‘Har Ghar Jal’: A Case Study of Khancheepuram District of Tamilnadu

Dissertation Submitted to the Panjab University, Chandigarh for the award of degree of **Executive Masters in Public Administration and Public Policy,** in partial fulfilment of the requirement for the Advanced Professional Programme in Public Administration (2023-24)

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49th ADVANCED PROFESSIONAL PROGRAMME IN PUBLIC ADMINISTRATION (2023-24)

INDIAN INSTITUTE OF PUBLIC ADMINISTRATION

NEW DELHI

CERTIFICATE

I have the pleasure to certify that **A Ashok** has pursued his research work and prepared the present dissertation titled **'Har Ghar Jal': A Case Study of Khancheepuram District of Tamilnadu**, under my guidance and supervision. The same is the result of research done by him and to the best of my knowledge; no part of the same has been part of any monograph, dissertation or book earlier. This is being submitted to the Panjab University, Chandigarh, for the purpose of **Executive Masters in Public Administration and Public Policy** in partial fulfillment of the requirement for the Advanced Professional Programme in Public Administration (APPPA) of Indian Institute of Public Administration (IIPA), New Delhi.

I recommend that the dissertation of **A Ashok** is worthy of consideration for the award of Executive Masters degree of the Panjab University, Chandigarh.

Date March

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ACKNOWLEDGEMENT

At the outset, I am thankful to the Integrated Headquarters, Ministry of Defense (Indian Navy) for sponsoring my candidature for the 49th APPPA course. I am also grateful to Indian Institute of Public Administration, New Delhi for providing the opportunity to enrich my knowledge. This dissertation has been milestone in my academic career. I have been fortunate to learn theories and concepts, which should have been impossible if I had not extensively carried out the needed research. The dissertation owes its conception, development, construction and completion to a whole host of magnanimous benefactors, who did handholding for me at various stages of work.

I take this opportunity to place on record my deep sense of gratitude to my guide Dr G Mohapatra who guided me in selecting the final theme for this research. My guide, was there throughout my preparation of the proposal and the conceptualization of its structure. I would not have been able to do the research and achieve learning in the same manner without his help and support. His recommendations and instructions have enabled me to assemble and finish the dissertation effectively.

I am grateful to Dr Sachin Choudhury Program Director, and Dr Swapna Chadda Program Co-Director both have always been with me through thick and thin and supported me with lots of encouragements.

I also express my gratitude to Dr Roma Debnath who guided me in following the

correct research methodology in progressing my research. I would also like to thank my course mates who were a constant source of inspiration for me. My sincere thanks are also due to the faculty members, staff of APPPA Secretriat administrative and library staff of IIPA for helping in various ways to complete the work

(A Ashok)

ABSTRACT

This research delves into the exemplary implementation of the 'Har Ghar Jal' program in Tamilnadu's Kancheepuram district, recognized by the Ministry of Jal Shakti for achieving tap water access for all 2.18 lakh rural households (100% FHTC coverage) within six months, receiving the Prime Minister’s Award for Public Administration in 2022. The study aims to understand the contributing factors, assess current functionality, and examine sustainability plans in Kancheepuram district. Lessons learned are also extrapolated to aid other districts facing implementation challenges.

The district's saturation approach, securing comprehensive approval and funding, facilitated swift implementation of functional household tap connections (FHTC), aligning with sustainability objectives. However, Pudukkottai district (studied to get a comparative analysis), characterized by distinct annual rainfall and aquifer conditions, encountered delays in FHTC coverage, with 45% pending completion, challenging the 2024 target. Water conservation efforts lagged, leading to groundwater depletion, notably an annual decline of 10 feet in groundwater level in Gandarvakottai block.

Critical challenges include the absence of water consumption monitoring, jeopardizing water source sustainability. Proposed solutions entail integrating volumetric flow meters and groundwater level sensors in the rural water supply network. Addressing awareness gaps at panchayat levels requires active involvement from academic institutions and NGOs to bolster local governance in water resource management.

Moreover, the impact of eucalyptus plantations on groundwater depletion underscores the need for further research and policy interventions. Inefficiencies in employing MGNREGA laborers necessitate audits and interventions for scheduled project completion. Stakeholder recognition, fueled by Kancheepuram's PM Award, highlights the importance of fostering pride and cooperation.

In conclusion, addressing monitoring gaps, enhancing stakeholder cooperation, and bolstering sustainability measures are paramount for effective water supply schemes. Policy recommendations advocate for integrated expert inputs, nuanced FHTC implementation, tailored regional approaches, strengthened external organizations, environmental interventions and regulatory frameworks. Enhanced monitoring mechanisms, IoT technology, and Phase II initiation are proposed to ensure continued progress post-2024.

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ACRONYMS

AAP	Annual Action Plan
CBO	Community Based Organisation
CSO	Civil Society Organization
CWPP	Community Water Purification Plant (CWPP)
DAP	District Action Plan
DDP	Desert Development Programme
DDWS	Department of Drinking Water and Sanitation
DMDF	District Mineral Development Fund
DPAP	Drought Prone Area Programme
DPR	Detailed Project Report
DWSM	District Water and Sanitation Mission
EAP	Externally Aided Projects
EBR	Extra Budgetary Resources
ESR	Elevated Storage Reservoir

FC	Fully Covered FHTC Functional Household Tap Connection
FTK	Field Test Kit
GIS	Geographic Information System
GP	Gram Panchayat
IMIS	Integrated Management Information System
IEC	Information, Education and Communication
ISA	Implementation Support Agency
JE-AES	Japanese Encephalitis - Acute Encephalitis Syndrome
JJM	Jal Jeevan Mission
KRC	Key Resource Centre
LPCD	Litres Per Capita Per Day
M&E	Monitoring & Evaluation
MeITY	Ministry of Electronics & Information Technology
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MPLADS	Members of Parliament Local Area Development Scheme

MLALADS	Member of Legislative Assembly Local Area Development Scheme
MVS	Multi Village Scheme GO
NJJM	National Jal Jeevan Mission
NRDWP	National Rural Drinking Water Programme O&M Operation and Maintenance
PFMS	Public Financial Management System
PHED	Public Health Engineering Department
PPP	Public Private Partnership
PPR	Preliminary Project Report
PRA	Participatory Rural Appraisal
PRI	Panchayati Raj Institutions
Q&Q	Quality and Quantity
R&D	Research and Development
RJJK	Rashtriya Jal Jeevan Kosh
RWH	Rain Water Harvesting
RWS	Rural Water Supply
SAP	State Action Plan

SBM	Swachh Bharat Mission (Grameen)
SDG	Sustainable Development Goals
SHG	Self Help Group
SVS	Single Village Scheme
SWSM	State Water and Sanitation Mission
ToR	Terms of Reference
ToT	Training of Trainers
UC	Utilization Certificate
VAP	Village Action Plan
VO	Village Organisation
VWSC	Village Water and Sanitation Committee
WASMO	Water And Sanitation Management Organisation
WQM&S	Water Quality Monitoring & Surveillance

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EXECUTIVE SUMMARY

The research focuses on the exemplary implementation of the ‘Har Ghar Jal’ scheme in Kancheepuram district, Tamilnadu, recognized by the Ministry of Jal Shakti, Government of India for achieving tap water access in all 2.18 lakh rural households within a record-period of six months. The study seeks to understand the unique elements that led to this success, present functionality status and sustenance measures in place. Further it also provides insights applicable to other districts facing challenges in scheme implementation.

The ‘Har Ghar Jal’ scheme faced common issues across Tamilnadu, including slow progress, inadequate water supply, poor water quality, and a lack of long-term sustainability measures. The statement of the problem underscores the need for a case study in Kancheepuram to analyze institutional mechanisms and sustainability measures.

The research objectives include evaluating the functionality of Functional Household Tap Water Connections (FHTCs), examining obstacles to infrastructure viability, and assessing the feasibility of replicating the scheme in other districts. The rationale emphasizes the complexity of rural water provision, the importance of government standards, and the need for sustainable water sources.

The study design employs both qualitative and quantitative methods, utilizing official databases, field surveys in Kancheepuram and Pudukottai districts (one of the five water

stressed district in the state) to have a comparative analysis, and inputs from stakeholders. The research questions focus on the scheme's functionality, challenges to sustainability, and best practices for replication. The report is divided into seven chapters as:-

Chapter I: Introduction. The first chapter provides an overview of the research, starting with the background of the study, identifying the statement of the problem, and defining the purpose of the research. The rationale behind undertaking the study is discussed, followed by the formulation of research questions. The chapter outlines the research strategy, design, and the scope and limitations of the study. Additionally, it details the methods applied and the sources of data used for the research.

Chapter II: Literature Review. This chapter delves into an extensive review of the existing literature related to rural water supply services in India, focusing on the challenges and opportunities of the 'Har Ghar Jal' initiative. Research papers reviewed include an appraisal of public water supply initiatives, the role of water harvesting in rural development, and case studies on reforming drinking water schemes and their impact on groundwater availability.

Chapter III: Role of State in Drinking Water Governance. This chapter explores the historical perspective and background of the state's involvement in drinking water governance. It outlines the framework of the 'Har Ghar Jal' scheme under the Jal Jeevan Mission, discussing its envisaged execution in ensuring water access for every household.

Chapter IV: ‘Har Ghar Jal’ Scheme Implementation in Kancheepuram District. This chapter focuses on the specific implementation of the 'Har Ghar Jal' scheme in Kancheepuram district. It covers the district's background and status, detailing the planning and preparation stages, the creation of action plans, sustainability measures, identification of gaps, and the actual implementation of the Jal Jeevan Mission across different sections of society.

Chapter V: A Comparative Analysis of ‘Har Ghar Jal’ Scheme Implementation in Pudukkottai District. This chapter conducts a comparative analysis of the 'Har Ghar Jal' scheme in Pudukkottai District of Tamiladu. It examines the planning and implementation process, providing basic details about the district, the status of Functional Household Tap Connections (FHTC), organizational structures, and the construction of water conservation structures.

Chapter VI: Exploring Stakeholders' Perspective in 'Har Ghar Jal' Scheme Implementation. This chapter employs field visits, interviews with key stakeholders, community interactions and an analysis of water conservation structures built through MGNREGA to explore the perspectives on the implementation of the 'Har Ghar Jal' scheme. It assesses FHTC functionality, reasons for the declining water table and the need for sustainable measures.

Chapter VII: Conclusion and Policy Recommendations. The final chapter consolidates the findings and conclusions drawn from the research. It addresses the

sustainability of water sources, the realities of meeting 'Har Ghar Jal' target by 2024, mechanisms for measuring and monitoring water quantity, challenges and opportunities in assessing groundwater dynamics, the impact of eucalyptus plantations, and MGNREGA, contributions to water management, and overall water resource enhancement. and lastly recommendations for Policies.

Interview with Mrs M Aarthi IAS

Interview Extract - Mrs. M Aarthi IAS, Former District Collector Kancheepuram

The ‘Har Ghar Jal’ Scheme stands out as one of the most extensive welfare initiatives, distinguished by the government's endeavor to establish infrastructure for operational tap water connections in every rural household. Its distinctive feature lies in the transfer of completed infrastructure to local governments, fostering public ownership and empowerment. This approach instills a sense of community responsibility in the day-to-day functioning of the system, transforming it into a self-sustained unit. While this transition posed challenges, it concurrently encouraged the emergence of leadership, particularly among women. Notably, water quality monitoring at the village level, with active participation from 50% women, ensures the sustainability and safety of the water supply system.

The district administration team implemented strategic interventions to enhance community involvement in water and sanitation initiatives. These included monthly mandatory meetings for Village Water Sanitation Committees, Panchayat-level manpower development, gradual expansion to village levels, training initiatives, community mobilization, and leveraging Self-Help Group women members. These efforts effectively addressed inertia and improved outcomes. Successful implementation owes much to the meticulous planning and preparation of the district administration team.

The District Action Plan, addressing water demand, existing sources, and infrastructure, was compiled systematically such as segregation of major/ minor works, prioritizing areas for new sources and streamlined execution. Weekly reviews and strong support from state and central governments ensured efficient progress of all JJM projects.

Effective convergence with other government schemes played a critical role in completing source sustainability measures like rainwater harvesting and water conservation which stabilized groundwater levels. The challenges initially included ensuring community participation, collecting public contributions, and meeting project timelines through MGNREGS drive. All issues were navigated with effective coordination among administrative officials, Panchayat Secretaries, and Presidents.

CHAPTER I

INTRODUCTION

1.1 **Background**. Resolving challenges with sustainable Rural Water Supply Services (RWSS) has become a major program in several international development debates over the past few decades. Since the 1950s, India's RWSS framework has changed as a result of its five-year plans. However, it is only after 'Accelerated Rural Water Supply Programme' (ARWSP) in the late 1960s that efforts were made to institutionalize the RWSS. Between the 1970s and 2000s, a number of water reforms and initiatives were launched, and the National Rural Drinking Water Programme (NRDWP) was established in 2009. NRDWP was formed as a course correction in the RWSS system's thinking approach, providing equitable and inclusive water supply coverage from habitations to household levels and decentralized operations. It is currently the largest RWSS in the world. (with more power to local elected bodies such as Gram Panchayats)[1]

The Department of Drinking Water and Sanitation of the Jal Shakti Ministry and the state government implement the NRDWP through a memorandum of understanding (MoU). NRDWP is enforced through a comprehensive set of guidelines such as scheme initiation implementation and handover to the village committees, the reporting of coverage, and other related matters. The mandatory elements that are ensured through NRDWP include: decentralized approach, commitment through Panchayat Raj Institutions, community participation, creation of a data repository, the use of Management Information System

[1] *Operational Guidelines for Implementing of Jal Jeevan Mission, Government of India. New Delhi.2019*

(MIS), and the reporting of coverage, quality, sustainability, etc. Support activities account for 5% of overall financing and enable the states to carry out advised initiatives like IEC (Information, Education, and Communication), research, monitoring and evaluation, and use of advanced technology.

The Jal Jeevan Mission is being carried out in collaboration with the states to enable every household in every village to have a functional household tap water connection (FHTC) by 2024. The successful implementation of the National Jal Jeevan Mission is expected to have the following outcomes on society such as overall improvement in health, decrease in the hardships experienced by women and girls, empowerment of women, decrease in the dropout rates of girls in upper primary school, and an increase in rural communities and employment opportunities.

The sustainability element of implementing the 'Har Ghar Jal' scheme is deteriorating due to the decreasing amount of water available for agriculture and industrial uses. NRDWP has different institutional arrangements at various levels of government, such as the Village Water and Sanitation Committee (VWSC) at the village level, which deals with the Gram Panchayat for planning and implementing local water infrastructure; the District Water and Sanitation Mission at the district level; and multiple agencies at the state level, like the State Water and Sanitation Mission (SWSM) and the Public Health and Engineering Department (PHED).

A number of things must be taken into account to ensure the sustainability of rural drinking water supplies which include:

(a) **Strong Capacity Building**. Planning for maintenance, rehabilitation, and network extension.

(b) **Regulation and Oversight**. Strong regulation, oversight, and control of management contracts.

(c) **Asset Management**. A sound asset management policy and investment planning.

(d) **Source Sustainability**. Sustainable sources of water supply are a pre-requisite for maintaining the tap water source service levels as per norms.

The Tamilnadu Water Supply and Drainage Board (TWAD Board), the state's key body for rural water supply, implements the Jal Jeevan Missions' Har Ghar Jal scheme in Tamilnadu. A state action plan has been created by the TWAD Board to connect all rural households to tap water by 2024. The strategy contains a number of elements including source augmentation, distribution network, monitoring of the water quality, operation and maintenance, etc. The Ministry of Jal Shakti recognized the Kancheepuram district of Tamilnadu for best implementation of 'Har Ghar Jal' scheme within a record-breaking duration of six months in the year 2020 wherein all of its 2.18 lakh rural households were given Functional Household Tap Water Connection. Har Ghar Jal project was implemented differently in the Kancheepuram district with effective planning and monitoring of the scheme, by encouraging community participation and implementing quality assurance. The progress of Functional Household Tap Water Connection (FHTC) coverage is not uniform and consistent across all of Tamilnadu's districts. The common

issues observed in implementation of the scheme include sluggish progress, inadequate water supply, poor water quality/ maintenance capacity, and a lack of long-term sustainability measures.

1.2 **Statement of Problem**. A case study of the Kancheepuram district in regard to institutional mechanism and sustainability measures in implementing 'Har Ghar Jhal' scheme would give an overview on operational, technical and organizational frameworks which could be addressed in other districts of Tamilnadu.

1.3 **Study Objectives**. The Kancheepuram district provided tap water to all of its rural households and declared all of its villages as 'Har Ghar Jal villages' (every residence with tap water connection) in 2020. The study's particular goals are as follows:

Ser	**Objectives**	**Major Indicators**
(a)	To evaluate the service delivery and functionality of Functional Household Tap Water Connections (FHTCs) in rural drinking water supply program in Tamilnadu's Kancheepuram District	Functionality Assessment, Water Quality and Quantity Monitoring and Surveillance Capacity at Gramha Panchayat Level

(b)	To examine financial, operational, and institutional obstacles to the long-term viability of infrastructure and drinking water sources.	Review the organizational structure of the Jal Jeevan Mission's Har Ghar Jal Scheme – Preparation and Implementation Mechanism. In-village water supply infrastructure and O& M Measures Community involvement and recovery of service charges/ water tariff and source sustainability measures.
(c)	Based on the best management techniques used in the development and upkeep of the 'Har Ghar Jal' scheme in Kancheepuram district, ascertain whether it is possible to replicate the program in other districts of Tamilnadu.	Assessment of Village Action Plans and District Action Plans Convergence of other schemes and financial resources Analysis of government policies and framework for scheme implementation.

