8: Quality parameters dissatisfied at village level					
1. pH (Acceptable Range- 6.5 to 8.5)					
S.No .	Block Name	Panchayat Name	Villages	No. of HHs outside the acceptable range	
1	Ariyankuppam	Abishegapakkam	Abishegapakkam	18	
2		Manapet	Varkalpet	9	
3		Parikalpet	Chinna Arachikuppam	6	
4		Pillaiyarkuppam	Pillaiyarkuppam	1	
5			Valluvarmedu	6	
6			Eatchangadu (Eswarikuppam)	4	
7		Poornankuppam	Poornankuppam	9	
8	Villianur	Kottaimedu	Kottaimedu	2	
9		Mathikrishnapuram	Pudukuppam	9	
10		Sulthanpet South	Sulthanpet	2	
2. Free residual chlorine (Acceptable Range- 0.2 to 1 PPM)					
S.No .	Block Name	Panchayat Name	Villages	HHs outside the acceptable/permissible range	HHs with no chlorine
1	Ariyankuppam	Abishegapakkam	Abishegapakkam	0	9
2		Andiarpalayam	Korkumedu	0	9
3			Thavalakuppam Part2	0	9
4		Ariyankuppam East	Ariankuppam East	0	9
5		Bahour East	Bahour	0	9
6		Bahour West	Bahour	0	9
7		Embalam	Embalam	0	9
8		Eripakkam	Eripakkam	0	9
9			Pudhupattu (Eripakkam Old Pet)	0	9
10			Andharasikuppam	0	9
11		Kakkayanthope	Kakkaynathoppu	0	8
12			Ariyankuppam Part3	0	9
13		Kalmandapam Pandasozhanallur	Pandasozhanur	0	9
14			Vadukuppam	0	9
15		Karayamputhur	Karaiyambuttur	0	9
16			Panayadikuppam	0	8
17		Kariamanickam	Kariyamanickam	0	9
18			Molapakkam	0	9
19		Karikalampakkam	Karikalampakkam	0	27
20		Kirumampakkam	Kirumampakkam	0	9
21		Korkadu	Korkadu	0	18
22		Kudiyiruppalaiyam	Kudiyiruppalayam	0	9
23			Sarkasimedupet	0	9
24		Kuruvinatham	Kuruvinatham	0	9
25		Maducarai East	Maducarai East	0	9
26		Madukarai West	Kuruvanpet	0	9
27		Manamedu	Chinnakaraiyambuttur	0	9
28			Kaduvanur	0	8
29			Manamedu	0	9
30		Manapet	Kanniakoil	0	9
31			Manapattu	0	9
32			Varkalpet	0	18
33		Manavelly	Manavelly	0	9
34		Mathikrishnapuram	Moorthykuppam	0	9
35			Pudukuppam	0	9
36			Koravallimedu	0	9
37		Nallavadu	Nallavadu	0	9
38			Pudukuppam	0	9

<b>Table No. 8: Quality parameters dissatisfied at village level</b>					
39	Villianur	Nettapakkam	Mettu Theru	0	9
40			Nettapakkam	0	9
41		Nonankuppam	Nonankuppam	0	9
42			Ariyankuppam Part4	0	9
43		Odaively	Odaively	0	18
44		Pannithittu	Aladimedu	0	9
45			Pannithittu	0	17
46		Parikalpet	Chinna Arachikuppam	0	9
47		Pillaiyarkuppam	Pillaiyarkuppam	0	17
48			Valluvarmedu	0	9
49			Eatchangadu (Eswarikuppam)	0	9
50		Poornankuppam	Poornankuppam	0	13
51		Seliamedu	Seliamedu	0	9
52		Sembiapalayam Nathamedu	Pudukuppam	0	9
53		Sooramangalam	Sooramangalam	0	18
54		Soriankuppam	Soriyankuppam	0	9
55		Thavalakuppam	Edayarpalayam	0	9
56			Thavalakuppam	0	27
57			Nanamedu	0	9
58		Thimmanayakkanpalayam	Thimmanaikenpalayam	0	11
59		Veerampattinam	Veerampattinam	0	9
60		Ariyur North	Anandhapuram	0	18
61			Ariyur North	0	4
62		Ariyur South	Pangur	0	9
63		Chettipet	Manalipet	0	18
64		Kalitheerthalkuppam East	Kalithirthalkuppam East	0	9
65		Kalitheerthalkuppam West	Silkaripalayam	0	9
66			Kalitheerthalkuppam West	0	9
67		Kodathur	K.Manavely	0	9
68			Kaikalapet	0	18
69			Kodathur	0	36
70		Koodapakkam	Koodapakkam	0	1
71		Kunichampet	K.R.Palayam	0	18
72			Kunichempet	0	18
73		Kurumbapet	Kurumbapet	0	10
74		Madagadipet	Madagadipet	0	8
75			Nallur	0	9
76			Nallur-Kuchipalayam	0	9
77		Manavely North	Muthupillaipalayam	0	10
78			G.N.Palayam	0	9
79		Manavely South	Authuvaikalpet	0	9
80			Manavely South	0	9
81		Mannadipet	Mannadipet	0	18
82			Sompet	0	17
83		Odaimpet East	Odiampet East	0	9
84		Odiampet West	Uthiravaginipet	0	9
85		Pillaiyarkuppam	Pillaiyarkuppam	0	9
86		Poraiyur Agaram	Poraiyur	0	9
87		Sanniyasikuppam	Pidarikuppam	0	9
88		Sathamangalam	Keezsathamangalam	0	9
89			Sedarapet	0	1
90		Sellipet	Sellipet	0	9
91		Sivaranthagam	Kizhur	0	9
92		Sorapet	Sorapet	0	9
93		Sulthanpet North	Sulthanpet North	0	9
94		T.Palayam-M.Palayam	Tribuvanaipalayam	0	9
95			Madagadipetpalayam	0	8



