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

Har Ghar Jal
Jal Jeevan Mission

District Report: Kannur, Kerala
Survey Duration: February to April, 2022

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Abbreviations

AWC	Aanganwadi Centre
FHTC	Functional Household Tap Connection
GoI	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	>= 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	1,000
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	2,000
xiii. Fluoride	Mg/litre	1	1.5

Parameters for potable water tested in the survey		Unit	Acceptable Limit	**Permissible Limit** in the absence of alternative sources
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	Kerala	Kannur
Functionality status of FHTC at households		
Households (HHs) which received water through FHTC at least once in last 7 days (%)	99	100
Fully functional (%)	40	38
Partially functional (%)	58	62
Non-functional (%)	2	0
Quantity of water received by households		
Adequate quantity (>55 LPCD) (%)	97	100
Partially adequate quantity (> 40 LPCD - < 55 LPCD) (%)	2	0
Inadequate quantity (<40 LPCD) (%)	1	0
Regularity of water received by households		
Fully Regular Supply (as per schedule) (%)	76	62
Partially Regular Supply (not as per schedule) (%)	21	38
Irregular Supply (less than 9 months' supply) (%)	3	0
Potable (Quality) water received by households		
Potable (%)	53	64
Non-potable (%)	47	36
Residual Chlorine (RCL) detected with in permissible limits (%)	49	24

Household level indicators		
Households receiving water supply daily-7 days a week (%)	52	39
Daily HH requirement of water being met by FHTC (%)	78	58
Households reported FHTC as a primary source of drinking water (%)	58	16
Households purifying water before drinking (%)	94	98
Households paying water service delivery charges (%)	63	51
Households having coping mechanisms during scarcity (%)	48	47
Households aware of grievance redressal mechanism for reporting problems with FHTC (%)	83	100
Households reported incidence of water-borne diseases in the last year (%)	0	0
Households reported a reduction in time and effort in collecting water (%)	55	80
Overall user satisfaction at the household level		
Regularity (%)	87	99
Overall quality (%)	87	100

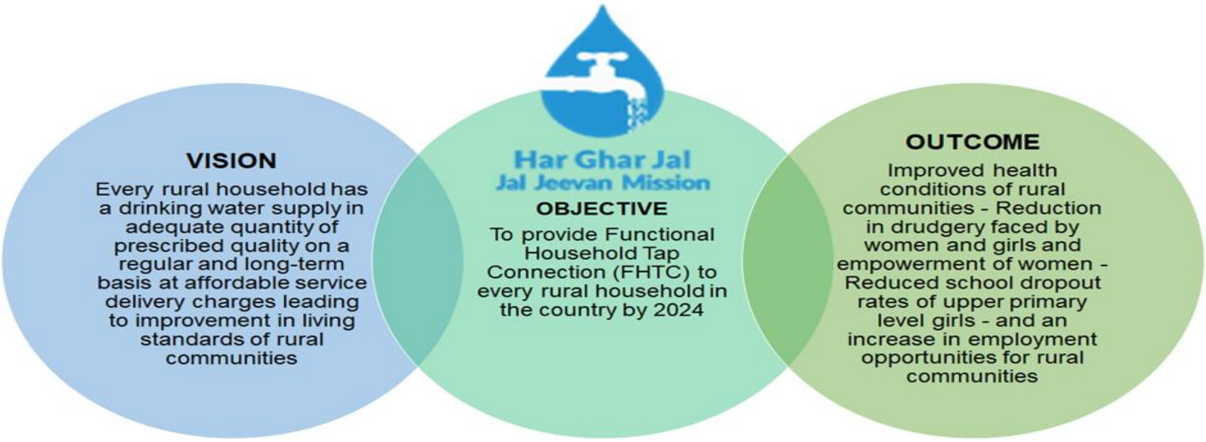
Indicators	Kerala	Kannur
Village level indicators (based on village questionnaire)		
Schemes reported to be functional (%)	35	44
Villages with groundwater resource (%)	30	10
Villages having groundwater recharge structure[1] (%)	2	0
Water supply and storage status in villages		
Average no. of times water is supplied in a day	1	2
Villages having OHT/ Sump for storage of water (%)	52	52
Water quality monitoring and surveillance in the villages		
Villages with Field Test Kits (%)	19	10
Villages in which bacteriological test was done in last 1 year by VWSC/ Pani Samiti (%)	17	24
Villages reported to have a mechanism for chlorination (%)	17	5
VWSC/Pani Samiti and PWS signage in villages		
Village reported having presence of VWSC/ Pani Samiti (%)	33	5
Villages in which VWSC/ Pani Samiti is responsible for Operation & Maintenance of PWS schemes (%)	7	0
Villages in which persons are trained to use Field Test Kits (%)	18	19
Villages in which signages about JJM were observed (%)	2	5
Operation and maintenance at village		
Villages levying water service delivery to households (%)	57	62
Convergence of JJM activities with other schemes in the villages (%)	9	0
Villages having skilled manpower for Operation & Maintenance of PWS schemes (%)	40	52
Community monitoring of water wastage in villages (%)	16	24

[1] Out of villages who reported to have groundwater source (N_v=2)

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: Kannur

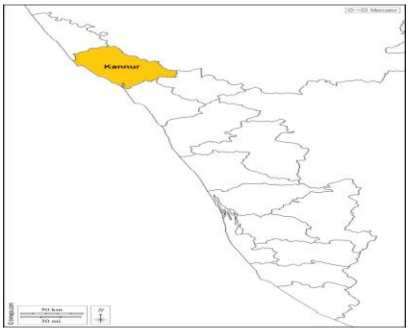
District Kannur of Kerala has a population of 19,39,217. The district has 10 blocks. Out of 110 villages in the district, None, are SC dominated and None are ST dominated villages. The district lies in West coast plains and hill region and receives an annual rainfall of 3438mm.