VWSC and SHG of Melkathirpur Panchayat of Kancheepuram District

1.4 **Rationale**. Every single rural household in the Kancheepuram district, numbering 2.18 lakh, now has tap water. However, there are a number of problems and challenges with the "Har Ghar Jal" program's execution in several districts in Tamilnadu. Safe drinking water supply in rural places is a complex problem with many social, environmental, and technological challenges. The Ministry of Jal Shakti, Department of Drinking Water and Sanitation, Government of India, aimed to monitor the delivery of water services, bridge the knowledge and technology gap and use research to ensure effective implementation and sustainability.[2]

[2] *Guidelines for research and development projects on the Jal Jeevan Mission, Government of India's Ministry* of Jal Shakti, 2020.

In addition Ministry of Jal Shakti, Department of Drinking Water and Sanitation provided a number of suggestions for events that could be held as part of the Jal Shakti Abhiyan Catch the Rain 23 (JSA-CTR). The main justification for the program is that Jal Jeevan Mission is hastening the installation of household tap connections in rural communities. However, there is a need to developed the concept of "Source Sustainability for Drinking Water" to give necessary focus on water conservation. Ministry of Jal Shakti has identified 150 districts across India where implementation of various thematic activities would be closely monitored by Central Nodal Officers. The water stressed districts have been identified based on inputs from states and Central Water Board's National Compilation on Ground Water Resources of India 2022.

1.5 **Research Strategy and Design**. The study is judicious mix of both qualitative and quantitative research methods. For the study, Jal Shakti Ministry's official geo-database of NRDWP was accessed through the Integrated Management Information System (IMIS) portal. The report is also based on field survey conducted in three villages from two different blocks in Kancheepuram district. A survey was also carried out in four villages of Pudukkottai district, one of the state's water-stressed districts, in order to compare the distinctiveness of the design and execution of the 'Har Ghar Jal' scheme in Kancheepuram district.

Functionality Evaluation in Kancheepuram District

The research paper delves into the comprehensive methodology employed to plan and implement the ‘Har Ghar Jal’ Scheme, emphasizing extensive engagement with diverse stakeholders crucial to the scheme's implementation. The study involved interaction with key participants such as District Collectors, Project Directors, members of the District Water and Sanitation Mission (DWSM), block-level technical staffs, the Village Water and Sanitation Committee members, and households/beneficiaries from both districts.

To ensure a thorough examination, the research adopted a multifaceted approach. The initial phase comprised a meticulous analysis of secondary data, focusing on planning, preparation, and implementation inputs. This involved reviewing Village Action Plans, District Action Plans, and relevant information sourced from the District Administration

and the Jal Jeevan Mission portal. Subsequently, the research employed a targeted survey methodology. Four sets of questionnaires were meticulously designed and administered to various stakeholders. These questionnaires facilitated structured interviews with key figures such as the District Collector, Project Directors, Panchayat Presidents from selected villages, and Focus Group Discussions (FGD) with beneficiaries. The questionnaires, containing both close and open-ended questions addressed critical aspects such as planning, preparation, implementation, maintenance, and source sustenance measures of the Har Ghar Jal scheme.

FGDs and community interaction with beneficiaries of the scheme from different groups, (including village women, men, and members of the Scheduled Caste (SC) community) gave good insight into ‘on ground’ impact and functionality aspects of the program. Data collected from various sources underwent systematic analysis, focusing on success indicators such as participation, transparency, responsiveness, effectiveness, efficiency, accountability, and sustainable measures. This comprehensive methodology aimed to capture diverse perspectives and nuances surrounding the Har Ghar Jal Scheme, providing a robust foundation for subsequent evaluation and policy recommendations.

Finally, spot analysis was conducted to assess the functionality and impact of the Har Ghar Jal scheme in selected villages of Kancheepuram and Pudukkottai. This involved a detailed examination of 12 households in each village and all public institutions. This multifaceted approach allowed for a thorough evaluation of the Har Ghar Jal Scheme's planning, execution, and overall effectiveness in the study areas.

1.6. **Research Question**. Kancheepuram district in Tamilnadu was able to provide tap water to every rural family. However, Functional Household Tap Water Connection (FHTC) coverage and service delivery are not consistent throughout the state. In this context, the study makes an effort to investigate the following:-

(a) How well-functioning is the Har Ghar Jal Scheme's Functional Household Tap Water Connection (FHTC) in Tamilnadu's Kancheepuram district at the moment?

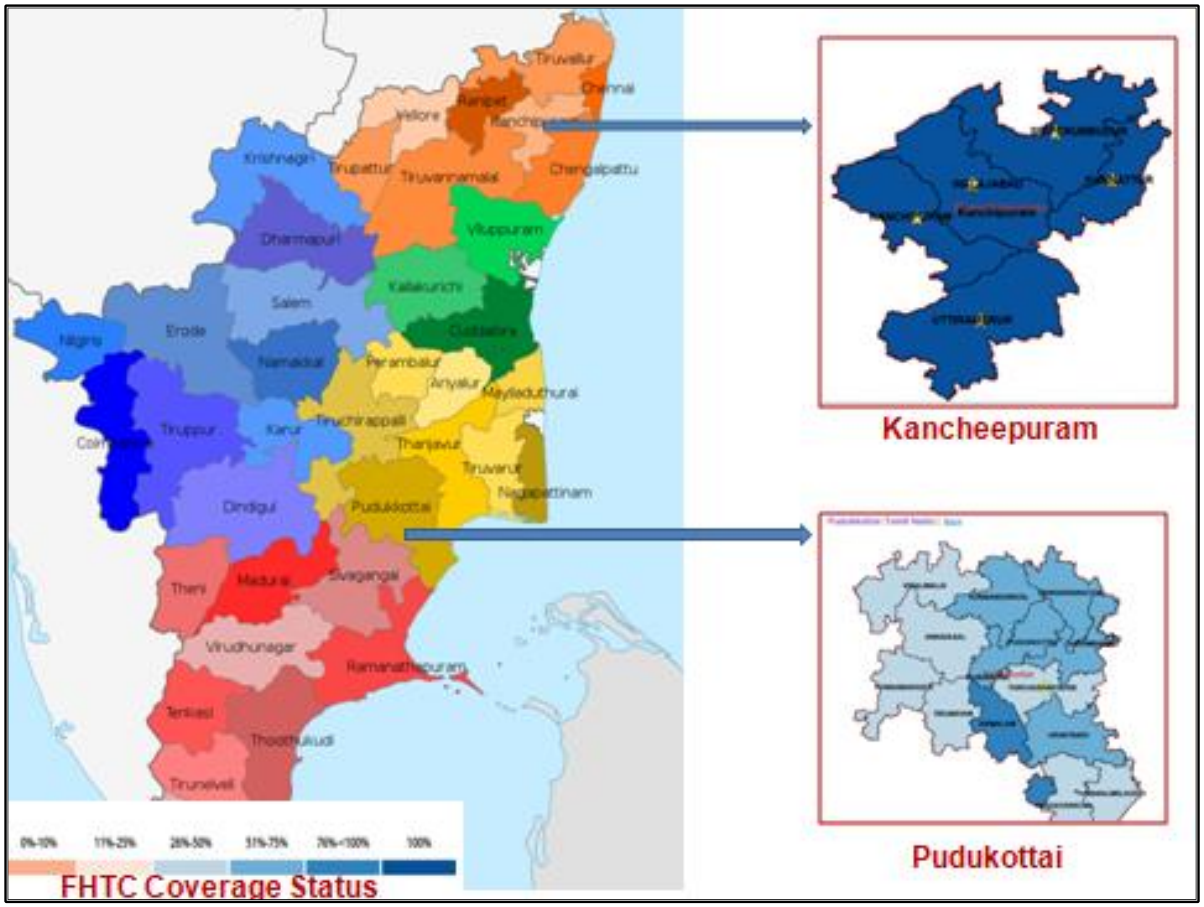
(b) What are the challenges faced in the sustainability of drinking water source and infrastructure (financial, operational, and institutional) built under the Jal Jeevan Mission?

(c) What are the best management practices emerging from the field that could be replicated in other districts of Tamilnadu?

1.7 **Scope and Limitation**. In order to gain a comprehensive understanding of the planning, preparation, and implementation of Jal Jeevan Missions' Har Ghar Jal scheme in Kancheepuram district, a comparative analysis with another district that differs in terms of water resources, annual rainfall, and aquifer conditions was deemed necessary. As a result, Pudukkottai district which is one of five water stressed districts in Tamilnadu, was selected for the study. The study's foundation was the examination of secondary data from journals, papers, articles, the official geo-database of the NRDWP, the CGWB, the site dashboards of the Jal Shakti Ministry, the Village Action Plans of seven villages, and the District Action Plans of the districts of Kancheepuram and Pudukkottai. A thorough

analysis of the program was conducted through the use of reports, expert interview responses, stakeholder surveys, and Focused Group Discussions with various beneficiaries in rural areas (restricted to study area stakeholders in Kancheepuram and Pudukkottai districts). Mrs. M Aarthi IAS, the previous Collector of Kancheepuram district and who was instrumental in planning and implementing 'Har Ghar Jal' scheme was interviewed as a part of the study. She was acknowledged as the "Champion of the Change" and was crucial to the scheme's successful implementation.

Fig 1.1: Field Study undertaken in Two Districts: Kancheepuram and Pudukkottai



Source : JJM Dashboard

CHAPTER II

LITERATURE REVIEW

2.1 '**Water for All (Har Ghar Jal): Rural Water Supply Services (RWSS) in India , Challenges and Opportunities'** by Sriroop Chaudhuri, Mimi Roy , Louis M. McDonald and Yves Emendack, (2020): The study aims to offer an overview of the operational performance of the RWSS in India, between 2013 and 2018, against two water supply norms 40 and 55 LPCD (litters per capita per day) to highlight achievements vis-à-vis concerns. In the process, it integrates technical with policy/institutional aspects of the RWSS to evaluate the fundamental motto/ vision of the NRDWP. A prime motivation to conduct the study was that there is yet no nationwide spatial appraisal of RWSS operational performances that incorporates a temporal component. The study highlights generic issues that need to be strategically incorporated in RWSS systems' design to ensure a sustainable delivery system. The study was divided into three sections:

In section 1, the Spatial–statistical–graphical appraisal of coverage details, and how these attributes 'evolved' over time (2013–2018). Computation/mapping for this part was based on state-wise percentages of habitations with full-coverage (FC) status year to year. FC indicates that 100% of the population is receiving 40 LPCD and/or 55 LPCD of water.

In section 2, Policy concerns associated with current RWSS systems' architecture, focusing on the level of functionality of various waterworks committees ranging from village to district to state level.

In section 3, The study team releases two significant findings: Declining piped water coverage is correlated with decentralization efforts and poorer coverage in areas with low ground water supplies. Among the inadequacies found are the state of the scheme's quantity and quality control mechanisms and the requirement to fortify the water delivery infrastructure in order to guarantee sustainability.

2.2 **Delivery of Safe Drinking Water in Rural India: An Appraisal of Public Water Supply Initiatives** by Subhalakshmi Paul and Prasenjit Sarkhel (published in 'In Quest of Humane Development' (Human Development, Community Networking, and Public Service Delivery in India). The study examines the effectiveness of decentralized reforms in increasing coverage of drinking water in rural India. Further, it also covers in terms of decentalized government involvement and geographic characteristics like availability of groundwater. The researchers made use of the IMIS database for the period 2013–2014 to collate the piped water supply data. The handing over of schemes is supposed to capture several aspects of decentralization as envisaged in the NRDWP guidelines. These include the exclusive role of the Gram Panchayats in managing and operating in-village drinking water projects, while the state government agencies are supposed to carry out the treatment and distribution of water up to the village. To check whether the coverage is sensitive to the groundwater levels that denote regional water endowments, the team used data from the Central Groundwater Commission. The study discusses the transition of rural water supply programs from centralized provision model to NRDWP that is demand-driven and outlines data and estimation strategies. The two main findings of the research is highlighted, firstly that the Functional Household Tap Water Connection

(FHTC) coverage is lower in low-ground water availability areas, and decentralization attempts are associated with declining piped water coverage.

2.3 **Making Water Management Everybody's Business: Water Harvesting and Rural development in India** by Agarwal,A. and Narain, (1999) published in International Institute for Environment and Development (1999). The article has brought out that water crisis is occurring in India despite it being one of the wettest countries in the world. The country currently uses only a small part of its water endowment – there is still huge potential for it to meet its water needs through developing water harvesting systems. It brings out that India had a rich tradition in rainwater harvesting and one such example of system followed in southern state of Tamilnadu was also highlighted. In Tamilnadu, a large stream was frequently redirected to supply a series of 25–30 tanks one after the other. The conventional design, known as "system tanks," is seen to be far more desirable than a tank with a single tiny catchment because it consists of a chain of tanks that are serviced by a stream that collects water over a vast catchment. For instance, the palar anicut (dam) system irrigates over 32,000 hectares in the districts of Chengalpattu and North Arcot by providing water to 317 tanks. But two developments in colonial ideas toward the administration and management of water resources weakened it. First, the state now supplies the majority of the water; formerly, homes and communities served as the main units for water management and provision. Furthermore, there has been a growing focus on the utilization of surface and groundwater, while the earlier reliance on rainwater and flood water has declined. It has shown that every settlement needs an open platform where people can come together to talk about their issues and come up with solutions, as well as a clearly defined and legally protected environment.

2.4 **Reforming Rural Drinking Water Schemes: The Case of Raigad District in Maharashtra** by Pooja Prasad, Vishal Mishra And Milind Sohoni(2014). India faces challenges in sustainable water quality management in rural areas, where 70% of the population relies on groundwater for drinking water. Decentralization of health-related monitoring at villages require capacity development at all levels. Redesigning data management programs at village, district, and national levels, upgrading district-level laboratories. Addressing technical, legal, and institutional components should be the first step in achieving effective water-quality management and improving health for millions of people in rural India. The shift from surface water to ground water has undoubtedly controlled microbiological problems in rural India, but it has also led to newer problems of fluorosis and arsenicosis. Water quality is now being recognized in India as a major crisis, and any sustainable water quality management plan must address technical, institutional, and legal components to become effective. Ensuring the supply of safe drinking water in India is a constitutional mandate, with the duty of providing clean drinking water and improving public health standards to the state.

2.5 **Impact Of Eucalyptus Plantations on Ground Water Availability in South Karnataka** by Mukund Joshi and K. Palanisami. This study examines data demonstrating the substantial negative impacts of large scale eucalyptus plantations, which over a 20-year period resulted in decreased ground water supplies in southern Karnataka. What distinguishes eucalyptus from other perennial tree species is its tolerance to water interactions. Unlike other perennial plants, it can gather water from a large region surrounding its root system. Under harsh circumstances, its roots can stretch up to 6–9 meters and extract more water from the ground. It demonstrates that while

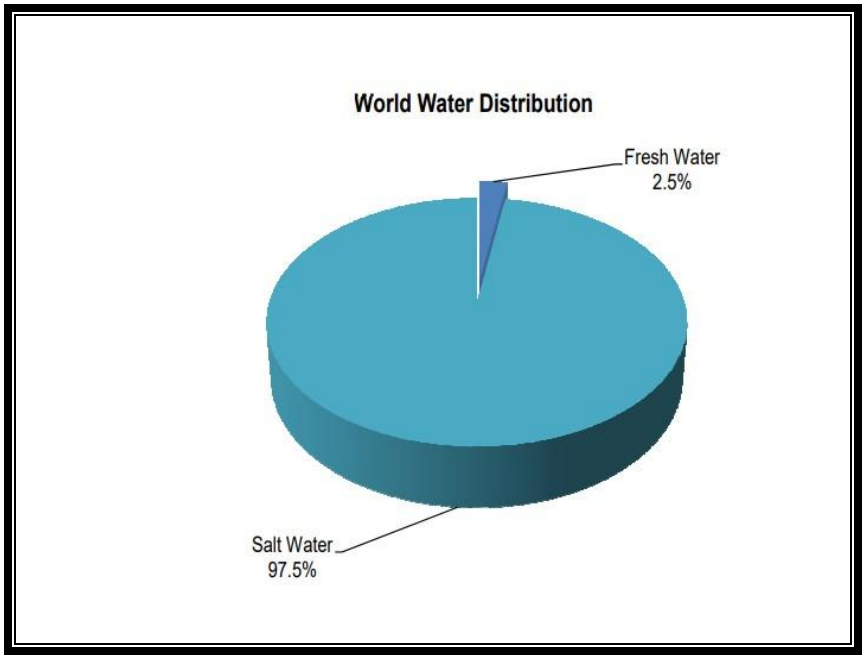
eucalyptus can produce more dry matter per unit of water utilized, the water balance in deeper strata is upset by its rapid development, which is eight to ten times faster than that of native tree species. It also highlights how rapidly the region's danger of drought could increase as a result of growing eucalyptus forests, especially downstream.