Table No. 8: Quality parameters dissatisfied at village level					
96		Thirubuvanai	Thirubuvanai	0	9
97		Thirukanchi	Thirukanji	0	18
98		Thirukkanur	Thirukkanur	0	9
99		Thiruvandarkoil	Thiruvandar Koil	0	9
100		Uruvaiyar	Uruvaiyar	0	10
101		Vadhanur-P.S.Palayam	P.S.Palayam	0	18
102			Vadhanur	0	18
103		Villianur (Central)	Villianur Central	0	9
104		Villiyannur East	Villianur	0	9
105		Villiyannur West	Ariyapalayam	0	9
106		Villianur West	0	9	
3. Turbidity (Acceptable Range- 1 to 5 NTU)					
S.No	Block Name	Panchayat Name	Villages	HHs outside the acceptable/permissible range	
1	Ariyankuppam	Korkadu	Korkadu	1	
2		Mathikrishnapuram	Pudukkuppam	9	
3		Nallavadu	Nallavadu	2	
4		Seliamedu	Seliamedu	9	
5	Villianur	Thirukanchi	Thirukanji	1	
4. Total hardness (Acceptable Range- 200 to 600 Milligram/litre)					
S.No	Block Name	Panchayat Name	Villages	HHs outside the acceptable/permissible range	
1	Villianur	Kurumbapet	Kurumbapet	4	
5. Total alkalinity (Acceptable Range- 200 to 600 Milligram/litre)					
S.No	Block Name	Panchayat Name	Villages	HHs outside the acceptable/permissible range	
NA	NA	NA	NA	NA	
6. Chloride (Acceptable Range- 250 to 1000 Milligram/litre)					
S.No	Block Name	Panchayat Name	Villages	HHs outside the acceptable/permissible range	
1	Villianur	Kurumbapet	Kurumbapet	4	
7. Ammonia (Acceptable Range- 0.5 Milligram/litre)					
S.No	Block Name	Panchayat Name	Villages	HHs outside the acceptable/permissible range	
NA	NA	NA	NA	NA	
8. Iron (Acceptable Range- 1 Milligram/litre)					
S.No	Block Name	Panchayat Name	Villages	HHs outside the acceptable/permissible range	
1	Ariyankuppam	Andiarpalayam	Korkumedu	1	
2		Pillaiyarkuppam	Valluvarmedu	4	
3	Villianur	Manaveli South	Authuvaikalpet	2	
9. Nitrate (Acceptable Range- 1 Milligram/litre)					
S.No	Block Name	Panchayat Name	Villages	HHs outside the acceptable/permissible range	
NA	NA	NA	NA	NA	
10. Sulphate (Acceptable Range- 200 to 400 Milligram/litre)					
S.No	Block Name	Panchayat Name	Villages	HHs outside the acceptable/permissible range	
1	Villianur	Sedarapet	Karasur	9	
2			Sedarapet	9	
3		Sorapet	Vinayagampet	3	
11. Total dissolved solids (Acceptable Range- 500 to 2000 Milligram/litre)					
S.No	Block Name	Panchayat Name	Villages	HHs outside the acceptable/permissible range	
1	Villianur	Kurumbapet	Kurumbapet	4	
12. Bacteriological test (Presence)					
S.No	Block Name	Panchayat Name	Villages	HHs outside the acceptable/permissible range	
1	Villianur	Manaveli South	Manaveli South	3	
13. Fluoride (Acceptable Range- 1 to 1.5 Milligram /litre)					
S.No	Block Name	Panchayat Name	Villages	HHs outside the acceptable/permissible range	
1	Villianur	Sandaipudukuppam	Lingareddipalayam	1	

Table No. 8: Quality parameters dissatisfied at village level				
14. Arsenic (in hotspots) (Acceptable Range- 0.01 Milligram /litre)				
S.No	Block Name	Panchayat Name	Villages	HHs outside the acceptable/permissible range
NA	NA	NA	NA	NA