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

Figure 2: District IMIS Status & Map

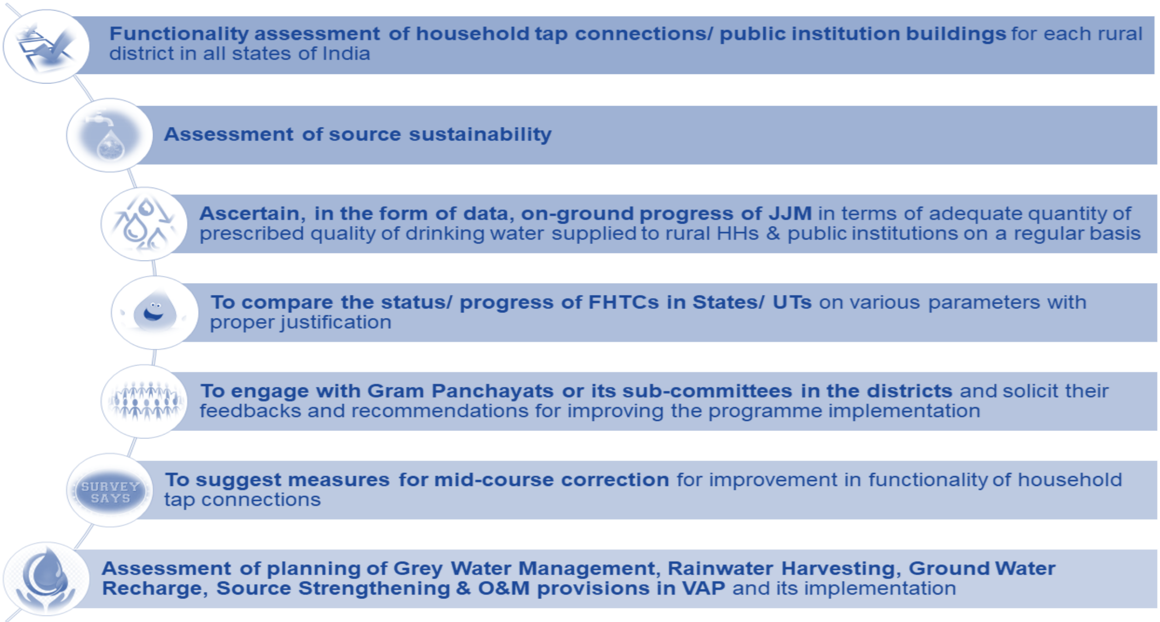
IMIS status:

- 4 (4% of all) villages are Har Ghar Jal
- 106 (96% of all) villages are non-Har ghar Jal
- Non-SC/ST dominated district
- Non-JE/AES
- Yes- History of water contamination
- 74 (67% of all) villages with PWS more than 20 FHTC



2.2. FHTC Assessment Objectives

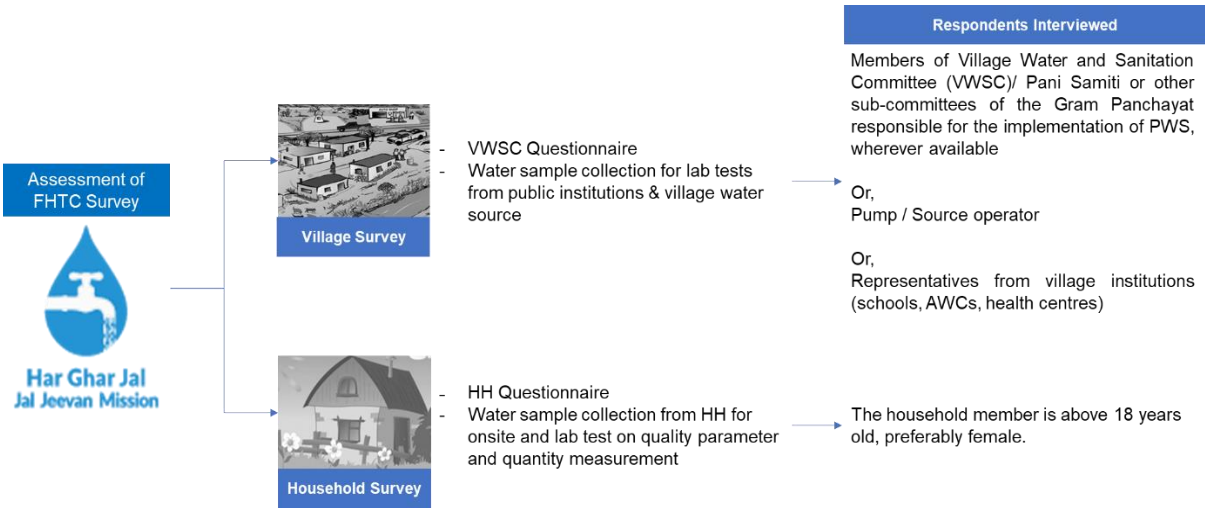
Figure 3: Objectives of Functionality of Tap Connections



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.

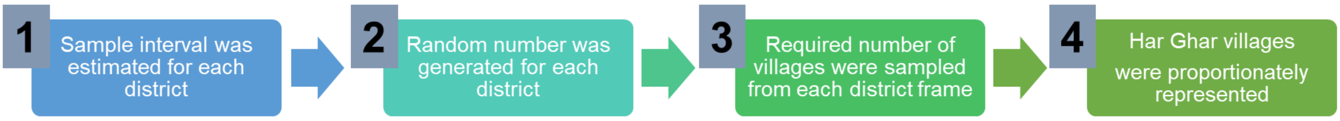
- Village sample is estimated to be representative at the state level
- HH sample estimated to be representative at the district level

- 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

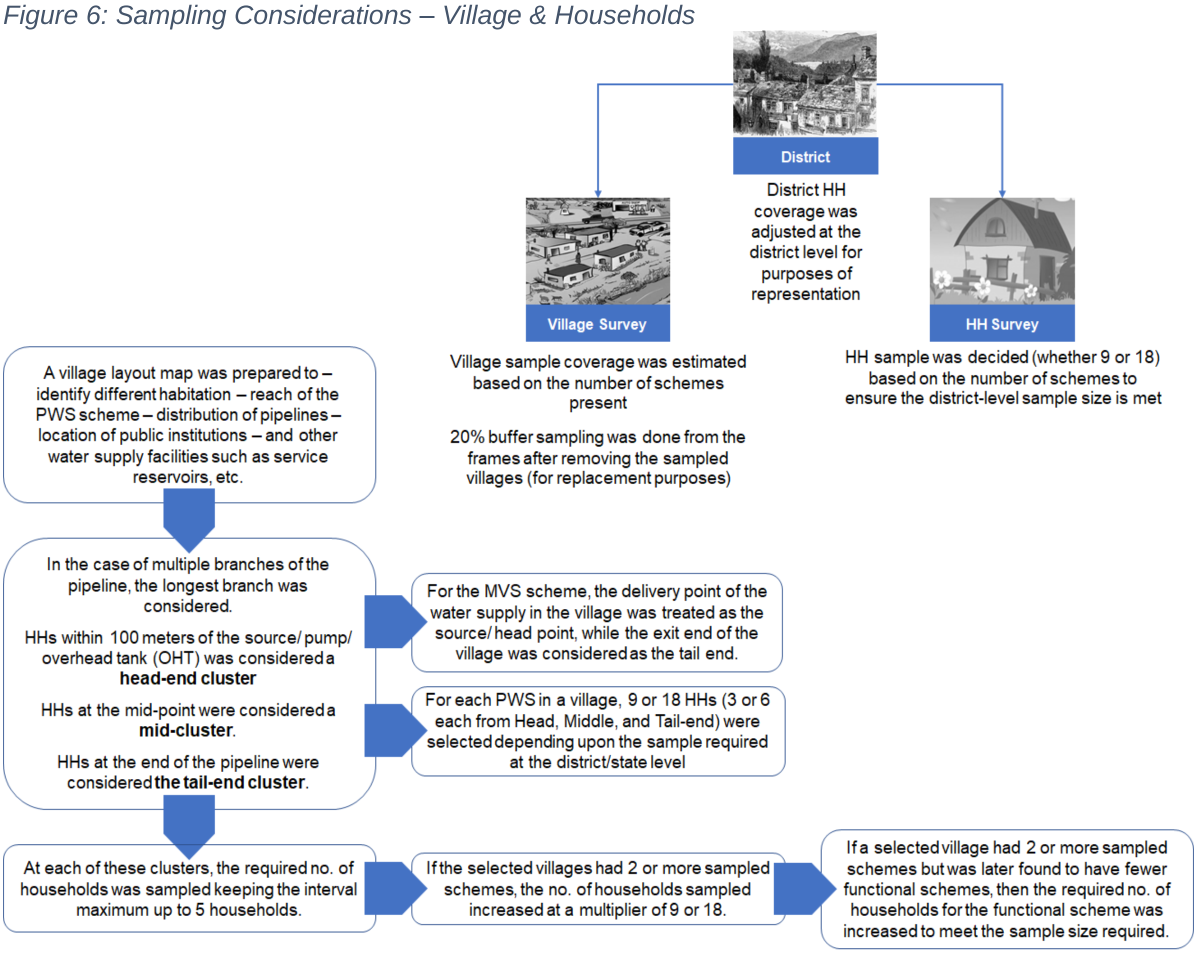
As per the design, all villages having a PWS scheme with 20 or more functional household tap connections were included in the sample frame. The probability proportionate to size (PPS) method was used for village selection in each district. The steps for random selection of villages using PPS are as presented:

Figure 5: Steps for Village Sampling



The key considerations for the village and household sampling were:

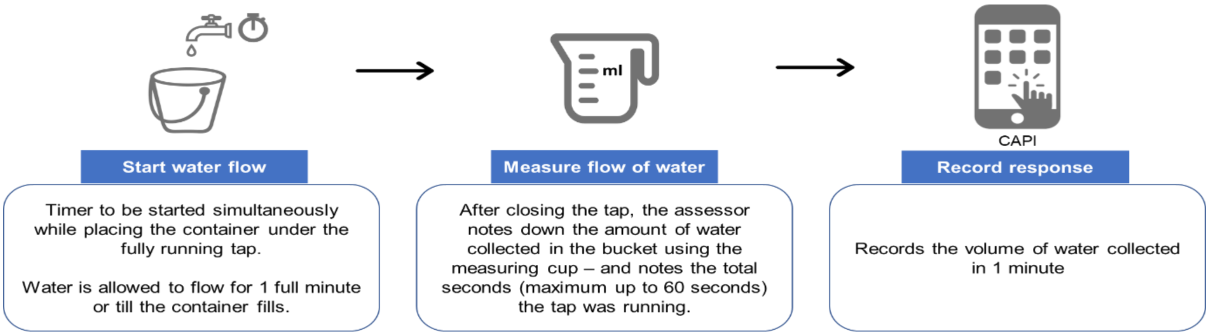
Figure 6: Sampling Considerations – Village & Households



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:

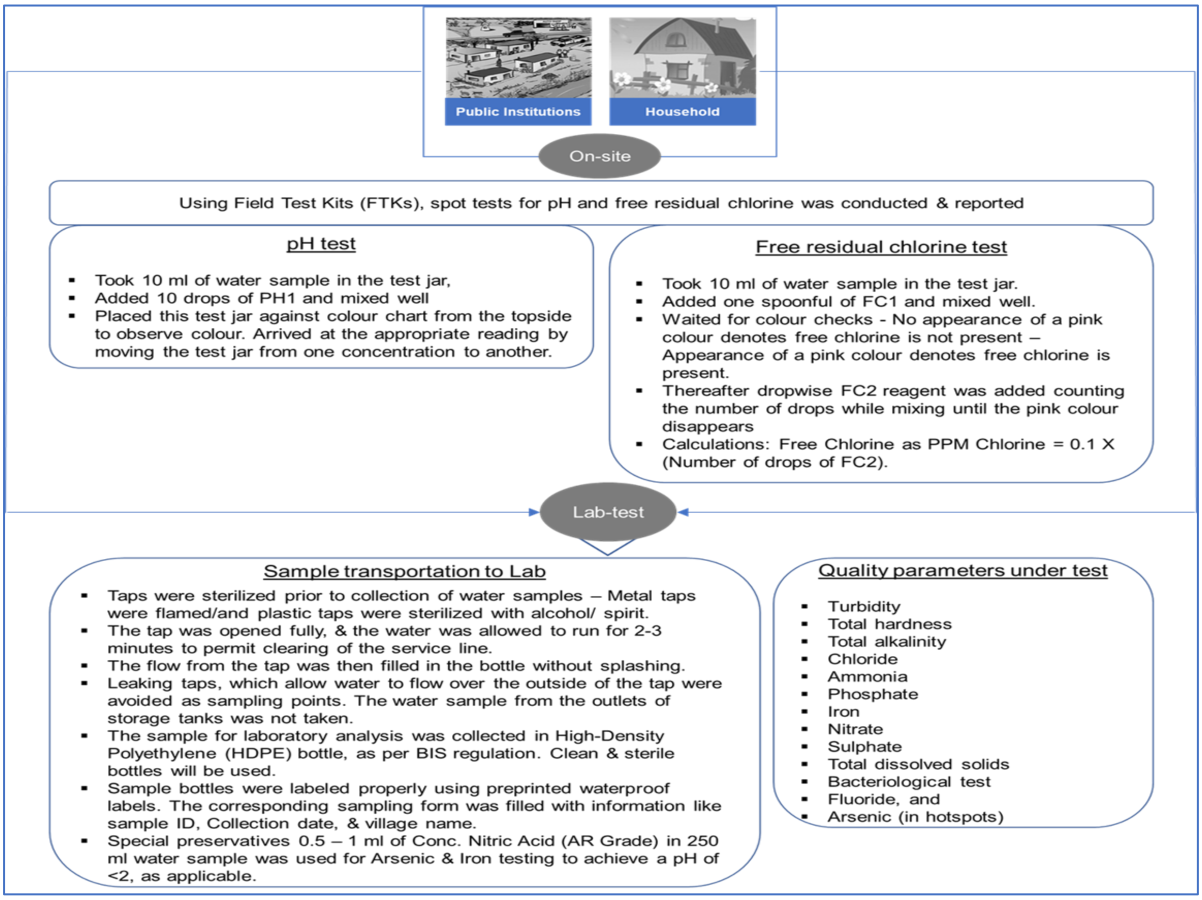
- Assessor first asked and recorded length, breadth, and height.
- Assessor dipped a 5 feet long rod, marked the level of the water table, and calculated the volume – length x breadth x-height of water.
- Next the assessor opened the valve of the connection and allowed the water to flow inside the storage 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