CHAPTER III

ROLE OF THE STATE IN RURAL DRINKING WATER GOVERNANCE

3.1 **Background**. Slightly over two-thirds of the fresh water on earth is trapped in polar ice caps and glaciers, making up just 2.5% of the total water on earth. Seawater makes up the remaining 97.5% of the liquid. The majority of fresh water that is still liquid is found below the earth, with only a small amount located above ground or in the atmosphere. Even so, fresh water only comprises a very small portion of the enormous volume of water on earth. Over the past 100 years, the amount of water used worldwide has increased by a factor of six and is still growing continuously at a rate of about 1% per year. (World Water Development Report, 2020 by UN)[3].

Fig 3.1 Water Distribution in World

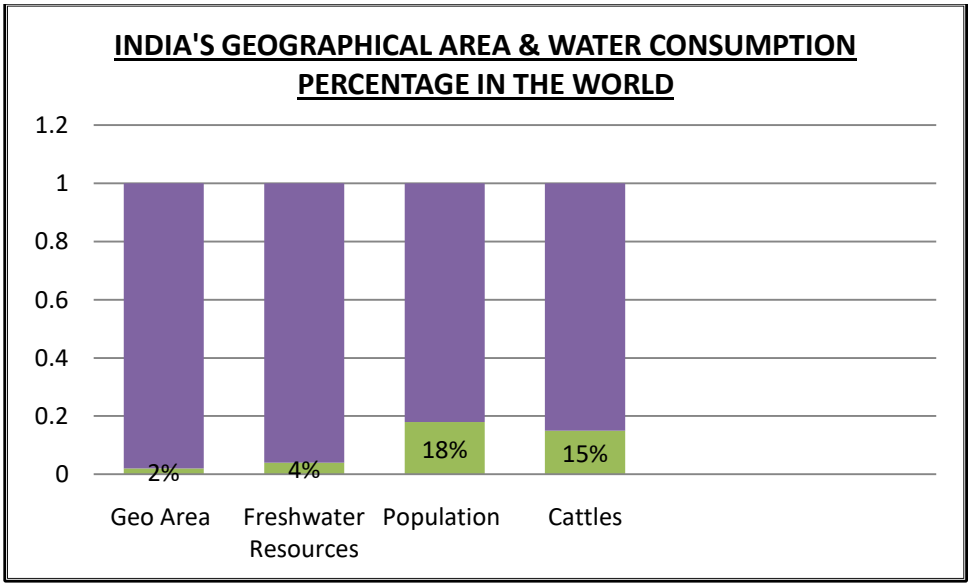


Source Water and Related Statistics – CWC

[3] *Water and Related Statistics, Central Water Commission, New Delhi, 2021*

15% of the world's cattle and 18% of its inhabitants live in India, still, it comprises only 4% of the world's freshwater resources and 2% of its total land area. Water is scarce but due to population growth and economic expansion there is a growing demand for it across various residential, industrial, commercial, recreational, and infrastructure development. Therefore, due to its limited availability and competing needs, managing drinking water is a difficult problem. Other problems include over-extraction leading to groundwater depletion, inadequate recharge, inadequate storage capacity, climate change causing irregular rainfall, the presence of pollutants, and poor operation and maintenance (O&M) of water delivery systems.

Fig 3.2 India's Resources

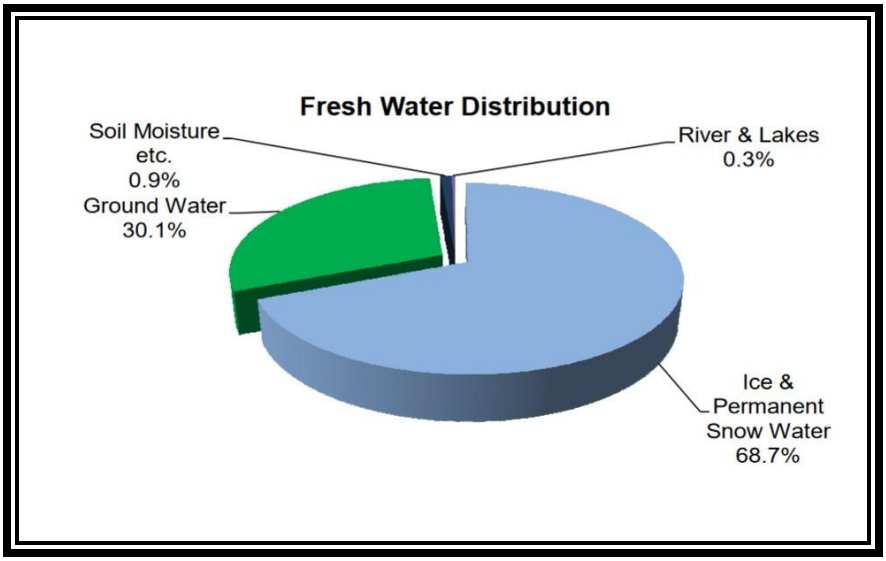


Source : Water and Related Statistics – Central Water Commission

In India as well as throughout the world, governments' effort to offer safe drinking water to rural communities has always been a challenge. For this reason, the Indian government has aggressively carried out a number of drinking water initiatives during the past few

decades. In the Jal Jeevan Mission, it is presently in the midst of carrying out one of India's biggest and may be the most ambitious drinking water programs. It was established in 2019 with the goal of giving every rural family in the nation a functional household tap connection (FHTC) by 2024. The initiative aims to protect the security of drinking water in rural India. The Indian Central and State governments have made significant interventions at various points of time to address issues deemed pertinent at the relevant times[4].

Fig 3.3: Fresh Water Distribution Status



Source : Water and Related Statistics – Central Water Commission

3.2 **Historical Perspective**. The evolution of water supply governance in India has undergone significant transformations over the decades. In 1954, the National Water

[4] *NC Narayanan and Rohit Kumar Prince, Changing Role of the State in Rural Drinking Water Governance in India,2023.*

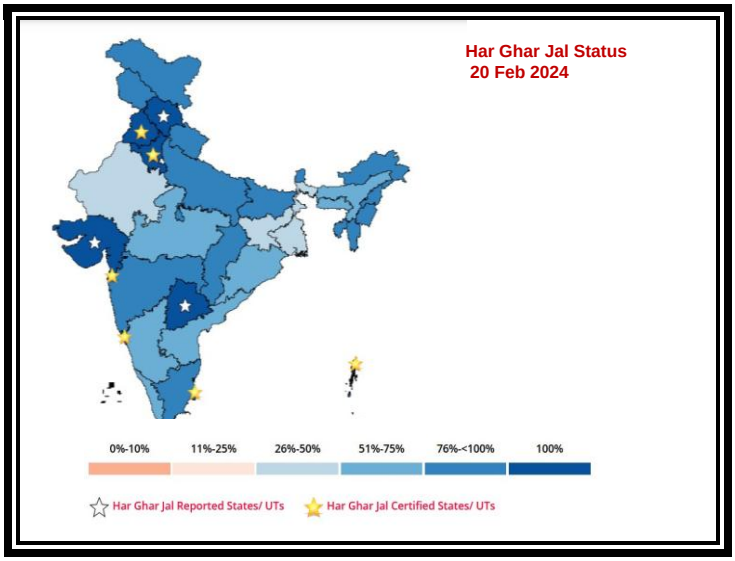
Supply Programme was initiated under the health sector. The community development program, extending drinking water delivery to rural areas, operated until the Third Five Year Plan (1961–1966), with support from the Ministry of Health's National Water Supply and Sanitation Programme. The 1972–1973 Accelerated Rural Water Supply Programme (ARWSP) was implemented to solve extreme shortages and illnesses caused by water. Under the minimal necessities program, the effort gained traction during the Fifth Five Year Plan (1974–1979). The National Drinking Water Mission (NDWM) was founded in 1986 with the goal of addressing water scarcity through the provision of cost-effective technological solutions and scientific guidance. Sub-missions in the Eighth Plan (1992-97) targeted quality issues, leading to the renaming of ARWSP as the National Rural Drinking Water Programme (NRDWP) in 2009–2010. The NRDWP used a decentralized strategy including community organizations and Panchayati Raj Institutions(PRIs)[5], emphasizing sustainability in terms of potability, sufficiency, convenience, affordability, and equity.

Reforms in 1999-2000 involved decentralized, demand-driven, community-managed sector initiatives which later scaled up as Swajaldhara in 2002. ARWSP joined Bharat Nirman in 2004–05, aiming to cover all habitations by 2008–09. The Eleventh Plan's (2007–12) ARWSP transitioned into the NRDWP, emphasizing pipe water supply schemes, increased service levels, water quality, wastewater treatment, and operations and maintenance. In 2013 further amendments were made focusing on Japanese encephalitis-Acute Encephalitis Syndrome (JE-AES) affected districts and decentralization. The restructuring of NRDWP in 2017 aimed at competitiveness, result-

[5] *Reforms in Rural Drinking Water Supply(2022). GOI, Ministry of Jal Shakti, New Delhi.*

oriented outcomes, flexibility for states, and prioritizing piped water supply, with exceptions allowed in JE-AES affected districts.

Fig 3.4 Status of Har Ghar Jal Implementation in India - Feb 2024



Source : JJM Dashboard

3.3 **Functioning of Jal Jeevan Mission's Har Ghar Jal Scheme**. The Jal Jeevan Mission is a flagship scheme of the government which seeks to not only provide functional household tap connections for all, but seeks to promote the holistic management of local water resources. For the first time, this water supply programme addresses the need to sustain water sources with conservation and reuse measures made mandatory to the scheme designs.

Table 3.1 Status of Tap water connection in India in Mar 2019

Description	**Numbers**	**Percentage**
No of Rural Households	17. 87 crores	
No of Rural Households with Tap Water Connection	3.28 crores	18%
No of Rural Households without Tap Water Connection	14.60 crores	82%

Source : IMIS maintained by Department of Drinking Water and Sanitation

Every rural home in the nation was to receive a Functional Household Tap Connection (FHTC) through the JJM. As a result, by 2024, around 14.60 crore households which lacked tap water connections would be connected in collaboration with States and UTs as part of the objective. With a primary focus on water conservation, source sustainability, and rainwater storage, it sought to encourage the management of water at the lowest appropriate level through decentralized yet integrated water resource management by the Gram Panchayats. Apart from that, the JJM would concentrate on building infrastructure for the collection and basic treatment of grey water, which makes up around 80% of all home water.

3.4 **Envisaged Execution**. With FHTC, it is intended that every family will regularly and sustainably have access to a sufficient supply of drinkable water that meets the required quality standards. Institutional arrangements have been developed at several

levels to carry out the mission, and the State's PHED/RWS departments will be essential to this effort. They must assist the Gram Panchayat and/or its subcommittee in organizing, carrying out, overseeing, running, and maintaining the village's water supply systems. The village community must be given a sense of ownership because they are the focal point of this project. As part of these efforts, National Water Quality Sub Mission (NWQSM) was launched in February, 2017 with an objective to make provision of safe drinking water to Arsenic and Fluoride affected habitations by March 2021. Water Quality Monitoring and Surveillance (WQM&S) programme was implemented in 2021 to enable PHEDs/ RWS departments to monitor quality of water supply and empower local community to keep surveillance on quality of water supplied. The activities include: purchasing Field Test Kits (FTKs), establishing and upgrading State, District, and Sub-Division level water quality testing laboratories, supplying mobile laboratories for outreach and disaster use, routinely monitoring the water quality of various drinking water sources, and enhancing the ability of local employees to perform basic water quality tests[6].

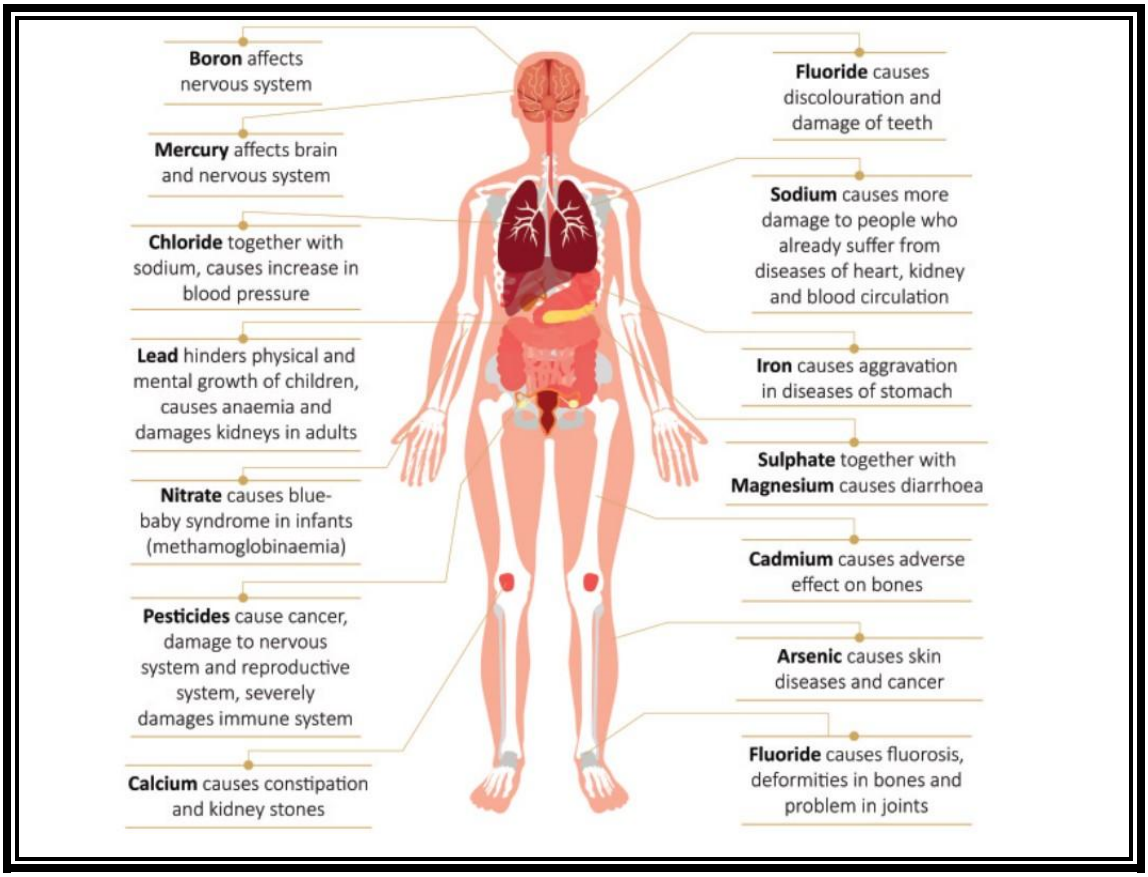
VAP, DAP and SAP. In order to supply FHTC to every rural home, the village must establish a Village Action Plan (VAP) based on the type of scheme to be implemented in the village. The District Action Plan (DAP) and State Action Plan (SAP) formulation requirements will determine the aggregate of all VAPs of a district and all DAPs of all districts in the state, together with regional water supply schemes/bulk water transport and treatment plants. Additionally, the State will create an Annual Action Plan with yearly goals in line with the annual budget. The village's action Plan will serve as the

[6] *Operational Guidelines for Implementing of Jal Jeevan Mission, Government of India. New Delhi.2019*

primary document for all water supply-related projects, and all money from various sources will be dovetailed upon Gram Sabha's approval. State Action Plan (SAP) and District Action Plan (DAP) will also include other activities taken up under different schemes/ programmes to achieve long-term water security.

3.5 **Water Quality Monitoring and Surveillance**. Water quality surveillance and monitoring of drinking water quality are two different but connected activities. According to the "Service Delivery" model, the Rural Water Supply (RWS) Department and the Public Health Engineering Department (PHED) will "monitor" the drinking water quality, i.e. supplier/agency in charge of ensuring the availability of a guaranteed tap water supply, while the Gram Panchayats (GPs) and/or its subcommittee, the Village Water & Sanitation Committee (VWSC)/Pani Sami, are in charge of the "surveillance" of water quality at the local level.

Fig 3.5 Impact of Prolonged Consumption of Contaminated Drinking Water on Human Body



Source : WQMS Framework

3.6 **Uniform Drinking Water**. The uniform drinking water quality monitoring protocol was established by the Indian Government's Ministry of Drinking Water and Sanitation in 2013. The purpose of this initiative was to standardize the requirements for the establishment and operation of laboratories at different levels. The protocol offers guidance on a number of topics, including the minimal infrastructure needed for building space, manpower, instrumentation, chemical glassware, and sampling and testing

procedures. Although the guidelines are merely indicative and suggestive, states are free to establish their own standards based on spare tool availability and state-specific requirements[7].

3.7 **Need to Measure and Monitor**. Investments in water service delivery measurement and monitoring are anticipated to reduce operations and maintenance costs, enhance service delivery, and inculcate the necessary behavioral changes in rural water supply departments, VWSC. Numerous problems with rural water delivery, including a high rate of scheme failure, contamination, source drying up, frequent outages, unequal distribution, non-revenue water and waste, can be resolved with its assistance. In order to mitigate outages and lower scheme failure, it can assist in providing community members, engineers, and officials with almost real-time alerts and information[8].