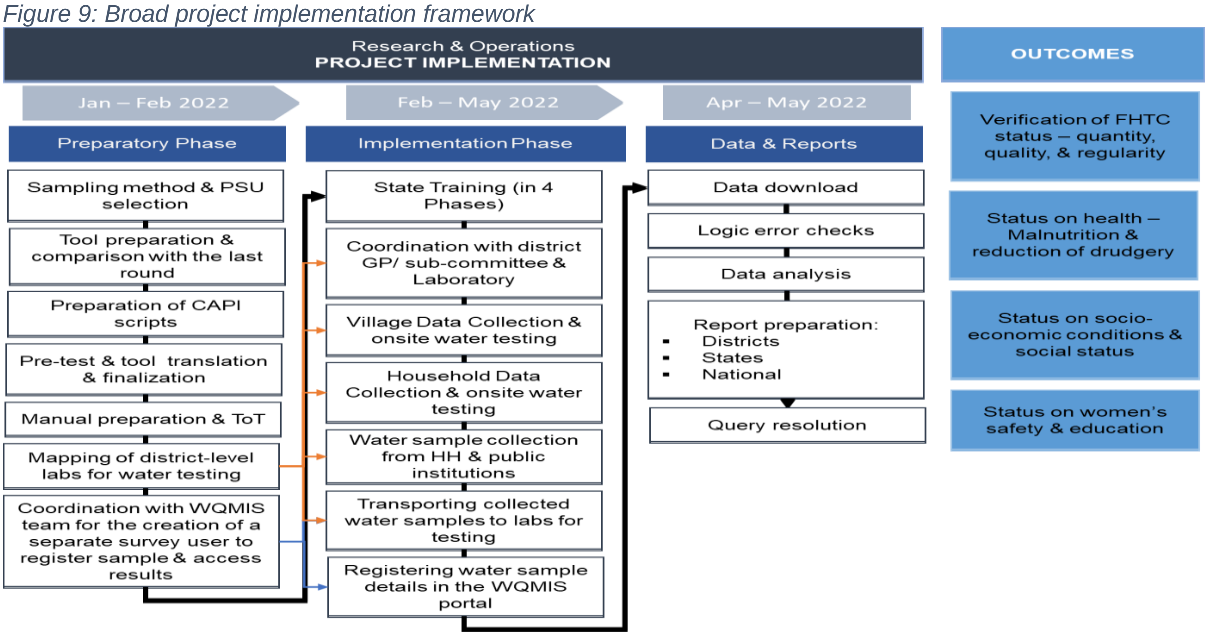


JJM, with the support of the BMI Division of ICMR, enabled a new interface on the WQMIS portal for "Functionality Assessment (FA) User" to enable seamless harmonization of water sample registration, sample submission for testing, and sharing of results as per the applicable quality parameters.

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 states of Kerala. 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
Kerala	6 Teams	02-18-2022	04-06-2022	45 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
Kannur	**21**	**432**	**21**	**454**	**29**
Kerala	**296**	**6,471**	**296**	**6,583**	**245**

2.10. Sampled village and household profile

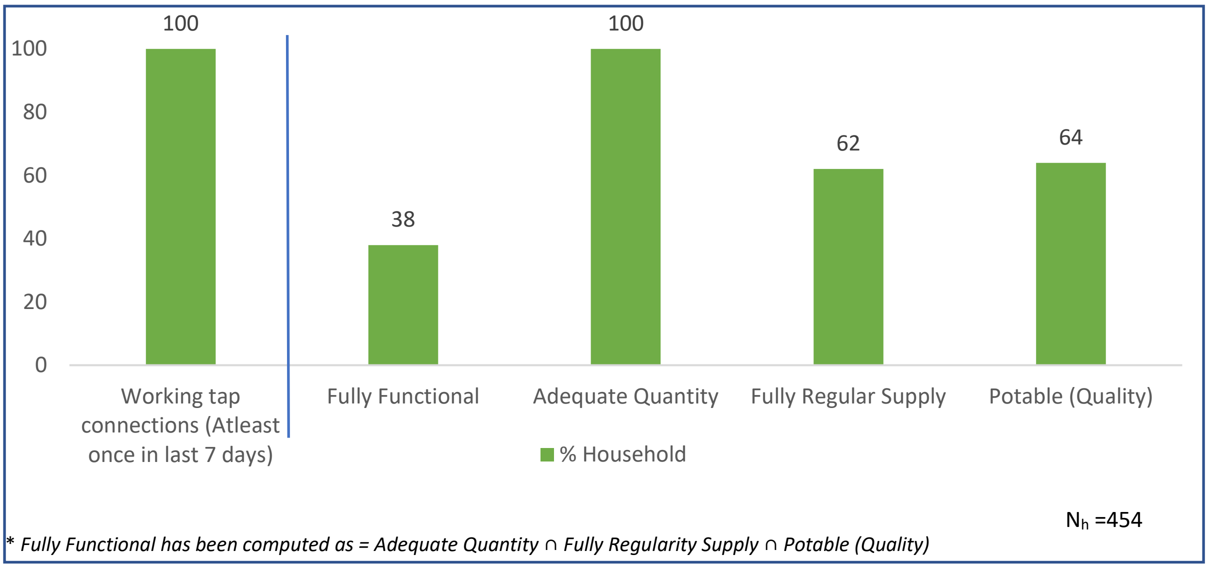
SAMPLED VILLAGES	SAMPLED HOUSEHOLDS
• Total no. of villages covered in the district **–** 21 • Percentage of SC dominated villages covered in the district is 0% (which is equal to the state average, i.e., 0%) • Percentage of ST dominated villages covered in the district is 0% (which is lower than the state average, i.e., 1%) • Lower proportion of other interviewed at the village level • **Yes,** the district reported to have any historical incidence of water contamination	• Total no. of households covered in the district **– 454** • Proportion of General - 83%, SC 0%, ST% 0, OBC 17% households • **46%** of the FHTC connections are under the name of a female member • Average household size **–** 4 • **>75%** positive user experience in 5/5 measures

3. Findings

3.1. Functionality status of FHTC at household level

A. Functionality – Working tap connection vs 55 LPCD vs regularity vs potability

Figure 10: Functionality of HH tap connection



It has been found that 100 percent of the sampled HHs (N=454) had working tap connections (i.e., received water at least once in last 7 days). Less than half (38 percent) HHs had fully functional tap connection (i.e., HHs receiving adequate quantity of prescribed quality of water on a regular basis).