[7] *Uniform Drinking Water Quality Monitoring Protocol,Government of India Ministry of Drinking Water and Sanitation, New Delhi, 2013.*

[8] *Technical Expert Committee Report-A road map for the measurement and monitoring of water service delivery in rural areas, Government of India, 2021.*

CHAPTER IV

HAR GHAR JAL SCHEME IMPLEMENTATION IN KANCHEEPURAM DISTRICT

4.1 **Background**. In order to provide coordination, convergence, and policy guidance at the state level under the direction of the chief secretary of the state, the State Water and Sanitation Mission (SWSM) was conceived in 1999. The State Governments would grant the SWSM the authority it needs to successfully implement JJM. The goal of JJM was accomplished by further strengthening the already-existing SWSM. The organization in charge of implementing JJM in the state is SWSM, a state-level institution led by a Chief Secretary and consisting of a Principal Secretary, Secretary in charge of the PHED/RWS Department, and a Mission Director. The State Water and Sanitation Mission, which oversees the state's JJM implementation, is led by the Managing Director of the Tamilnadu Water Supply and Drainage Board. For the JJM's time-bound implementation, the majority of mission officials are on deputation from different departments, agencies, and institutions. It employs subject matter experts on a contract basis in addition to regular officials to promote synergy and the most recent expertise. SWSM can hire consultants to provide specialized help; funds allocated under support activities can be used for this purpose.

4.2 **Status of Kanchipuram District**. Kanchipuram district has 274 village panchayats with 1354 habitations. District has a population of 8,83,698 covering all the members of the 2,15,813 households. Kanchipuram district is being notified with more water bodies as 380 minor irrigation tanks and 4421 ponds/ ooranies(small ponds)

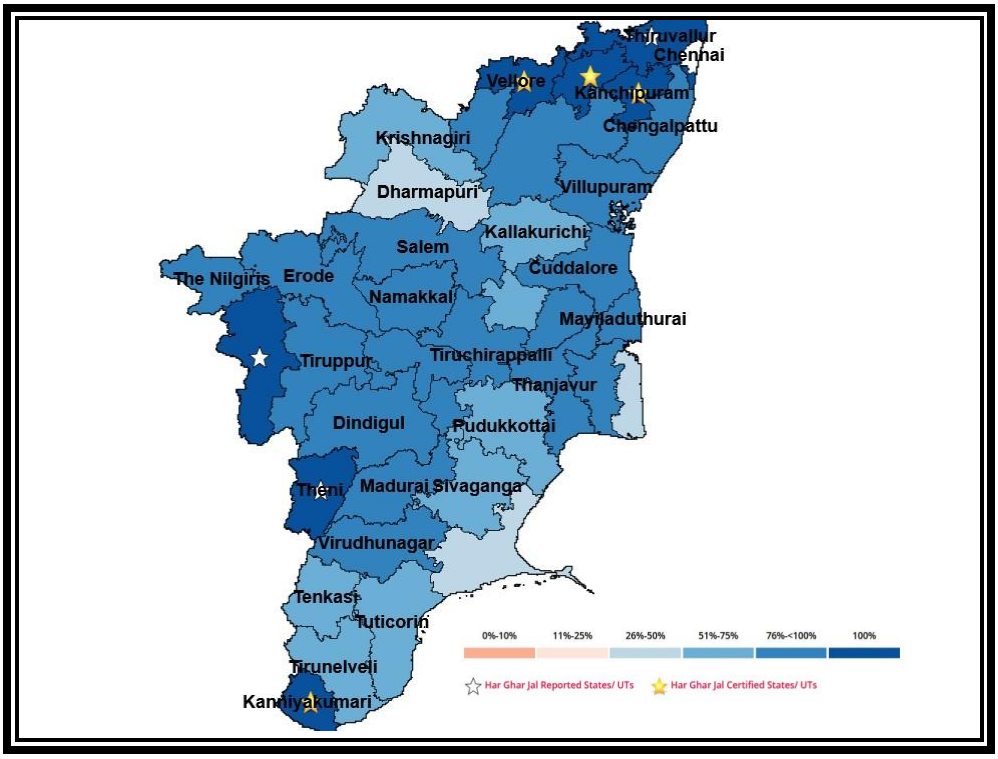
recharge structures like recharge shaft, check dam constructed by the district. Before launching of Jal Jeevan Mission only 58,912 households had functional household tap connection facility out of 2,15,813 households.

Table 4.1: Present Status of Har Ghar Jal Coverage in Tamilnadu (Feb 2024)

District	Total households	Households with tap water supply	Households with tap water supply (%)
HGJ Certified			
Kanchipuram	**2,16,311**	**2,16,311**	**100.00**
Ranipet	1,89,334	1,89,334	100.00
Vellore	2,12,528	2,12,528	100.00
HGJ Reported : All villages reported as 100% by PHED/ RWS			
Coimbatore	3,72,578	3,72,578	100.00
Theni	1,85,013	1,85,013	100.00
Tiruvallur	4,75,915	4,75,915	100.00
Districts : Current Coverage Status			
Nilgiris	96,916	95,785	98.83
Namakkal	3,52,093	3,41,860	97.09
Cuddalore	5,13,851	4,93,627	96.06
Thanjavur	4,21,955	5,04,512	95.04
Chengalpattu	4,16,489	3,93,767	94.54
Mayiladuthurai	2,02,590	2,02,590	91.42
Ariyalur	2,07,503	1,85,753	89.52
Tiruchirappalli	4,73,476	4,23,839	89.52
Erode	4,18,984	3,72,623	88.94
Tirupur	4,56,522	3,90,758	85.60
Tirupathur	2,15,357	1,79,965	83.57
Virudhunagar	4,68,526	3,75,047	80.05

Salem	6,47,476	5,17,126	79.87
Madurai	4,50,545	3,59,346	79.76
Villupuram	4,40,335	3,41,672	77.59
Tiruvarur	3,05,169	2,34,428	76.82
Dindigul	4,55,283	3,42,870	75.31
Tirunelveli	2,84,517	2,00,838	70.59
Thoothukudi	3,56,587	2,50,730	70.31
Perambalur	1,48,348	1,04,291	70.30
Krishnagiri	4,09,438	2,77,104	67.68
Tenkasi	3,40,966	2,20,954	64.80
Sivaganga	3,31,483	1,80,936	54.58
Kallakurichi	3,03,411	1,63,262	53.81
Pudukkottai	**3,70,681**	**1,89,581**	**51.14**
Dharmapuri	3,42,902	1,63,268	47.61
Nagapattinam	1,57,427	54,705	34.75
Ramanathapuram	3,33,286	85,121	25.54
Total	**1,25,25,846**	**1,00,74,350**	**80.43**

Fig 4.2 : Tamilnadu FHTC Coverage



Source : JJM Dashboard

Table 4.2 : Tamilnadu FHTC Status

JJM Status Tamilnadu			
Ser	**Description**	**Numbers**	**Remarks**
(a)	No of Households	1,25,25,846	
(b)	HH with Tap Water connection in 2019	21,76,071	17.3%
(c)	HH with Tap Water Connection Feb 2024	1,00,74,350	80.5%
(d)	Balance HH for FHTC	24,51,496	19.5%

Mission Director JJM Tamilnadu and Managin Director TWAD Board

4.3 **Planning and Preparation.** Based on the operational guidelines of the Jal Jeevan Mission the district administration of Kancheepuram had proposed to go on 'Saturation' mode on first year(for 100 % coverage of FHTC in first year) of JJM. The entire district comprising of 274 village Panchayats in five blocks having 135 habitations within one year was planned to be covered. Toward this end the district administration carried out a preliminary survey in the month of April 2020 and came out with a requirement of sustenance plan including a source augmentation and storage structures works to meet a future period requirement for 30 years. To have an effective monitoring mechanism and ensure quality and completion of works a third party agency namely M/s NSS Associates was finalized which reported completion of works after due verification on ground and the financial bill settlements.

Interaction with Kancheepuram District and Block Officials on DAP/ VAPs

4.4 **Preparation of Village Action Plans and District Action Plan**. Kancheepuram district administration focused on preparing a comprehensive Village Action Plans so as to compile the District Action Plan by considering the following factors:-

(a) A detailed study of history of water supply, availability in the villages, any drought/ cyclone/ flood and general trend of water availability in the village including cases of reported water-borne diseases.

(b) Detailed observation of existing status of water supply in villages.

(c) Water availability in all the sources in villages and its long term sustainability was assessed in depth.

(d) A survey was undertaken to clearly establish the existing FHTCs including illegal connections which need to be regularized and the number of FHTCs yet to be provided in all habitations.

(e) Based on survey and audit a detailed plan for providing water to public institutions viz. Schools, Anganwadi centres, Health Centres, Gramha Panchayat buildings in all the villages was prepared.

(f) Overall, the district prepared a comprehensive plan first by calculating the water demand, thereafter assessing with the existing water source and storage capacity. Thus the district administration prepared a detailed estimate of required pipeline infrastructure and prepared habitation level mapping.

4.5 **Other Schemes in Kancheepuram for Water Source Sustenance**.

(a) '**Thai' Scheme**. 'Thai' Scheme is part of the government's efforts to harness rainwater effectively and increase groundwater recharge. It typically involves activities such as the construction of check dams, farm ponds and other water conservation structures to capture and store rainwater. Implementation of this scheme aims to mitigate water scarcity issues by maximizing the utilization of rainwater during the monsoon season.

(b) **Kudimaramathu Scheme**. Kudimaramathu Scheme focuses on community participation and to revive traditional water management practices. "Kudimaramathu" translates to "working together" in Tamil, highlighting the collaborative approach involving local communities. Under this scheme, local

communities, including farmers and villagers, actively participate in the restoration and maintenance of water bodies such as lakes, ponds, and irrigation tanks. Activities include de-silting, repairing bunds, removing encroachments, and promoting sustainable water management practices. The scheme encourages the concept of "Shramdan," where people voluntarily contribute their labor for the improvement of water bodies.

(c) **State Finance Commission (SFC)**. Works to revitalize and restore water features including ponds and tanks. Many of these water sources have accumulated silt over time, making them ineffective. Replenishment work include De-silting: Clearing water bodies of accumulated silt tidying up outlets and inlets: ensuring that water flows unhindered.

(d) **Corporate Social Responsibility**. CSR is the practice of businesses investing in initiatives that improve and restore water bodies in order to support efforts to save water. Cleaning, de-silting, and fortifying bunds are possible tasks. The objective is to support sustainable water management and increase the availability of water, particularly in metropolitan areas.

(e) **Atal Mission for Rejuvenation and Urban Transformation**. AGAMT is to modernize urban infrastructure, particularly infrastructure connected to water. Its main points of emphasis are: storm water drains, parks and green areas, non-motorized transportation, drinking water facilities, and wastewater and sewage disposal management.

(f) **MI Tanks**. These tanks are small to medium-sized water storage structures designed to capture and store rainwater, providing a reliable source of water for irrigation in areas where water scarcity is a concern.

4.6 **Measures Taken for Source Sustainability**. The status of Kancheepuram's source sustainability measures undertaken are as enumerated below:-

Table 4.3 : Status of MI Tanks

	Blocks				
	Kanchipuram	**Uthiramerur**	**Walajabad**	**Sriperum budur**	**Kundrathur**
No of MI Tanks	54	130	53	84	59
Rejuvenated under THAI scheme	5	6	5	5	6
Rejuvenated under Kudimaramathu scheme	14	30	20	15	13
Rejuvenated under MGNREGS (completed)	0	8	8	5	2
Rejuvenated under MGNREGS (Partially completed)	35	27	7	37	3

Table 4.4 : Status of Ponds

	Blocks				
	Kanchipuram	**Uthiramerur**	**Walajabad**	**Sriperum budur**	**Kundrathur**
No of Ponds	54	130	53	84	59
Rejuvenated under Kudimaramathu	5	6	5	5	6

Rejuvenated under SFC	14	30	20	15	13
Rejuvenated under CSR	0	8	8	5	2
Rejuvenated under AGAMT	7	5	0	10	10
Rejuvenated under MGNREGS	63	12	119	17	50

4.7 **Identifications of Gaps**. The Technical team of the Rural Development had conducted a detailed survey and habitation wise analysis was made with regard to source (borewell, open well, storage (OHT)) and distribution line. The identified gaps in the infrastructure for fulfillment of JJM scheme were as below:-

Table 4.5 : Status of Water Sources and Infrastructures

Ser	**Block**		**Existing Sources**		**JJM Proposed Details**		
		No of FHTC	**OHT**	**Borewells**	**OHT**	**Borewells**	**Total Amount (in cr)**
(a)	Walajabad	8682	559	338	38	93	10.75
(b)	Sriperumbudur	29317	15	447	18	65	30.71
(c)	Kanchipuram	4753	281	319	22	71	22.48
(d)	Kundrathur	61914	350	382	18	65	13.20
(e)	Uthiramerur	12117	390	317	73	73	15.70
	Total	**116783**	**1595**	**1803**	**223**	**458**	**92.84**

Table 4.6 : Work Estimate by District Administration

to Achieve 100% FHTC Coverage

Ser	Block	Providing FHTC with Minor Works		Providing FHTC with Major Works (Retrofitting Source Augmentation /OHT Construction and other works)		
		No of FHTC	Amount in Lakhs	No of FHTC	Amount in Lakhs	Total Amount
(a)	Walajabad	5235	237.88	8608	2361.25	2599.13
(b)	Sriperumbudur	11235	505.37	19325	2946.95	3452.32
(c)	Kanchipuram	6296	328.44	7614	1948.54	2276.98
(d)	Kundrathur	22536	1188.30	52441	5541.13	6729.43
(e)	Uthiramerur	7701	359.70	18083	3572.08	3931.78
	Total	**53003**	**2619.69**	**106071**	**16369.9**	**18988.96**

4.8 **JJM Implementation in Kanchipuram**. To provide functional household tap connections to every rural household and ensure 55 LPCD of quality water to each household it was proposed to cover all households in 1350 habitations in 274 village Panchayats of Kanchipuram district in 'saturation mode'. A preliminary survey was carried out by analysing the requirement and water budget was prepared for future 30 years. Village action plan was prepared for all the village Panchayat with the detailed requirement of source augmentation, storage structures and pipeline extension works.

Table 4.7 : Status of Works Implementation

Ser	Description	Units	Total Taken Up	Completed	% of Completion
(a)	OHT	No	40	40	100
(b)	Borewell	No	96	96	100
(c)	Open Well	No	5	5	100
(d)	Pump Rooms	No	22	22	100
(e)	Sump	No	1	1	100
(f)	Punping Main Line	Meters	68673	68673	100
(g)	Distribution line	Meters	113582	113582	100

Table 4.8 : Status of NRM Works

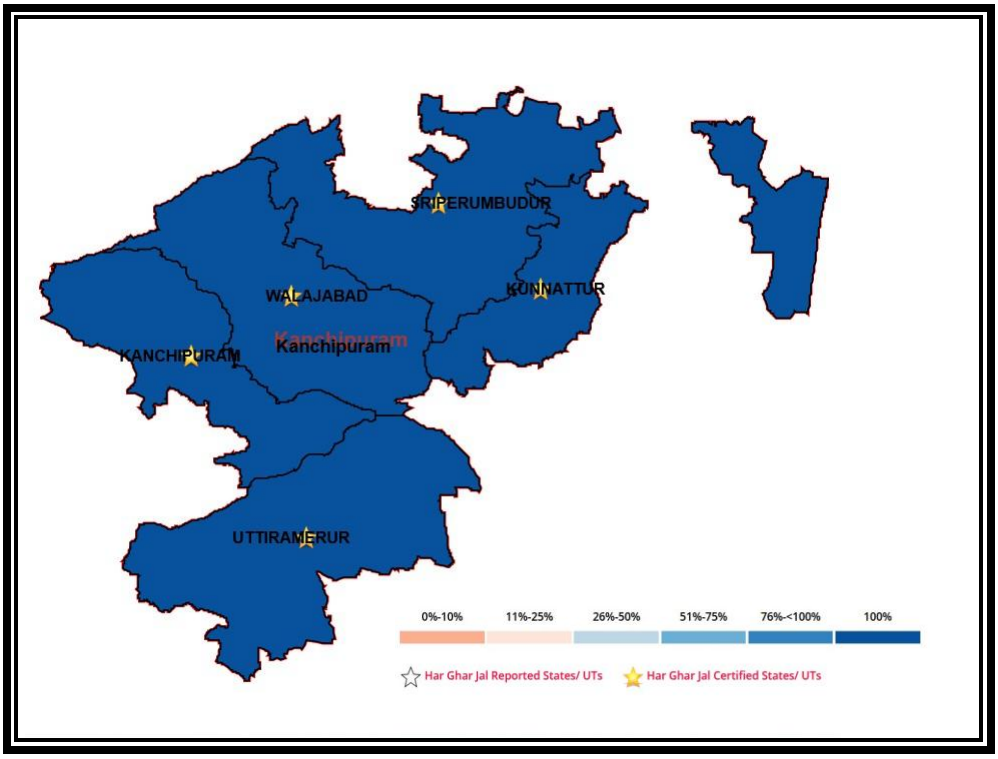
Ser	Block	Check Dams	Recharge Pit	Recharge Shaft
(a)	Walajabad	77	50	30
(b)	Sriperumbudur	66	40	26
(c)	Kanchipuram	67	40	30
(d)	Kundrathur	79	35	20
(e)	Uthiramerur	110	60	32
Total		**399**	**225**	**138**

15th CFC Expenditure Details. Apart from the main scheme funds, additional source augmentation was undertaken under the convergence of 15th Central Finance Commission Funds. Administrative sanctions were accorded to 257 works for creating additional sources, OHT and pipelines to an estimated amount of Rs 22.57 crore under the convergence fund.

Table 4.9 : CFC Fund Utilization

Ser	Description	Amount in Crores
(a)	Total Allotted Amount	22.57
(b)	Expenditure Incurred as of Jan 20224	20.98
(c)	Balance Expenditure to be made	1.59

Fig 4.3: Kancheepuram 100% FHTC



Source : JJM Dashboard

4.9 **Jal Jeevan Mission Across all Sections**. According to data from the Kancheepuram district administration, only 6.08% of SC/ST households in rural areas had a functional household water tap connection prior to the implementation of the JJM scheme.

However, as a result of the JJM scheme, 100% of SC/ST households now have water tap connections, which has changed their lifestyle and forced them to concentrate on their means of subsistence. Under the JJM program, 278104 SC/ST individuals are currently guaranteed a 100% water supply in their homes as well as the benefit of drinking portable water.

4.9.1 **Ensuring Water Quality and Quantity**.

Village Water and Sanitation Committee (VWSC). Every village is required by JJM to have a Village Water and Sanitation Committee consisting of 10 to 15 members. This committee is responsible for overseeing the main water supply systems in the village. A minimum of 50% of women participate in each VWSC and encourage women to hold leadership positions in society. In accordance with the directions, the district administration has announced that every Panchayat now has a minimum of 10 members on the VWSC Committee, with at least half of them being women. According to the report from district administration, 1470 out of 274 Panchayats had women as participants, making up more than 50% of the total.

SHG Members Participation for Water Testing. According to the district administration, five female volunteers from Self Help Groups (SHG) in every village in Kanchipuram district have been educated by the TWAD board to test 13 criteria of water quality and have been given a field test kit through JJM. In the Kanchipuram district, there are 1370 SHG members in total who have been trained by TWAD. The team conducts water quality tests, and the results are regularly published to the WQMIS webpage.

Innovative Steps for Monitoring of Water Supply. According to the district administration, all 274 Panchayats' OHTs have been equipped with chlorination units to guarantee enough chlorination across every village Panchayat. In 10 Panchayats, a smart water supply distribution pilot project using a sensor-based system has been carried out. This initiative will eventually be extended to all 274 village Panchayats.

Serapabancheri Panchayat Anganwadi in Kancheepuram District

Water Testing by SHG Members Using Field Test Kit

CHAPTER V

A COMPARATIVE ANALYSIS OF HAR GHAR JAL SCHEME IMPLEMENTATION IN PUDUKKOTTAI DISTRICT

5.1 **Study of Har Ghar Jal Scheme - Planning and Implementation in Pudukkottai District**. The investigation into the "Har Ghar Jal" scheme in Pudukkottai district aimed to enhance comprehension of the initiative. To derive meaningful insights from the case study of the planning and implementation of the scheme in Kancheepuram district, a comparative analysis with a different Tamilnadu district was deemed essential. Pudukkottai, classified as one of the state's water-stressed districts and one among the 150 water-stressed districts in India, presented an opportune contrast. This selection was justified by various factors which include:-

(a) As of January 2024, Pudukkottai exhibited a FHTC coverage of only 54%, a stark contrast to Kancheepuram's impressive 100% coverage within a year of the program's launch.

(b) Diverse ecological and environmental conditions, encompassing variations in annual rainfall, surface and groundwater resources, as well as disparities in the extent of agricultural and industrial activities, played a significant role in the choice of Pudukkottai as a comparison site.

(c) The study considered the varying levels of awareness among the public and local elected members in Pudukkottai compared to Kancheepuram.

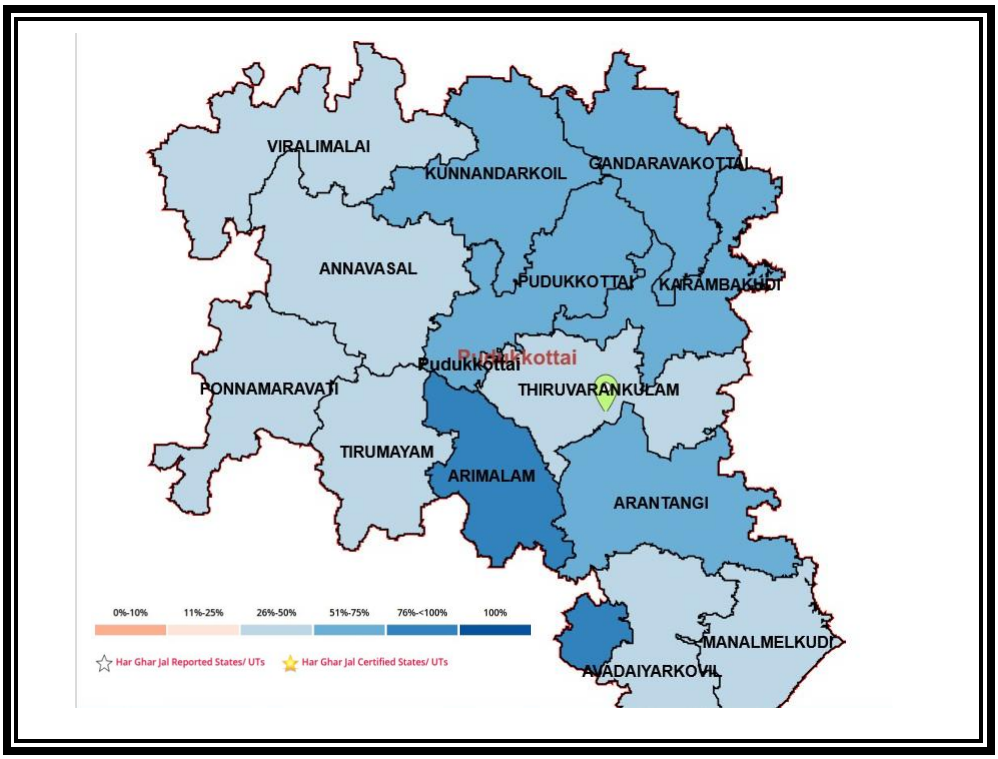
(d) The investigation delved into the distinctive approaches of administrative organizations at state and district levels, examining factors such as fund allocation, fund utilization, convergence of government schemes, and efforts toward long-term sustainability.

(e) Lastly, the exploration sought to identify and document best practices in Pudukkottai and Kancheepuram that could serve as models for emulation in other districts and states. This comprehensive approach aimed to provide a '360-degree' perspective on sustainable water management measures in diverse contexts.

5.2 **Basic details about Pudukkottai District**.

Ser	**Description**	**Remark**
(a)	Location	Falls in East Coast Plains and Hill Region
(b)	Annual Rainfall	798mm
(c)	Population	16,21,234
(d)	Blocks	13
(e)	Number of Villages	497

Fig : 5.1 : Pudukkottai Har Ghar Jal Coverage Status



Source : JJM Dashboard

5.3 **Background**. Pudukkottai district has an undulating topography. There are no major hill ranges in this district, except some detached patches of residual hills at Thirumayam, Kudimiyanmalai, Sithannavasal, Viralimalai and Narthamalai. There is no perennial river, however Agniar, Vellar, Koraiyar, Gundar, etc are some of the seasonal rivers that drain the district. The rivers Vellar and Pambar flow in a N.W.S.E direction. Apart from these rivers there are approximately 5451 shallow inter connected tanks which are mainly rain-fed.

Pudukkottai district in Tamilnadu is categorized as water-stressed due to its predominantly arid climate, low average rainfall, and dependence on unreliable

monsoons. The region faces challenges such as depleting groundwater levels, insufficient water storage infrastructure, and the absence of perennial rivers. Agricultural practices further strain water resources, leading to a precarious water balance. The district's susceptibility to drought exacerbates water scarcity issues, necessitating focused interventions like the Har Ghar Jal scheme to ensure sustainable water supply for domestic and agricultural needs.

In Pudukkottai district, the Integrated Watershed Management Programme is currently underway, overseen by the District Watershed Development Agency. This initiative spans across 97 watershed areas in seven blocks including Gandaravakottai, Pudukkottai, Thiruvarankulam, Karambakudi, Arimalam, Annavasal, and Kunnandarkovil. Notably, the completion of projects has already been achieved in Gandaravakottai, Pudukkottai, Thiruvarankulam, and Karambakudi blocks. Typically, these projects have a duration of five years, with an integration period of two years, making a total of seven years. The funding structure involves a 60% contribution from the Government of India and a 40% share from the State Government. The primary objective of the scheme is to restore environmental equilibrium by integrating, protecting, and developing affected natural resources such as soil, greenery, and water. This comprehensive approach addresses issues like soil erosion and contributes to an increase in the groundwater table through rainwater harvesting, thereby safeguarding the natural green environment. The projects encompass various crucial activities aimed at achieving sustainable watershed management.

5.4 **FHTC Status of Pudukkottai**. Prior to the Har Ghar Jal scheme's implementation in April 2020, Pudukkottai, which has 497 Panchayats and 13 blocks, had less than 15% FHTC coverage. As of February 2024, the FHTC coverage has increased to 64 % and there are balance of 1,70,915 rural households with outstanding FHTC coverage(46% of all rural households).

Table 5.1 : Pudukkottai FHTC Status

Basic Data Pudukkottai District		
Ser	**Details**	**Numbers**
(a)	Total Number of Blocks	13
(b)	Total Number of Panchayats	497
(c)	Total Number of Habitations	4062
(d)	Total Household in Rural Areas (as per YDU)	3,70,681
(e)	Total Population in Rural Areas(as per YDU)	16,21,234
Details of Tap Connections (FHTCs)		
(f)	Tap Connections Provided by Existing Schemes(Before 01.04.2020)	52,109
Activities of Jal Jeevan Mission		
(g)	Number of FHTCs can be Achieved Out of 2020-21 Sanctioned FHTCs(93930)	89,229
(h)	Number of illegal Tap Connections Regularized in 2020-21 to 22-23	6,908
(i)	Number of FHTCs Provided by Single Village Scheme in 2021-22	21,614
(j)	Number of FHTCs Provided by Single Village Scheme in 2022-23	18,065
(k)	Number of FHTCs Provided by Single Village Scheme in 2023-24	11,841
(l)	**Total**	**1,99,766**
(m)	**Balance to be Provided**	**1,70,915**

Soak Pit constructed in Aganwadi at Mattangal Vilage of Pudukkottai District

Evaluation of JJM Scheme at Gandarvakottai Girls Higher Secondary School

5.5 **Organisation**. The District Collector is the head of the Water Sanitation Committee (DWSC) and also the chairperson of DWSC. The District Collector is responsible for approving the DAP prepared by DMMUs based on VAPs submitted by VWSCs. The District Collector is also responsible for releasing funds to VWSCs and TPIUs for implementing FHTCs and in-village water supply infrastructure. The District Collector is also responsible for monitoring and reviewing the progress and performance of JJM in the district. The projects are taken over by gram panchayats through their sub-committees i.e. VWSCs or Paani Samitis. The VWSCs are responsible for executing FHTCs as per VAPs approved by DWSMs. The VWSCs are also responsible for managing O&M of FHTCs and in-village water supply infrastructure under JJM.

5.6 **Construction of Water Conservation Structures**. It is learnt that in Pudukkottai district of Tamilnadu, being a water-stressed region, water conservation and management has always been a priority for the district administration. Authorities typically conduct surveys and studies to assess the water needs and availability in a particular region. Based on the assessment, a plan is formulated to address water scarcity issues, which may include the construction of various water source sustenance structures. Community participation is crucial in planning and implementing water projects. Local communities often have valuable knowledge about water resources and can contribute to the planning process. The status of water source sustenance measures that were available prior launch of JJM scheme and the progress achieved post implementation are enumerated in the succeeding tables.

Combined Water Supply Schemes. CWSS are strategic initiatives aimed at alleviating water scarcity and enhancing access to safe drinking water in specific regions. These schemes integrate diverse water sources including surface water, groundwater, and treated water from plants, with key objectives to ensure access to reliable and safe drinking water. The scheme is designed to expand coverage through infrastructure development, diversifying water sources for risk mitigation, enhancing water quality through treatment plants, prioritizing long-term sustainability with considerations for groundwater recharge and source protection. It also fosters community participation in planning, implementation, and maintenance of water supply infrastructure.

Status of CWSS Pudukkottai District

No of PRI	No of Habitation	Capacity of OHTs (in Ltrs)	Status as on 07.11.2023		
			Designed Quantity (in ltr)	Actual Supplied Quantity (in ltr)	Shortage in Qty (in ltr)
497	4062	82110000	3,89,02,407	2,37,49,849	1,52,69,545

Table 5.2 : Source Details - Block Wise Prior Launch of JJM Scheme

Ser	Name of Block	Status Before Launch Of JJM			
		FHTC Before JJM	Borewell	OHT	JJM Estimate Cost
1	Annvasal	4215	258	51	1156.13
2	Aranthangi	463	364	222	1068.08
3	Arimalam	4676	55	23	470.81
4	Avudayarkoil	9073	284	180	538.52
5	**Gandarvakkottai**	**2341**	**180**	**188**	**577.37**
6	Karambakudi	2047	226	125	771.81
7	Kunnandarkoil	5935	110	105	777.19
8	Manamelkudi	6552	125	143	977.73
9	Ponnamaravathi	4772	325	327	624.92
10	Pudukkottai	11188	255	274	1049.41
11	Thirumayam	3318	14	34	539.81
12	Thiruvarankulam	2862	426	82	961.94
13	Viralimalai	1575	303	441	982.48
Total		**53097**	**168**	**84**	**7804.07**

Interaction with Village Presidents and Secretaries of Gandarvakottai Block

FHTC Functionality Evaluation at Gandarvakottai Government Hospital

Table 5.3 : Source Details - Post Launch of JJM Scheme

Details Describing Progress Achieved					
Ser	**Name of the Block**	**JJM Proposal Details (2020-21 & 2022-23)**			
		FHTC	**Borewell**	**OHT**	**JJM Estimate Cost**
1	Annvasal	2904	22	4	377.76
2	Aranthangi	8612	9	1	893.88
3	Arimalam	4632	10	7	1015.08
4	Avudayarkoil	1656	12	0	542.05
5	**Gandarvakkottai**	**3395**	**0**	**0**	**426.86**
6	Karambakudi	4080	7	12	635.27
7	Kunnandarkoil	5029	0	17	517.64
8	Manamelkudi	1336	1	1	148.42
9	Ponnamaravathi	1732	14	7	227.75
10	Pudukkottai	4969	27	5	720.02
11	Thirumayam	5438	30	13	801.44
12	Thiruvarankula	5852	18	6	808.37
13	Viralimalai	3462	18	11	689.53
Total		**59017**	**53097**	**168**	**84**

Retrofittment of Pipe water supply system. In implementing JJM FHTC, the existing functional piped water supply system were to be fully utilized and retrofitted. The scope of work for retrofitting a pipe water supply system under the Har Ghar Jal scheme involves surveying existing infrastructure, planning and designing upgrades, procuring

materials, construction and installation of pipelines and equipment, quality control, community engagement, monitoring, capacity building, regulatory compliance, and documentation, all aimed at improving water accessibility and quality for households.

Table 5.4 : Infrastructure Details - Post Launch of JJM Scheme

Name of the Block	FHTC	Estmate cost	Source	Pumping main (M)	OHT	Distribution Main (M)
Annvasal	13459	1533.89	280	28,285	55	63972
Aranthangi	26432	1961.96	373	4,182	223	100365
Arimalam	19026	1485.89	65	8,124	30	44639
Avudayarkoil	10318	1080.57	296	9,558	180	78283
Gandarvakkotai	**15665**	**1004.23**	**180**	**5,810**	**188**	**56206**
Karambakudi	15153	1407.08	233	2,770	137	89022
Kunnandarkoil	14129	1294.83	110	5,492	122	41797
Manamelkudi	8254	1126.15	126	1,441	144	13566
Ponamaravathi	12372	852.67	339	4,279	334	10066
Pudukkottai	16340	1769.43	282	22,025	279	79121
Thirumayam	14488	1341.25	44	13,066	47	59012
Thiruvarankula	21321	1770.31	444	10,738	88	43215
Viralimalai	17007	1672.01	321	24,742	452	82654
TOTAL	**203964**	**18300**	**3093**	**140512**	**2279**	**761917**

CHAPTER VI

EXPLORING STAKEHOLDERS' PERSPECTIVE IN HAR GHAR JAL SCHEME IMPLEMENTATION

6.1 **Field Visits for Analysing JJM's Har Ghar Jal Scheme Implementation**. In the pursuit of comprehensively analyzing the Jal Jeevan Mission's Har Ghar Jal scheme, the research involved extensive engagement with a diverse array of stakeholders crucial to the scheme implementation. Key participants included District Collectors, Project Directors, members of the District Water and Sanitation Mission (DWSM), block-level technical staff, the Village Water and Sanitation Committee, and households/ beneficiaries from both districts. To ensure a thorough examination, the study employed a multifaceted approach. Initially, a meticulous analysis of secondary data was conducted, focusing on planning, preparation, and implementation of inputs. This phase included a review of Village Action Plans, District Action Plans, and pertinent information obtained from the District Administration and the Jal Jeevan Mission portal.