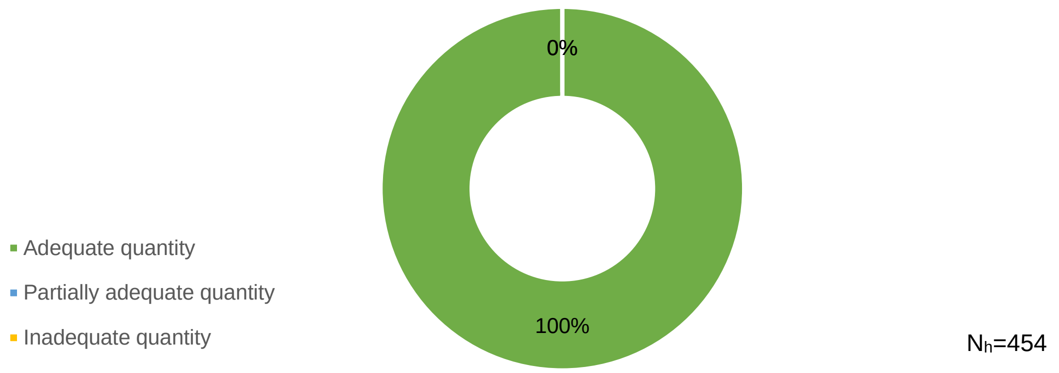
3.2. Quantity, Regularity, and Quality of Water

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)

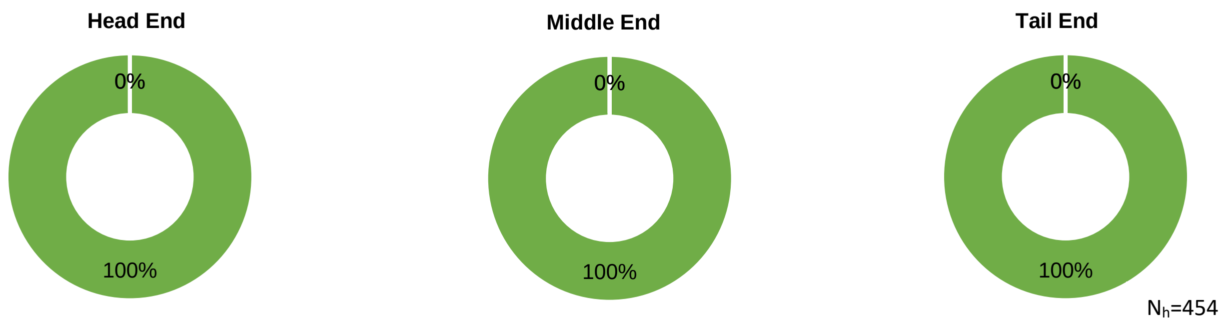
100% HHs reported receiving adequate quantity of water

Figure 11: Quantity of water received by households



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

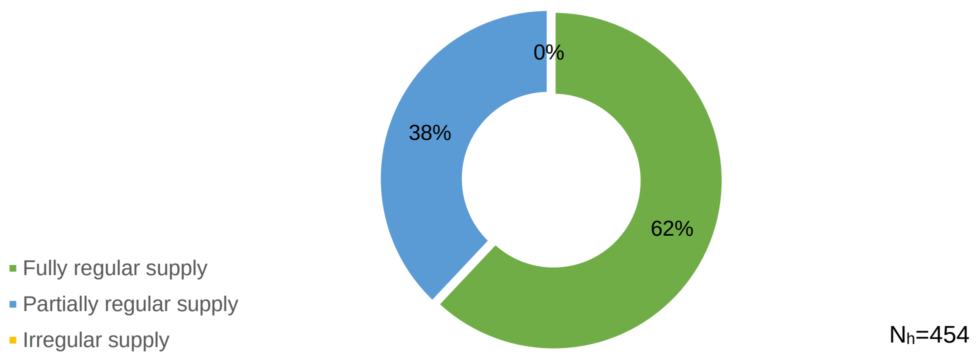
Figure 12: Quantity of water received across head, middle and tail end households



B. Regularity of water supply to households

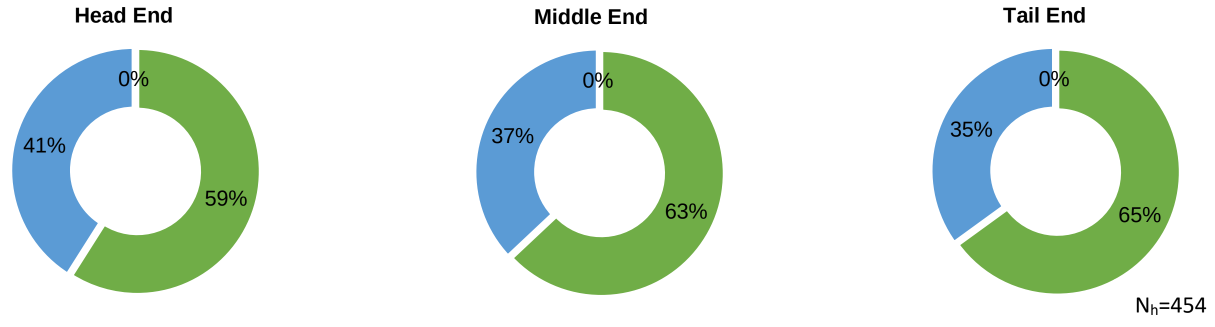
62% HHs receive a regular supply of water (as per agreed schedule)

Figure: Regularity of water received by households



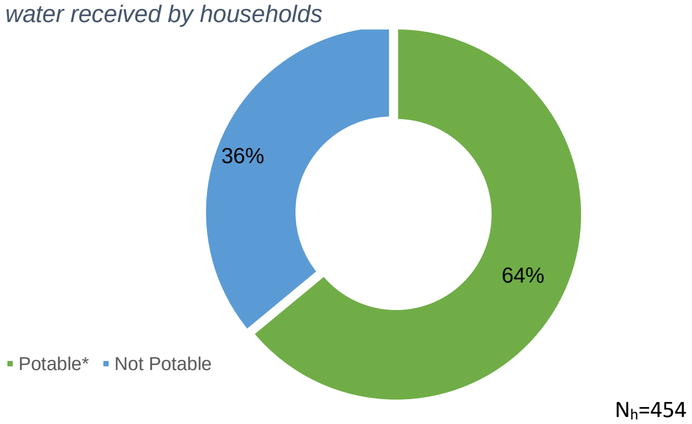
Regularity of water received across head, middle, and tail end

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 (N_v=21)	Water Samples Tested from Public Institutes			
	Anganwadi Centre	Health Facility	Schools	Others
pH (on-site)	100	100	92	
Turbidity	Not tested			
Total Hardness	Not tested			
Total Alkalinity	Not tested			
Chloride	Not tested			
Ammonia	Not tested			
Iron	Not tested			
Nitrate	Not tested			
Sulphate	Not tested			
Total Dissolved Solids	Not tested			
Bacteriological Test	Not tested			
Fluoride	No history			
Arsenic	No history			

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

Quality Parameters	No of water samples tested	% Samples within permissible range
pH (on-site)	454	94
Turbidity	445	98
Total Hardness	445	100
Total Alkalinity	445	100
Chloride	445	100
Ammonia	Not tested	
Iron	445	100
Nitrate	445	100
Sulphate	445	100
Total Dissolved Solids	445	100
Bacteriological Test(Presence/Absence)	445	70
Fluoride	No history	
Arsenic (In Hotspots)	No history	

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

The Residual Chlorine (RC) in the Kannur district was found in 24% samples. Out of which 52% samples were having RC outside range whereas 24% samples, had no RC. It has been found that 70% of the samples passed the bacteriological contamination test and the remaining 30% failed. Out the 30% samples that failed, 27% had RC within permissible limit, 45% outside the range, and the remaining 28% samples had no RC.