Subsequently, the research employed a targeted survey methodology. Four sets of questionnaires were meticulously designed and administered to various stakeholders. These questionnaires facilitated structured interviews with the District Collector, Project Directors at the District level, Panchayat Presidents from selected villages (a total of seven), and Focus Group Discussions (FGD)/ Community interaction with beneficiaries. The questionnaires, comprising both close and open-ended questions, addressed critical aspects such as the planning, preparation, and implementation of the Har Ghar Jal scheme, alongside issues related to maintenance and source sustenance.

The FGDs, a crucial element of the research, fostered discussions among different groups including village women, men, and members of the Scheduled Caste (SC) community. The collected data from these various sources were subjected to a systematic analysis, with a focus on success indicators encompassing participation, transparency, responsiveness, effectiveness, efficiency, accountability, and sustainable measures. This comprehensive methodology aimed to capture diverse perspectives and nuances surrounding the Har Ghar Jal Scheme, providing a robust foundation for the subsequent evaluation and policy recommendations

Lastly, spot analysis was conducted to assess the functionality and impact of the Har Ghar Jal scheme in the selected villages of Kancheepuram and Pudukkottai. This involved a detailed examination of 12 households and all public institutions in each village. The assessment aimed to ensure a detailed understanding of the scheme's on-ground performance, functionality, and its impact on the communities. This multifaceted approach allowed for a thorough evaluation of the Har Ghar Jal Scheme's planning, execution, and overall effectiveness in the study areas.

Table 6.1 : Study Sample from Kancheepuram and Pudukkottai Districts

Ser	**District/ Block**	**Village Panchayats**	**Household Sample Size**
(a)	**Kancheepuram District** Kundrathur Block	Serapabancheri	12 households were surveyed in each village
	Kancheepuram Block	Elichur	
		Melkathirpur	

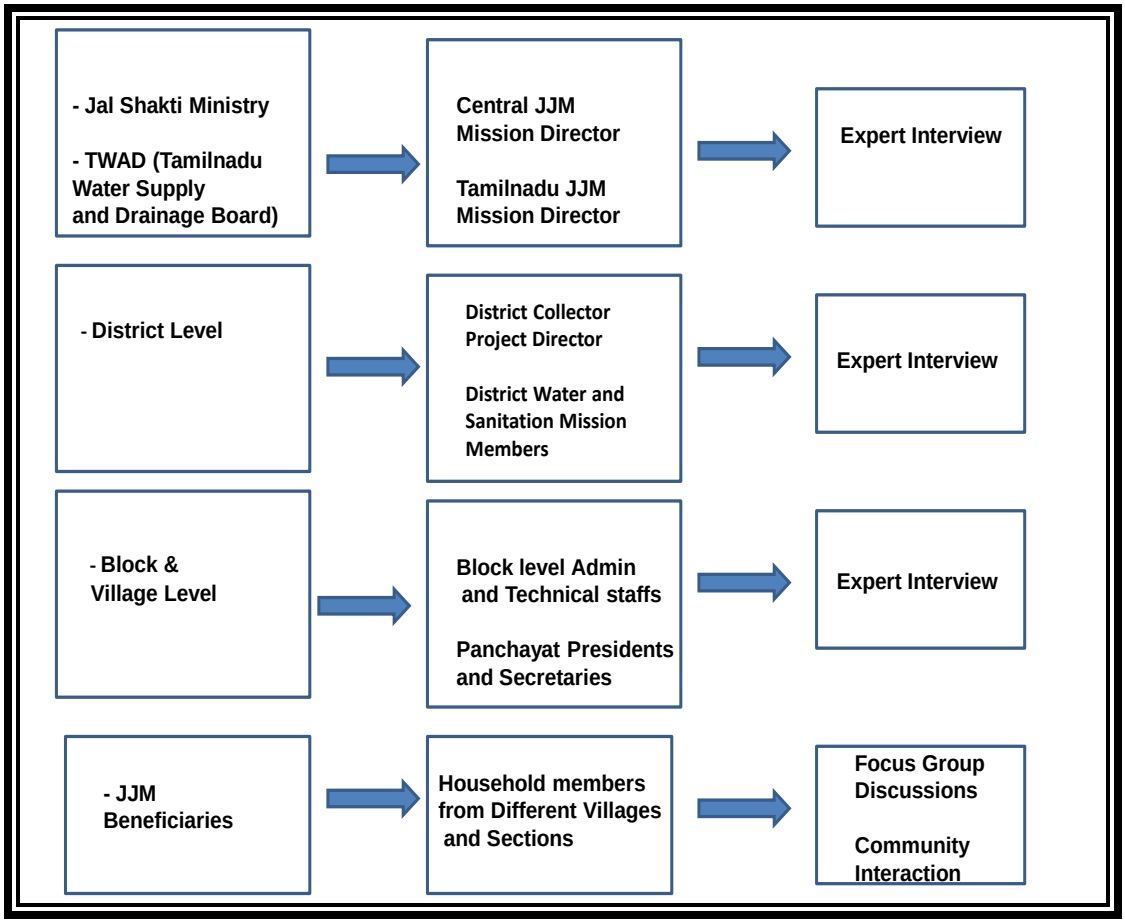
(b)	**Pudukkottai District** Gandarvakottai Block	Gandarvakottai	
		Akachipatti	
		Mattangal	
		Pisanathur	

Rationale for Sample Size. The selection of 12 households per village in Kancheepuram and Pudukkottai districts aimed to ensure a representative sample, considering the average village size of 500 to 1000 households. This sampling strategy allows for a assessment of the functionality of the FHTC (Functional Household Tap Connection) in relation to the overall village population. The primary focus of the sample survey was to assess the functionality/ impact of the FHTC in the selected households. The households were selected using a systematic random sampling method to ensure a fair representation of different sections of the village.

The decision to survey 12 households in villages reflects a balanced approach while considering the practical constraints of time and resources. It allows for meaningful insights into the performance and impact of the Har Ghar Jal Scheme in both Kancheepuram and Pudukkottai districts. The survey considered the demographic diversity within the villages, ensuring that the selected households represented various socio-economic backgrounds and community structures. Data collection involved structured interviews and on-site assessments to gather detailed information on the functionality of the FHTC, as well as the overall impact of the Har Ghar Jal Scheme.

These sample survey details provide a transparent and methodologically sound foundation for assessing the Har Ghar Jal Scheme's on-ground performance in the selected villages of Kancheepuram and Pudukkottai districts.

Fig 6.1 : Tools and Techniques for Data Collection



6.2 **Interview with District Collector Kancheepuram**. During the interview with Mrs. M Aarthi IAS, the former District Collector who played a pivotal role in the successful implementation of the Har Ghar Jal Scheme in Kancheepuram district, several key insights and perspectives were highlighted:

The Har Ghar Jal Scheme in Kancheepuram stands out as one of the largest welfare initiatives where the government not only creates infrastructure for functional tap water connections in every rural household but also emphasizes two distinctive features. Firstly, the completed infrastructure is handed over to PRIs/local governments, ensuring public ownership and empowerment. Secondly, minor contributions from the public are solicited, further fostering a sense of responsibility within the community. Community engagement was a significant challenge, requiring substantial participation and minimal financial contributions. To address this, the Village Water Sanitation Committees (VWSC) were crucial in addressing maintenance and sustenance issues, promoting independent functioning. The district administration took proactive measures, making VWSC meetings mandatory each month, facilitating progress awareness and team efficiency.

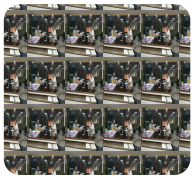
A strategic planning and preparation approach significantly contributed to the scheme's success. The District Action Plan was systematically compiled, incorporating water demand calculations, existing water source capacities, needs for creating new sources, quantification of additional infrastructure, and finalization of projects based on demand and supply requirements. Major and minor works were differentiated, and funds were allocated post-approval for timely commencement. The district administration focused on priority areas, segregating locations for new water sources, extensions, and repairs. Weekly reviews by the district administration ensured progress monitoring and issue resolution, backed by strong support from state and central governments.

Furthermore, the district administration prioritized convergence with other government schemes, emphasizing synergy among various water sector programs. Source sustainability measures including water recharge, greywater management, conservation, and rainwater harvesting, were implemented across villages. The effective utilization of funds through convergence and the implementation of rainwater harvesting and conservation measures stabilized the groundwater table, providing the freedom to undertake additional water source projects to meet growing demands.

The challenges during the initial period centered on ensuring community participation and collecting financial contributions. Panchayat secretaries, Presidents, and administrative officials at district and block levels played crucial roles in coordinating efforts and overcoming challenges, particularly meeting target timelines under MGNREGS projects. The effective resolution of these challenges, coupled with proactive measures and strategic planning, led to the remarkable success of the Har Ghar Jal Scheme in Kancheepuram.

(***Mrs. M Aarthi IAS was recognized for her exceptional contributions, receiving the PM award for best administration***).

Interview with then Collector Kancheepuram Mrs M Aarthi IAS (Presently Project Director Samagra Siksha Abhiyan)



PD/ District Administration (DWSM)
Planning, Preparation & Implementation
Source Sustenance Measures

Village Panchayat Presidents (VWSC)
Implementation
Functional Issues
Source Sustenance Measures

Beneficiaries / Public
Impact assessment
Functionality Check
Community Involvement

Fig 6.2 Study Inputs

6.3. **Preparation and Planning**. This study included an examination of the approved VAPs and District Action Plans (DAPs) of the chosen villages of Kancheepuram and Pudukkottai in conjunction with VAP/DAP format described in the Jal Jeevan Mission (JJM) Operational Guidelines. Several significant findings came out of this investigation:

(a) The format of VAPs and DAPs as described in Operational Guidelines for Implementing JJM scheme was deemed comprehensive. However, the study identified an opportunity for greater integration of inputs from various organizations, such as the Central Ground Water Board (CGWB)/ Central Water Commission (CWC){relevant state organizations TWAD/ TNWRAMA/ TNGWA etc}, to address village-specific issues. Notably, critical factors like the status and trajectory of the groundwater table, an essential determinant for planning water source sustenance measures, were not adequately considered in the VAPs. The involvement of additional organizations, including IITs, academic institutions, or NGOs, could enhance the monitoring of water quality and other sustenance measures.

(b) During the field visit, it was observed that the existing VAP and DAP formats adequately addressed specific issues such as providing Functional Household Tap Connections (FHTC), fund allocation and grey water treatment. However, shortcomings were identified in actual VAPs, wherein there was a lack of detailed inputs on grey water treatment and fund allocation concerning the convergence of schemes, contrary to the expected preparation outlined in the prescribed format.

(c) It was highlighted by VWSC that for the preparation of VAPs they received considerable support from block-level and were involved in a thorough discussions with VWSC. However, there appeared to be a lack of clarity and communication concerning scheme convergence, funding allocations, and the status of approved VAPs and DAPs at the PRI level. A follow-up conversation on DAP and VAP was notably absent.

(d) Kancheepuram was gearing up for a saturation mode of implementation, showcasing a more detailed and comprehensive approach. A comparative analysis revealed that Pudukkottai's DAP and VAPs lacked certain information that were highlighted in Kancheepuram's plans, particularly regarding the convergence of funds, schedules, and project works time schedule.

(e) By addressing these observations and enhancing coordination between local-level stakeholders, the preparation and planning phase could be optimized for more effective implementation of the Har Ghar Jal Scheme.

6.4 **Water Conservation Structures Through MGNREGA**. In accordance with JJM Operational Guidelines, utilization of MGNREGA for the construction of water conservation structures such as check dams, ponds, and percolation tanks are to be undertaken which would help in taking measures in water source sustenance. These projects aim to enhance water availability, recharge groundwater, and mitigate the impact of drought. By involving rural labor in these initiatives, it is envisaged that the scheme would contribute to improved water management, thereby enhancing water security for

the community. During the expert interview with VWSC and field visit to oversee employment of labors from MGNREGA the following came to light:-

(a) It has been difficult to complete planned work using MGNREGA laborers that could help finish water conservation structures, and the outcomes did not match the goals set forth in the plans.

(b) Consequently, the imperative to construct water conservation structures, essential for the sustainable management of village water resources, is neither accorded the requisite seriousness nor achieved to the necessary standards.

(c) The field visit revealed that, in order for the scheme to be truly effective, the audit and monitoring mechanisms of the current system need to be reviewed due to the inability to effectively engage laborers from MGNAREGA.

Water Testing demonstration by SHG at Kancheepuram

6.5 **Declining Groundwater Table**. It was discovered during the field tour and Focused Group Discussion that the primary supply of drinking water through borewells has remained in good condition as a result of water conservation structures works completed in the Kancheepuram district and good rainfall in the previous two years. It was also noted that throughout the previous two years, the ground water table in the area had improved.

A distinct situation was presented in Pudukkottai, a water-stressed district with lower annual rainfall over the last three years. The Pudukkottai district has relied mostly on groundwater obtained primarily from borewells for FHTC. During the Focused Group Discussion and community interaction, villagers highlighted several factors contributing to the decline in the groundwater table. Firstly, inadequate initiatives to conserve water, such as insufficient de-silting of village ponds, result in reduced water recharge capacity compared to consumption. Secondly, the increasing conversion of arable land into eucalyptus plantations exacerbates the issue. The community cited poor rainfall and rising labor costs as reasons for the farmers in choosing eucalyptus plantation, but this choice further depletes the groundwater table. Lastly, the community expressed concerns about industries depleting groundwater resources, citing KALS Distilleries Private Limited, the largest liquor factory in the region, as a major consumer of underground water (located at Kallakottai village in Gandarvakottai block).

Additional study on the rising number of eucalyptus plantations in the area was attempted by approaching the district agricultural office to confirm the facts revealed by the community that the farmers in the area are converting cultivable land to eucalyptus farms

as a result of a ten-year drop in rainfall. Although the authorities agreed to the fact of increasing eucalyptus plantation in the region however, there has not been a study in the changing crop pattern or the effect of groundwater depletion due to increasing eucalyptus plantation. Planting eucalyptus doesn't need a lot of water, but it is believed to cause the groundwater table to drop. The details regarding present extension of eucalyptus plantation given by the district agricultural office for the four villages as below:-

Ser	**Villages Panchayats in Pudukkottai District**	**Area of Eacalyptus Plantation**
(a)	Pisanathur	39.89 ha
(b)	Mattangal	146.99 ha
(c)	Gandarvakottai	105.20 ha
(d)	Akachipatti	44.23 ha

The field visit revealed a significant and shared concern among beneficiaries from four villages, as well as the Village Water and Sanitation Committee (VWSC), regarding the declining water table level in the region. The villagers estimated an annual drop of up to ten feet, drawing their conclusions from the necessity to lower submersible pumps by extending borewell pipelines. This adjustment became imperative as the water level consistently fell below the suction level, prompting a proactive response from the community.

Upon consultation with the District administration about the groundwater level trend in these specific villages, alignment was found with the VWSC's observations. However, it was noted that the district administration had limited data on the groundwater table trend, emphasizing the need for comprehensive monitoring and documentation. Importantly, the lack of records and analysis rendered it impractical to compile complete groundwater data for the area over a five-year period.

This collective evidence underscores the urgency of addressing the diminishing water table in the region. The convergence of concerns among local beneficiaries and official bodies, despite limited data availability, emphasizes the gravity of the situation and underscores the necessity for a thorough investigation into the causes and potential solutions for the declining water table.

6.6 **FHTC Assessment Objectives During Field Visit**. The aim of functionality evaluation of FHTC was to establish tap water infrastructure, providing water in adequate quantity and quality as below:-

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 < dailybasis	< 9 months or < daily basis
Quality	Potable	Potable	Non potable

Result of Spot Analysis

Ser	**Indicators**	**Villages of Kancheepuram and Pudukkottai**	**Remark**
Functionality status of FHTC at households			
(a)	Households (HHs) which received water through FHTC at least once in last 7 days (%)		All seven villages samples were checked from Kancheepuram (3 villages) and Pudukkottai (4 villages)
	Fully functional (%)	100 %	
	Partially functional (%)	-	

	Non-functional (%)	-	districts
(b)	**Quantity of water received by households**		
	Adequate quantity (>55 LPCD) (%)	100%	All seven villages samples were checked from Kancheepuram (3 villages) and Pudukkottai (4 villages) districts
	Partially adequate quantity (> 40 LPCD - < 55 LPCD) (%)	-	
	Inadequate quantity (<40 LPCD) (%)	-	
(c)	**Regularity of water received by households**		
	Fully Regular Supply (as per schedule) (%)	100%	All seven villages samples were checked from Kancheepuram (3 villages) and Pudukkottai (4 villages) districts
	Partially Regular Supply (not as per schedule) (%)		
	Irregular Supply (less than 9 months' supply) (%)		
(d)	**Potable (Quality) water received by households**		
	Potable (%)	100%	Tests for villages in Kancheepuram using field test kit and for Pudukouuai water samples were test in district laboratory for all 13 Parameters
	Non-potable (%)		
	Residual Chlorine (RCL) detected with in permissible limits (%)		

Note:- Water Test Results Sample Placed at Appendix 5

6.7 **Quantity, Regularity, and Quality of Water**. According to JJM, functionality entails the regular supply of water in sufficient quantities (55 LPCD or more), meeting the necessary quality standards determined by the Gram Panchayat (GP) and/or its subcommittee, and maintaining suitable pressure. This definition also incorporates considerations for long-term source and system sustainability.

To verify this functionality, a physical assessment of water supply was conducted in 12 households across all villages (3 in Kancheepuram district and 4 in Pudukkottai district) and public institutions. In Kancheepuram, water quality testing was performed in public institutions, schools, hospitals, anganwadis, and selected households using a field test kit. The trained Self-Help Group (SHG) members conducted regular spot tests, ensuring that all parameters remained within limits. Record-keeping of these tests was maintained at Panchayat offices in Kancheepuram.

In Pudukkottai, due to a lack of trained members for field test kit usage, water samples were sent to the district laboratory, and the test results (including 13 quality parameters status) was made available within 24 to 48 hours. The district lab reported that all parameters were within limits, confirming the water's potability.

The survey conducted in three villages of Kancheepuram and four villages of Pudukkottai revealed 100% functionality, meeting the prescribed JJM standards. This comprehensive evaluation ensures that the Har Ghar Jal Scheme's objectives are achieved, providing a robust framework for the sustainable delivery of clean water to rural households.

Summing up the findings of the research study, several key observations and insights emerged regarding the implementation of the Jal Jeevan Mission's Har Ghar Jal scheme:

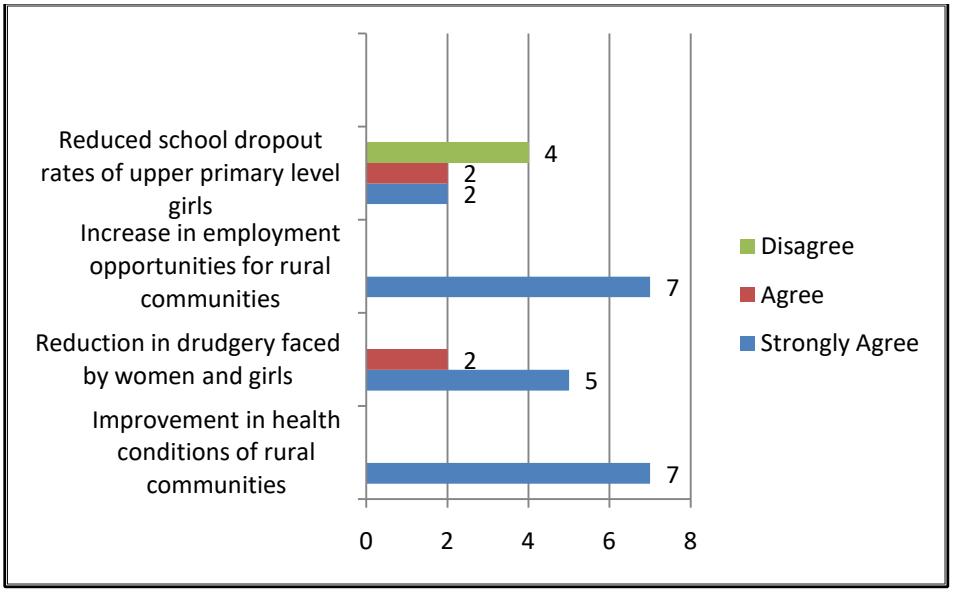
(a) **Exceeding Recommended Water Supply.** Conversations with village presidents and recipients indicated that actual water supply in households surpassed the recommended 55 liters per capita per day (LPCD) envisioned by JJM. Notably, residences and public buildings lacked water meters and there was resistance for installing water meters due to concerns about potential commercialization and high water rates.

(b) **Lack of Awareness and Misconceptions.** Tracking water usage at the Panchayat institution level was deemed crucial for program oversight and long-term sustainability. However, Focused Group Discussions revealed that beneficiaries were unaware of the JJM-prescribed water quantity of 55 LPCD. There were misconceptions about tariff collection, with the public expecting water delivery to be provided at no cost.

(c) **Disparities in FHTC Coverage.** While all households in Kancheepuram enjoyed 100 % Functional Household Tap Connection (FHTC) coverage, Pudukkottai's villages faced incomplete coverage due to funding constraints, however, it was noted that the current extension efforts prioritize all societal segments utilizing existing pipeline infrastructure on equal basis. The district administration acknowledged the gradual implementation of remaining FHTC coverage, requiring additional funding to reach 100% coverage from the present level of 55%.

(d) **Achievement of Main Goals.** Despite challenges, the study confirmed that the primary objectives of the Jal Jeevan Mission's Har Ghar Jal scheme have been successfully achieved. The findings underscore the program's positive impact on the targeted communities.

Fig 6.3 : Impact due to Har Ghar Jal Scheme



Source: Based on expert interview with Panchayat Presidents of 7 Villages

MLA Kancheepuram District Addressing the Public During Gram Sabha

CHAPTER VII

CONCLUSION AND POLICY RECOMMENDATIONS

7.1 **Water Source Sustainability**. The progress of implementation of FHTC at national level as envisaged by Har Ghar Jal scheme has been on a rapid pace (75% completed in 3 years) and the basic objectives of JJM's are being achieved. However, it is assessed that the actual challenge in the coming years would be in ensuring sustainability of water sources in long term scenario because of the following reasons:-

(a) Expanding the FHTC coverage to around 11 crore households within a concise timeframe of three years in India represents a substantial 63% surge in FHTC coverage. This notable increase significantly amplifies the demand for drinking water within the population. Consequently, there is a drastic rise in the consumption of water from the existing resources, primarily relying on groundwater sources.

(b) It has been noted that the JJM's planned projects and works related to rainwater harvesting, water recharge, and water reuse are not progressing at the same rate as the FHTC coverage or water consumption. The Pudukkottai district field research provides evidence for this, since it shows that although FHTC coverage has climbed to 40% in the last three years, the ground water levels have been declining at an alarming pace of 10 feet per year.

(c) It is observed that the groundwater source is not being assessed adequately nor monitored by all stakeholders. There is a need to have more synergy with all stakeholders so as to have focused efforts to ensure that groundwater is recharged

as it is being exploited. Implementing FHTC without ensuring adequate recharge structures for groundwater sources would pose a serious challenge to sustenance.

(d) A study has to be undertaken to assess the increased rate of consumption (after JJM implementation) and lowering of groundwater table (where borewells are the primary water source) to identify regions that are heading for saturation or depletion of groundwater. If enough focus is not paid to such areas, sustainability of Har Ghar Jal scheme will be a major challenge in future. There is a need to have a scientific approach in implementing Har Ghar Jal scheme because there is definitely an increase in water consumption by the public (village households) post JJM scheme implementation, however, the ground water monitoring and consumption monitoring of water is not in happening as envisaged by the mission. Excess exploitation and danger of ground water depletion is high and that would exert a tremendous pressure in sustainability of this scheme.

7.2 **Realities in Meeting 'Har Ghar Jal' Target by 2024**: The progress of the JJM's 'Har Ghar Jal' scheme implementation in Tamilnadu has been good (63%increase in FHTC coverage), however, achieving 100% FHTC target by 2024 faces challenges due to several factors:

(a) Regional variations in surface water sources, groundwater availability, and annual rainfall levels within the state pose significant obstacles in preparing water sources for sustained rural household supply.

(b) Uneven pre-existing water supply infrastructure across districts in Tamilnadu coupled with slow progress in low groundwater regions, particularly those with minimal surface water resources, hampers the scheme's advancement.

(c) Constraints specific to regions are not adequately reflected in the Village Action Plans (VAPs) and District Action Plans (DAPs), forming the basis for fund allocation. The standard formats provided in the JJM's Operating Instructions for implementation of FHTC lack the comprehensive consideration of factors crucial for successful scheme completion including sustainable measures. Despite the scheme's goal of achieving 100% FHTC coverage by 2024, a lag of approximately 20% (around 24.5 lakh households pending) is anticipated to be addressed in the next one to two years time frame, subject to fund availability as disclosed by the state/ district mission and administrative staffs.

Source : Operational Guidelines to Implement JJM

7.3 **Effective Mechanism for Measuring and Monitoring Water Quantity**. From the study visit it was observed that in majority of villages the consumption is much higher than the minimum guaranteed LPCD as per JJM guidelines. Further there is lack of streamlined organization for consumption monitoring both by the public and local elected bodies. The JJM Operational Guidelines recommend three options for measuring and monitoring the rural water supply namely basic, intermediate and advanced solutions. The basic solution involves fitment of a volumetric flow meter at outlet of service reservoir to provide aggregated data on quantity and periodicity of water to the distribution network and it should consists of a groundwater level sensor (wherever applicable) to ensure source sustainability. In the advanced level fitment of consumer level water metering integrated with Internet of Things (IoT) is envisaged for effective monitoring. As a result of lack of even basic monitoring in villages, excess water consumption in households is not realised by the beneficiaries and the PRIs do not monitor or maintain record of water consumption quantity. The district administration must be able to measure and track water consumption in each village using Internet of Things in order to carry out the true transformation as outlined in the JJM guidelines. In the present stage (prior settling down of JJM scheme) it would be difficult to expect VWSC to measure and track groundwater levels and water consumption on their own. In order to ensure sustainability the district administration should set the goal of tracking the trend in water usage and the analysis of groundwater tables, as this will inevitably guarantee accountability, openness, efficient use of funds, and appropriate service delivery. Handholding at this stage by district administration by means of measuring and monitoring system governance architecture

shall enable decentralized control, monitoring, and assessment of water delivery systems at the G.P. and VWSC levels.

7.4 **Assessing Groundwater Dynamics – Challenges and Opportunities**. The rapid developments in water resource sector have resulted in undesirable environmental impacts such as the drying up of large number of bore wells in some areas. Over the last decade, 54% of India's shallow wells became defunct due to declining groundwater levels and thus deep wells have been constructed[9]. Demand for safe drinking water and exploitation of ground water would increase in coming times due to the increasing consumption. During the field visit and discussion, it was found that water conservation structures and good rainfall in Kancheepuram district have helped in maintaining the groundwater level in the region which is the main drinking water source through borewells. However, in Pudukkottai, a water-stressed district with less rainfall, the administration has primarily relied only on ground water for FHTC. Beneficiaries in 4 villages and VWSC in Pudukkottai district expressed concern about declining water table levels, estimated at up to 10 feet fall of groundwater level annually. Ground water level trends received from Pudukkottai district administration align with VWSC's observations.

There is requirement to have a streamlined process at village, block and district level to closely monitor the groundwater level which would sensitize all stakeholders about over exploitation of groundwater sources. Continuous over exploitation of groundwater much higher than the recharging capacity would result in depletion of groundwater sources and cause a major problem for sustenance. Although crisis of ground water is widely

[9] Water and Related Statistics, Central Water Commission, New Delhi 2021

acknowledged, policy making and on ground intervention to prevent over exploitation and efforts to recharge are not given the requisite priority.

Based on the community's concerns regarding industries depleting groundwater resources, particularly in a water stressed district, it is imperative to implement stringent policies to relocate such industries which consume excess water so as to prevent depletion of groundwater. The Central Ground Water Board and relevant state organizations TWAD/ TNWRAMA/ TNGWA etc were established with the goal of creating and sharing technologies, as well as overseeing the implementation of national policies for the sustainable management of India's groundwater resources.[10] . Similarly National Water Academy (Pune) which is established under Central Water Commission is functioning as 'Centre of Excellence' should play more active role in the field of training and capacity building. Greater utilization of academic institutions and expertise is imperative for enhancing contribution to water security.

During the field visits and expert interviews with block and district administration it came out that there is a lack of understanding of seriousness of declining groundwater table and synergy between the stakeholders in addressing the issue such as clarity in declining groundwater table trend. There is a need to revisit the frameworks on which organization such as CGWB and National Water Academy (relevant state organizations such as TWAD/ TNWRAMA/ TNGWA etc and academic institutions) contribute in ensuring sustainability measures. Involvement of more Academic Institution and NGOs would be a key requirement to address the gap in knowledge, technology and auditing mechanism for monitoring and planning of water source sustenance measures in these regions.

[10] *Dashboard Central Water Commission*

7.5. **Impact of Eucalyptus Plantation on Groundwater Availability**. Transformation of arable land into plantations of eucalyptus is observed to be happening in large scale in Pudukkottai region where field study was carried out. Planting eucalyptus doesn't need a lot of water however, it came out during the Focused Group Discussions in four villages in Gandarvakottai block that expanding eucalyptus plantation has further resulted in declining ground water table in the region. Although depletion of groundwater resources can be caused by a number of other hydrological reasons or over-drawal for irrigation purposes, there are evidences which suggest that eucalyptus plantations can aggravate the depletion much earlier than expected by other reasons[11]. Agricultural data is collected and managed by various government agencies and departments related to agriculture. There is a need to record farming practices, changes in cultivation trends, or conversions of farm lands into eucalyptus farming and to carryout further research to study the impact in declining groundwater. Government intervention may be required if the observation is found valid so as to take concrete measures in preventing declining groundwater trend. This could involve coordination between the agricultural department, RWS, PHED, land revenue department and other related departments.

[11] *Mukund Joshi & Palanisami, K. Impact Of Eucalyptus Plantations on Ground Water Availability in South Karnataka,(2011)*

Large Scale Eucalyptus Tree Plantation in Pudukkottai District

7.6 **Addressing Challenges of MGNREGA Drive in Projects for Groundwater Recharge and Drought Mitigation**: Water conservation projects through MGNREGA are envisaged to enhance recharging of groundwater, mitigate the consequences of drought, and augment the availability of water. By enhancing water management and using rural labor (through MGNREGA) for these tasks, the initiative seeks to improve community water security. However, the inefficiencies that have crept into the system as a result of a lack of accountability and transparency in employment have made it exceedingly difficult to complete planned work utilizing MGNREGA laborers. For the proposed project works to be successful, interventions in the scheme's operation and audits of the tasks completed (assets developed) with the funds allotted for MGNAREGA would be essential. To avoid further delays in finishing important projects intended for water conservation the planning for the work that has to be done on the MGNREGA projects in the interim must be handled through alternative means.

Interaction with MGNREGA Labors

7.7 **Celebrating Excellence : Recognising Outsanding Contribution for Enhanced Water Management**. Kancheepuram district having been selected for PM's Award for best implementation of Har Ghar Jal scheme in 2022 has had a big positive impact on all stakeholders' i.e administrative staffs at district/ block and village level. An element of pride is seen in all stakeholders on being the best district in India in implementation of Har Ghar Jal Scheme. Further during the discussion with VWSCs there was a demand from Panchayat Presidents that there should be an award of best performing Panchayat in

the district in maintaining a functional and efficient FHTC. Recognizing and rewarding exceptional performance and innovative practices motivate public servants/ elected members to strive for excellence in their roles. It would be a welcome change if best performing districts are awarded at state level and best performing panchayat's are awarded at district level. By showcasing successful initiatives and best practices, these awards would help to disseminate knowledge and encourage the adoption of effective strategies across different government departments and agencies. The primary goal is often to enhance the quality and efficiency of public services. Awards recognize initiatives that have led to significant improvements in service delivery, cost-effectiveness, or citizen satisfaction. By publicly acknowledging achievements through awards, the state governments can promote transparency and accountability.

Interaction with Village Panchayat Presidents and Secretaries

7.8 **Policy Recommendations to Government of India**: To address the challenges and improve the efficiency of the Har Ghar Jal scheme, several policy recommendations are proposed:

(a) **Integration of Expert Inputs.** There is a critical need to enhance the Village Action Plan (VAP) and District Action Plan (DAP) structures by integrating inputs from specialized organizations such as CGWB/CWC{relevant state organizations TWAD/ TNWRAMA/ TNGWA etc}, and academic institutions. This collaborative approach will ensure a holistic and scientifically informed strategy for water source sustenance.

(b) **Addressing Challenges in FHTC Implementation.** Concerns arising from the rapid progress of FHTC implementation need a nuanced approach. A scientific assessment of groundwater, synchronized water recharge and conservation efforts, and stakeholder synergy are essential to ensure the long-term sustainability of water sources and groundwater table trends in the region.

(c) **Enhance Stakeholder Communication**. The Government should institute a robust communication strategy involving local stakeholders, including Village Water and Sanitation Committees (VWSCs) and Gram Panchayats. Regular forums, workshops, and awareness programs are essential to educate the public on water quantity guarantees, tariffs, and the significance of water meter installations.

(d) **Empower Local Governance Bodies**. Strengthening the capacity of local governance bodies, particularly Gram Panchayats, is imperative for effective water program management. Clarity on funding allocations, convergence of

schemes, and improved communication channels between VWSCs, Gram Sabha, and Panchayat institutions should be prioritized.