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.

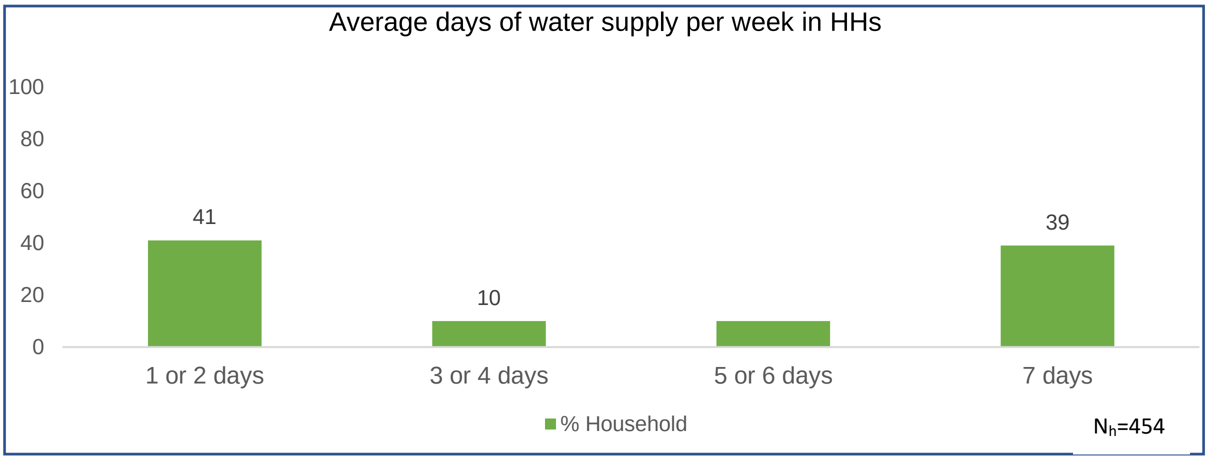
Comment on functioning of District Lab:

The district lab tested water samples for 9 water quality parameters. 483 water samples were submitted, and 445 water samples were tested, and reports made available. The turnaround time for testing was more than 48 hours in most cases.

Initially the lab was not accepting more than 20 sample in a day and refused to take sample on weekends and public holidays. However, it was sorted out after many discussions with State Chief Chemist.

3.3. Average water supply days in a week

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

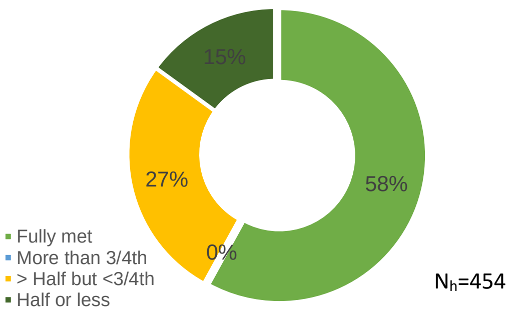


3.4. Household utilization of water for drinking and other activities

Fulfilment of requirement

58% HHs reported that their daily requirement of water is being met by FHTCs

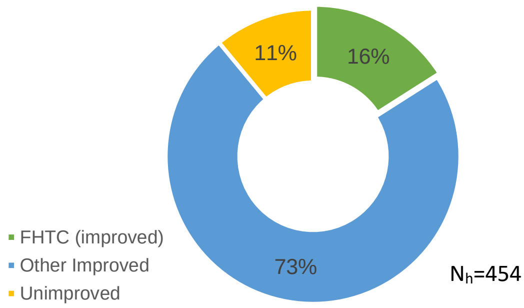
Figure 17: Daily household's requirement of water being met by FHTC



Primary source of drinking water

16% 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 (Nh=454)

% HHs purifying water before drinking	% HHs paying water service delivery charges	% HHs with booster pumps	% HHs having coping mechanism during scarcity
98%	**51%**	**1%**	**47%**

% HH aware of grievance redressal mechanism for reporting problems with FHTC	Channel for registering grievance (Nₕ=454*)	Key problems for reporting grievances (N=454)	% Reported complaints resolved (Nₕ=0)
100%	**10**	**0**	0%

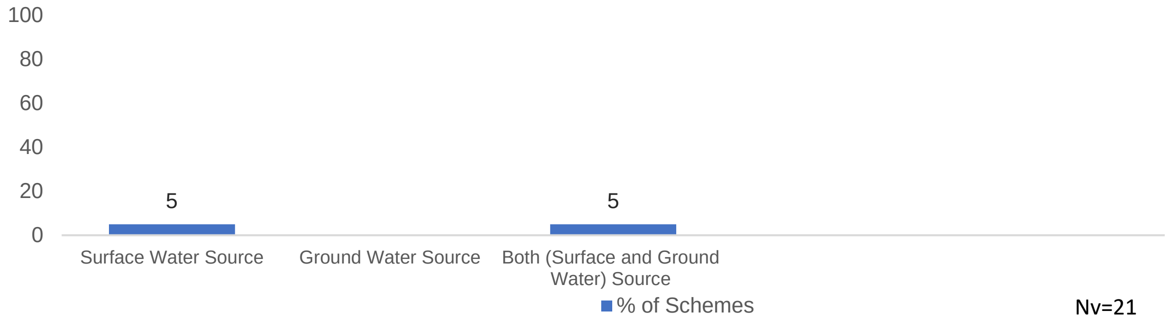
**HHs who reported complaints in last 1 year*

3.6. Source sustainability at the village level

Schemes based on surface and ground water

5% of schemes are reported to be based on surface water and 0% ground water.

Figure 19: Schemes based on water source in village

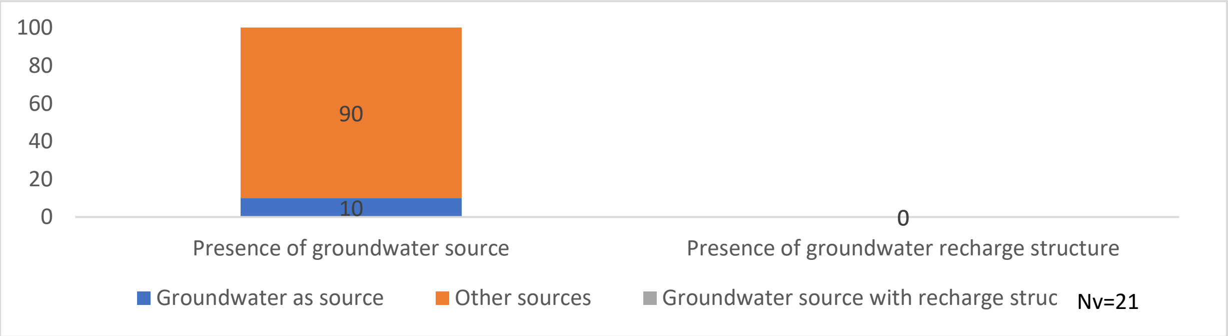


**'Surface Water Source' is Stream, Spring, Glacier, River, lake, pond etc. and Groundwater Source is open well, borewell, tube well, handpump, spring, etc*

Villages reported having presence of a groundwater source

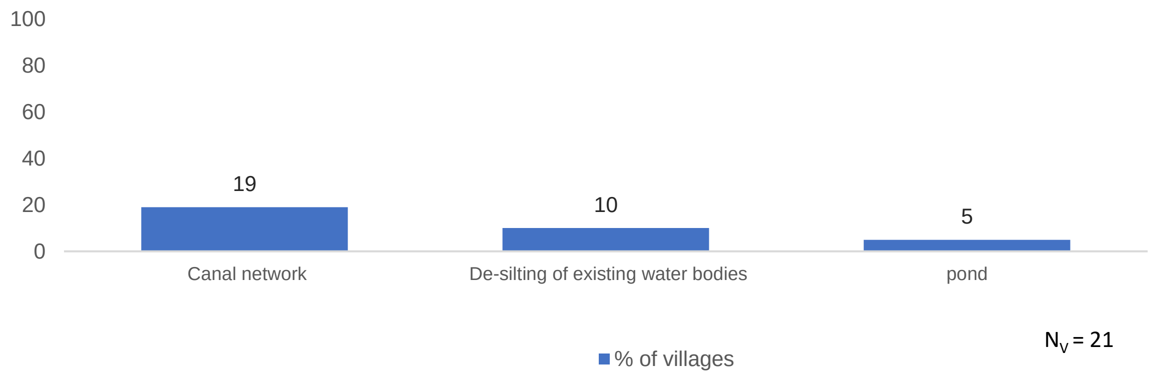
10% of villages reported the presence of groundwater sources like improved dug wells and borewells, and were supported by recharging structures.

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



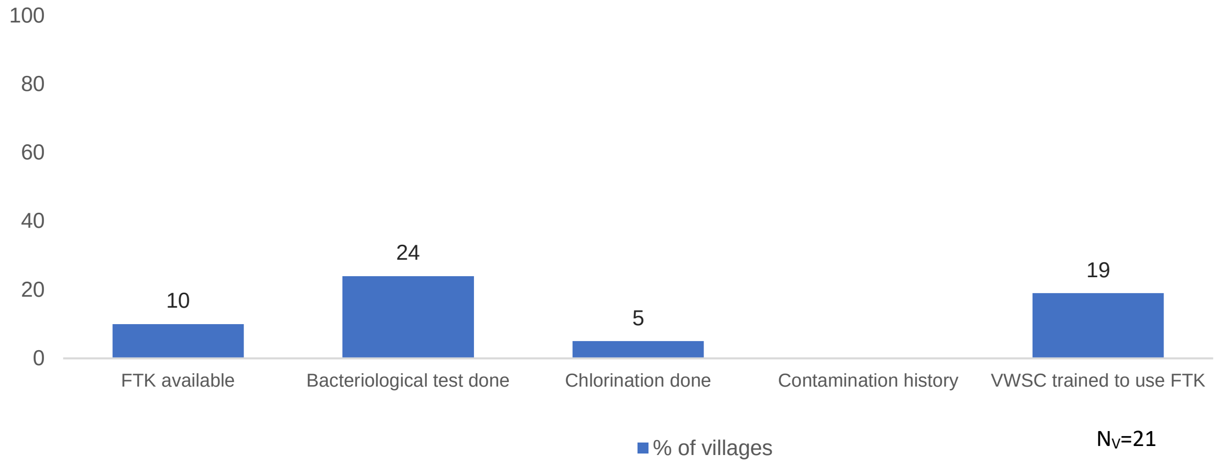
The top 3 other source sustainability measure taken by villages

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_v=21)

Presence of VWSC/Pani Samiti	VWSC/Pani Samiti responsible for O&M	% Villages – VWSC/PO trained to use FTKs	% Villages with PWS signages
5%	**0%**	**19%**	**5%**

B. Water supply, storage and operation & maintenance at village level (N_v=21)

Average no. of supply in a day	% Villages levying water service delivery to HH	% Villages with skilled manpower for O&M	Community monitoring of water wastage in villages
2	**62%**	**52%**	**24%**

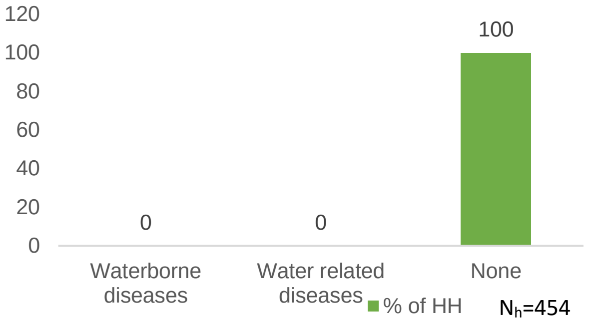
% Villages having OHT/ Sump	% Villages with O&M challenges	Primary points for reporting grievances	Key problems for reporting grievances
52%	**14%**	**none**	**none**

3.9. Perception of HHs on Outcome Indicators

a. Health

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

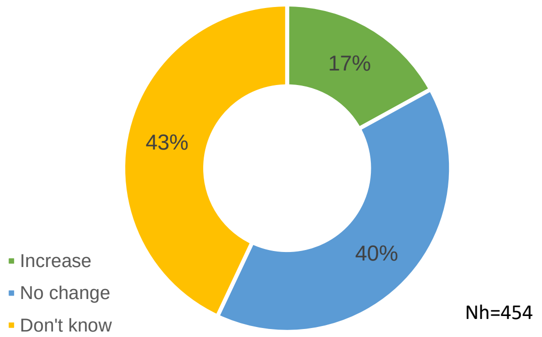
Figure 23: Household reported incidence of water borne diseases in last one year



b. Economic Income

Change in employment days since FHTC programmes/schemes

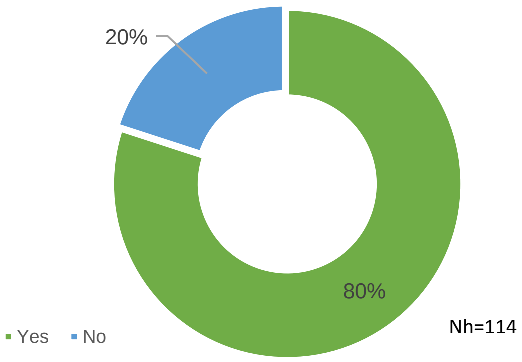
Figure 24: Household reported a change in employment days since FHTC programmes /schemes



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_h=454)		In %
1	Regularity	☺	99
2	Overall quality	☺	100
3	Colour	☺	100
4	Taste	☺	100
5	Odour	☺	100

Note:
Base (N_v)=21 means all villages sampled and covered in Kannur district
Base (N_H)=454 means all households sampled and covered across the 21 villages in Kannur district
Base (N_H)=454 means all households where female members used to fetch water before HH tap connection

4. Annexures

4.1. Summary of villages

Table No.6: Village summary

S.No.	Name of sample village	Sample HHs	Actual sample HHs (achieved)	No. of scheme	No of source of surface water available in the village	No of source of ground water available in the village
1	Total	432	475	20	2	3
2	Kooveri	27	33	1		
3	Pattuvam	27	31	1	2	2
4	Kunhimangalam	18	19	1		
5	Madayi	27	28	1		
6	Ezhome	27	28	1		
7	Mattool	18	19	1		
8	Padiyoor	27	28	1		
9	Kuttiattoor	27	29	1		
10	Pattannur	27	29	0		
11	Kolavelloor	9	10	1		1
12	Kathirur	18	19	1		
13	Pappinissery	18	19	1		
14	Muzhappilangad	18	19	1		
15	Anjarakkandy	18	29	1		
16	Dharmmadam	18	20	1		
17	Kalliassery	18	19	1		
18	Makreri	18	19	1		
19	Paduvilayi	18	19	1		
20	Pinarayi	27	28	1		
21	Iriveri	18	20	1		
22	Azhikode South	9	10	1		

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

Table No. 7: Functionality of HH tap connection

S. No.	Village	Functionality* (% HH)	Quantity >=55 LPCD (% HH)	Regularity (% HH)	Potability (% HH)	Working tap connections (%HH)
1	Total	38	100	62	64	100
2	Kooveri	25	100	100	25	100
3	Pattuvam	10	100	10	77	100
4	Kunhimangalam	100	100	100	100	100
5	Madayi	59	100	100	59	100
6	Ezhome	4	100	100	4	100
7	Mattool	100	100	100	100	100
8	Padiyoor	89	100	100	89	100
9	Kuttiattoor	57	100	61	93	100
10	Pattannur	7	100	7	14	100
11	Kolavelloor	0	100	100	0	100
12	Kathirur	0	100	94	0	100
13	Pappinissery	44	100	94	50	100
14	Muzhappilangad	100	100	100	100	100
15	Anjarakkandy	0	100	0	100	100
16	Dharmmadam	5	100	5	100	100
17	Kalliassery	100	100	100	100	100
18	Makreri	17	100	61	22	100
19	Paduvilayi	100	100	100	100	100
20	Pinarayi	4	100	4	100	100
21	Iriveri	0	100	5	5	100
22	Azhikode South	0	100	0	100	100

** Fully Functional has been computed as = Adequate Quantity ∩ Fully Regularity Supply ∩ Potable (Quality)*

Villages not meeting the quality parameters

Table No. 7: 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	Kalliasseri	Ezhome	Ezhome	26

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	Edakkad	Chembilode	Iriveri	18	0
2		Peralasseri	Makreri	7	0
3	Irikkur	Kuttiyattoor	Kuttiattoor	21	0
4	Iritty	Koodali	Pattannur	25	2
5	Kalliasseri	Ezhome	Ezhome	23	0
6		Kalliasseri	Kalliassery	0	18
7		Madayi	Madayi	0	26
8		Mattool	Mattool	0	18
9	Kannur	Azhikode	Azhikode South	9	0
10	Koothuparambu	Kunnothuparamba	Kolavelloor	0	9
11	Panoor	Kadirur	Kathirur	0	18
12	Payyannur	Kunhimangalam	Kunhimangalam	0	18
13	Thalassery	Ancharakandy	Anjarakkandy	28	0
14		Dharmadom	Dharmmadam	18	1
15		Pinarayi	Pinarayi	27	0
16		Vengad	Paduvilayi	15	0
17	Thaliparambu	Chapparapadvu	Kooveri	17	0
18		Pattuvam	Pattuvam	27	0

3. Turbidity (Acceptable Range- 1 to 5 NTU)

S.No.	Block Name	Panchayat Name	Villages	HHs outside the acceptable/permissible range
1	Edakkad	Chembilode	Iriveri	1
2	Irikkur	Kuttiyattoor	Kuttiattoor	1
3	Kalliasseri	Ezhome	Ezhome	1
4	Koothuparambu	Kunnothuparamba	Kolavelloor	3
5	Thaliparambu	Pattuvam	Pattuvam	5

4. Total hardness (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

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
NA	NA	NA	NA	NA

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	Irikkur	Kuttiyattoor	Kuttiattoor	1

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
NA	NA	NA	NA	NA
11. Total dissolved solids (Acceptable Range- 500 to 2000 Milligram/litre)				
S.No.	**Block Name**	**Panchayat Name**	**Villages**	**HHs outside the acceptable/permissible range**
NA	NA	NA	NA	NA
12. Bacteriological test (Presence)				
S.No.	**Block Name**	**Panchayat Name**	**Villages**	**HHs outside the acceptable/permissible range**
1	Edakkad	Chembilode	Iriveri	18
2		Peralasseri	Makreri	14
3	Irikkur	Padiyur-Kallyad	Padiyoor	3
4	Iritty	Koodali	Pattannur	24
5	Kalliasseri	Madayi	Madayi	11
6	Kannur	Pappinisseri	Pappinissery	9
7	Koothuparambu	Kunnothuparamba	Kolavelloor	9
8	Panoor	Kadirur	Kathirur	18
9	Thaliparambu	Chapparapadvu	Kooveri	24
10		Pattuvam	Pattuvam	2
13. Fluoride (Acceptable Range- 1 to 1.5 Milligram /litre)				
S.No.	**Block Name**	**Panchayat Name**	**Villages**	**HHs outside the acceptable/permissible range**
NA	NA	NA	NA	NA
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