(e) **Tailored Approach to Regional Disparities:** Acknowledging regional constraints and pre-existing infrastructure disparities, a tailored and nuanced approach is needed to meet the 2024 FHTC target (or to reach 100% FHTC in next one to two years). The incorporation of regional needs in Village Action Plans and addressing lag in completion should be prioritized.

(f) **Strengthening External Organizations**. To enhance the implementation of the Har Ghar Jal scheme in states, it is essential to focus on key recommendations:

(i) **Reassessing Organizational Roles**: Reevaluate the roles of organizations like CGWB, CWC, TWAD, TNWRAMA, and TNGWA at the planning stages, ensuring effective engagement at the district level.

(ii) **Engagement of National Water Academy**: Involve the National Water Academy in capacity building and training programs for stakeholders involved in the scheme's implementation on a larger scale.

(iii) **Inclusion of Academic Institutions and NGOs**: Increase collaboration with academic institutions and NGOs to enhance knowledge, facilitate technology implementation, and establish robust auditing mechanisms at rural level.

(g) **Addressing Environmental Concerns:** The government should intervene in large-scale eucalyptus plantations in water-stressed districts to prevent groundwater depletion. Coordination among agricultural department, RWS, PHED and land revenue departments is vital, necessitating further research and policy interventions.

(h) **Regulating Groundwater Consumption for Industrial Purposes in Water Stressed Districts**. Implementing a comprehensive policy framework is essential to regulate industrial water consumption and ensure compliance with Central Ground Water Board (CGWB) regulations. This includes establishing a robust auditing mechanism to monitor water usage for commercial purposes, enforcing groundwater recharging responsibilities through regular inspections and penalties for non-compliance, and promoting adoption of water-efficient technologies and sustainable practices by industries. Stakeholder engagement and awareness-raising efforts are also crucial for fostering collaboration and ensuring effective implementation of water conservation policies. Such measures will contribute to safeguarding water resources and promoting the sustainable development of water-stressed regions.

(i) **Completion of Water Conservation Projects through MGNREGA:** Completing water conservation projects requires addressing inefficiencies in MGNREGA workforce utilization. To guarantee openness and accountability and encourage a more efficient convergence of water security schemes, effective auditing and appropriate government actions would be necessary.

(j) **Enhanced Monitoring Mechanisms:** To address excessive water consumption and ensure transparency, the implementation of Internet of Things (IoT) technology and decentralized monitoring with district administration guidance are essential. Streamlining monitoring mechanisms will contribute to efficient water delivery.

(k) **Initiate Phase II of Jal Jeevan Mission**. It is recommended to start Phase II of Jal Jeevan Mission from the year 2025 to ensure sustained progress beyond the Har Ghar Jal scheme's target of 100% FHTC coverage by 2024. The proposed focus areas in Phase II should primarily be on the following:-

(i) Revisit and update Village Action Plans (VAPs) and District Action Plans (DAPs) with a primary focus on maintenance and sustainable measures to address major observations and drawbacks from Phase I.

(ii) Prioritize water-stressed districts in terms of resource and fund allocation to address their specific needs effectively. The revised VAPs and DAPs should address specific needs based on expertise inputs. Foster greater integration of inputs from various organizations, including the Central Ground Water Board (CGWB), Central Water Commission (CWC), and relevant state bodies, to address village-specific issues in VAPs and DAPs.

(iii) Improve human resource development within the water sector by actively engaging academic institutions, encouraging widespread participation, and customizing training programs to address regional variations. To broaden its

capacity-building initiatives, the Central Water Commission should collaborate with additional academic institutions and NGOs, prioritizing community involvement across all aspects of water management.

(iv) To effectively address water scarcity and enhance water management, comprehensive research focusing on river development schemes, flood management, and interlinking river projects is essential. Priority should be given to utilizing surplus water from major rivers to alleviate water stress in low annual rainfall regions, recognizing that rainwater harvesting and recharge structures alone may not be adequate. Alternative strategies must be explored to supplement water resources in such areas, emphasizing effective harnessing of short monsoon period rainfall, especially in regions with inadequate storage capacity and high rainfall variability. Highlighting the importance of interlinking rivers is crucial for strategically utilizing surplus water in water-stressed regions, offering a long-term solution to address water scarcity challenges and promote sustainable water management practices.

(v) Establish streamlined processes at the village, block, and district levels to monitor groundwater levels closely, sensitize stakeholders about overexploitation, and improve data availability on groundwater levels.

(vi) Implement mechanisms for tracking water usage at the Panchayat level to ensure program oversight and long-term sustainability, while communicating the guaranteed quantity of water (55lpcd) to the community and dispelling misconceptions about tariff collection.

(vii) Explore options for providing subsidies for water usage, similar to the Ujjwala gas connection scheme, to address water tariff collection issues from economically weaker sections and encourage behavioral changes towards responsible water consumption.

(viii) Record farming practices and changes in cultivation trends, conducting further research to study the impact on declining groundwater, and consider governmental interventions if necessary to prevent adverse trends.

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Appendix I

Schedule for Key Informant Interviews

(District Level Staffs)

Location

District	
Department	
No of Blocks	
Villages	
Hamlets	
No of Households	

I. General Information

1.1 Name of the respondent…….....
……...Age……

1.2 Sex: Male-1, Female-2

1.3 Department:

1.4 How long you have been serving in the Department?

1.5 What has been the progress of FHTC coverage in your district in the last 3 years

(a) 2020 (b) 2021 (c) 2022

(d) 2023 (e) 2024

Planning and Preparations

2.1 Can you please give some basic details about District Action Plan ?

2.2 Do you receive VAP in time from villages or there is a need to drive Top – Down for Compliance?

2.3 Do you have year-wise coverage plan for FHTC in your area of responsibility? If yes, were you able to meet the target for the last 3 years as per the plan?

2.4 How often is there interaction by the District Committee with Taluk and Villlage committees?

2.5 Has there been improvement on the following conditions post implementation of FHTC programme? Please indicate the condition based on the indicators data available at the District level?

Ser	**Outcomes**	**Improvement in Conditions**		
		Good	**Satisfactory**	**Negative**
(a)	**Health conditions of rural communities** - Reduced waterborne diseases and healthy rural communities - % Reduction in numbers of Acute Diarrheal Diseases, kidney stone issues reported as compared to 3 years back			
(b)	**Reduction in drudgery faced by women and girls** - Number of womenfolk who are relieved of drudgery of carrying water from distant sources			
(c)	**Increase in employment opportunities for rural communities** - Wellbeing of the rural households improved with- % increase in the			

	household incomes.			
(d)	**Reduced school dropout rates of upper primary level girls** - Upper primary school girl's dropout rates decreased from -% to -% and increase in attendance from -% to -%			

3. IMPLEMENTATION & PROGRESS

3.1 How much percentage of old infrastructure such as bore wells, pipelines , water storage tanks were used for progressing FHTC in the Har Ghar Jal scheme in your District ?

3.2 Please explain about the funding for the scheme (State and Central Government contribution)

3.3 How much is the convergence from other schemes / means such as MGNREGA, SBM, MPLAD, MLALAD, DMDF, PMKSY, CAMPA etc?

3.4 Do you have a mechanism to carry out third party audit? If yes please give details about the firm / organization.

3.5 Is there any involvement of NGOs in the planning, implementation or maintenance stage?

3.6 Is water tariff being collected in block and village levels? If so, what's the mechanism in place?

3.7 Do the household ask for 3 delivery points at home or only one?

3.8 How is JJM – Management information system updated?

3.8 Is there utilization of a water quality management information system and field user app?

3.9 Has there been any PPP/ JV model followed in implementing the drinking water/ Ground water recharge schemes?

3.1.1 . Are there villages in your district which have ground water contaminated zone by Arsenic, Chloride, Flouride, Iron Nitrate? If yes how is the FHTC coverage being done there?

3.1.2 Are there any community water purification plant in your district? If yes, please give details.

3.1.3 Are HGM maps used for locating ground water using GIS technology?

3.9.4 Do you have digital inventory of existing assets and overlaying them on GIS map(Pumps, water tanks , Borewells etc)? Are there digital 3D contour maps prepared by MeITY?

3.9.5 . Are there any project monitoring software used for prioritisation of villages for tasking?

4. **Sustenance Issues**

4.1 What measures have been taken to ensure that water meters are fitted in every FHTC in rural areas?

4.2 How is the technical human resources ensured at gram panchayat level?

4.3 Is there any recovery of water tariff at GP level?

4.4 How account/ledgers being maintained by gram panchayat & taluk committee are audited or supervised?

4.5 What are all the long term projects to ensure sustainability ?

4.6 What are the technological innovations & interventions that has been promoted at district level in implementing HGJ scheme?

4.7 Is there emphasis on contribution from households to help sustainance by panchayat and ensure people participation?

4.8 How do you monitor excess ground water exploitation in village areas(drinking water use, agriculture use, industrial use etc)?

4.9.1 What has been the extent of lowering of ground water table in the district?

4.9.2 How is excess ground water exploitation being addressed?

4.9.3 What are the other major projects/schemes in your zone that contribute for water source sustenance such as pond extensions, connecting of river canals, plans to get surplus water of Rivers?

4.9.4 What is the status of facility of laboratories for Water quality monitoring of rural areas already set up at District/ Sub-division/ Block/ level ?

4.9.5 Is it followed that every Gram Panchayat and/ or its sub-committee, i.e. VWSC/ Paani Samiti/ User Group, etc. identifies and train five women in every village to undertake surveillance activities.

4.9.6 Is it followed that Sub-divisional/ blocks undertake lab test of 100% water sources under its jurisdiction;(once for chemical parameters and twice for bacteriological parameters in a year, covering all sources of a block at least for 13 basic water quality parameters)

Appendix II

Schedule for Key Informant Interviews

(Taluk/Village Level)

Location

District	
Block/Taluka/Mandal	
Gram Panchayat	
Village	
Hamlet	
No of Households	

I. General Information

1.1 Name of the respondent…….....
……...Age……

1.2 Sex: Male-1, Female-2

1.3 **Educational Qualification**
Illiterate-1, Below Matric-2, Intermediate-3, Graduate-4, Post Graduate-5, Above Post Graduate-6

1.4 **Present Status**
Current Panchayat Member-1, Ex-Panchayat Member-2, Health Centre In Charge-3, Community Leader-4, President/Secretary/Treasurer of the SHG-5, School Teacher-6, Postmaster-7, Anganwadi/ASHA Worker-8

Planning and Preparations

2.1 Has the VAP been prepared for your village in consultation with Gram Sabha?

2.2 Are you satisfied with the proposed VAP and the final outcome of the approved plan at the district level?

2.3 Do you have year-wise coverage plan for FHTC in your area of responsibility? If yes, were you able to meet the target for the last 3 years?

2.4 Are you aware about the composition of District Planning Committee and about the overall District Action Plan?

2.5 Do you get adequate assistance and have regularly interaction with Taluk level Engineers when preparing, executing and monitoring VAP?

2.6 Has there been improvement on the following conditions post implementation of FHTC programme? Please indicate the condition as below:-

Ser	**Outcomes**	**Improvement in Conditions**		
		Good	**Satisfactory**	**Negative**
(a)	**Health conditions of your rural communities** - Reduced waterborne diseases and healthy rural communities - % Reduction in numbers of Acute Diarrheal Diseases/ kidney stone issues reported as compared to 3 years back			
(b)	**Reduction in drudgery faced by women and girls** - Number of womenfolk who are relieved of drudgery of carrying water from distant sources			

(c)	**Increase in employment opportunities for rural communities** - Wellbeing of the rural households improved with- % increase in the household incomes or increase in their involvement in other work.			
(d)	**Reduced school dropout rates of upper primary level girls** - Upper primary school girl's dropout rates decreased from -% to -% and increase in attendance from -% to -%			

3. IMPLEMENTATION & PROGRESS

3.1 What percentage of old infrastructure such as borewells, pipelines infrastructure, water storage tanks etc. were used for progressing FHTC in the Har Ghar Jal scheme in your village ?

(a) Borewells

(b) Overhead Tanks

(c) Pipeline Infrastructures

3.2 Is FHTC available for 24X7? Y/ N

Please inform about the FHTC status on the following:-

:-

Ser	Public Institute Name	Is FHTC available Y/N	Is Rain water harvesting structure available	Is soak Pit Available	Is water treatment facility available
(a)	Schools				
(b)	Anganwadis				

(c)	Health Care				
(d)	Other				
(e)					

3.3 Could you use funds/manpower for implementing HGJ Scheme using MGNREGS/ SBM ?

3.4 Did you face any problem while laying pipelines as per plan?
If yes please explain the issues.

3.5 Is water tariff being collected? If so, what is the mechanism in place/ If not what is the issue being faced?

3.6 Do the household ask for 3 delivery points at home or only one?

3.7 Is there any third party audit of your FHTC progress being undertaken? If yes, kindly state the details.

3.8 Is the FHTC coverage equally distributed across all sections/ streets?

3.9 Do you find any difficulty in fund allocations or payments in implementing the scheme or any other daily maintenance expenses?

3.1.1 What is the composition of Village Water and Sanitation Committee or Paani Samiti – for executing & managing the Har Ghar Jal scheme.

3.1.2 Is there a zone where ground water is not available for supply? If yes, how is it being addressed?

Maintenance Issues

4.1 Please classify FHTC in your zone under the following categories?

	Fully Functional	**Partially Functional**	**Non Functional**
Quantity	> = 55 lpcd	>40 < 50lpcd	< 40 lpcd
Quality	Potable	Potable	Non Potable
Regularity	12 Months Daily Basis	9 – 12 Months < Daily basis	<9 Months , Daily basis

4.2 Due you face transmission loss in ensuring water delivery to households? Please explain the issues?

4.3 Is you existing water storage tank adequate to meet FHTC distribution guidelines? If not please explain the details of issue?

4.4 Is water meter fitted during FHTC coverage in your zone? If no, kindly state the reasons.

4.5 Does your village/ zone face water shortage issues? If yes, please explain with details?

4.6 Are you equipped with field test kit? And what is frequency of testing and procedure followed?

4.7 Is there any trained member from your area/ including women who is able to ensure water testing?

4.8 Do you maintain a record of water testing? Please explain the procedure?

4.9 How is the electricity bill for water supply and maintenance done in your zone?

4.1.1 Do you maintain a record of daily consumption of water in your zone and how much is the over drawl of water on an average?

4.9.2 Do you have Sub-division/ block laboratory and how frequently the water is tested (Ideally once for chemical parameters and twice for bacteriological parameters in a year, covering all sources of a block at least for 13 basic water quality parameters) ?

5. **Sustenance Issues**

5.1 Is there a water recharge plan in your zone to ensure sustainability?
If yes, please give details.

5.2 Are there any water reuse/grey water / Treatment Plant Projects completed or in progress in your zone?

5.3 Is there an issue of excess exploitation of ground water?
If so how is it being addressed? Is there any case of innovative technology being explored to ensure equal/ controlled distribution of water?

5.4 Is there any audit being carried out to check water consumption? If yes please explain the procedure?

5.5 In the last 5 years have you observed lowering of ground water table in your zone? How much has been the lowering observed?

5.6 . Are there borewell recharge structure in all borewells ? What are the other source sustainability measures?

5.7 Has provision been made for grey water management through waste stabilization pond or other structures?

5.8 Has provision been made for rain water harvesting?

5.9 Was there any case of any failed borewell attempts because of non availability of Ground water post digging of borewell? If yes please give the details

5.91 Do you need more assistance in any of the following, if yes please give the kind of assistance you would like to get from officials?

(a) In maintaining Accounts/ Ledgers
(b) In providing technical training for maintenance

(c) In fund allocation/ Payment

(d) Technical assistance for water testing

(e) In proposing and preparing water recharge facilities

5.92 Are you able to select location and scope of water recharge/ treatment plants/ rain water harvesting plan as per the traditional knowledge (known to the village people) ?

5.93 Any other suggestion for better implementation of Har Ghar Jal Scheme

Appendix III

Focus Group Discussion

Group Composition Category: Mixed group/ Women/ Youths

Village:

Gram Panchayat:

District:

Information of Participants

Ser	Name	Age	Gender	Educational Qualification	Economic Activity if any
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

Name of the Facilitator:

1. Do you think that there has been any perceptible change in your living condition since last 3 years? (Due to implementation of FHTC as per Har Ghar Jal Scheme)

   Yes-1, No-2

   If yes, then specify the reasons for such changes.

2. Has the VAP been prepared for your village in consultation with Gram Sabha and are you satisfied that projects are implemented based on suggestion by the Gram Sabha?

3. Is the quantity and quality of water you get through FHTC adequate ? If we have to clarify them in the following category where would you place the service ?

	Fully Functional	**Partially Functional**	**Non Functional**
Quantity	> = 55 lpcd	>40 < 50lpcd	< 40 lpcd
Quality	Potable	Potable	Non Potable
Regularity	12 Months Daily Basis	9 – 12 Months < Daily basis	<9 Months , Daily basis

4. Has there been improvement on the following conditions post implementation of FHTC programme? Please indicate the condition as below:-

Ser	**Outcomes**	**Improvement in Conditions**		
		Good	**Satisfactory**	**Negative**
(a)	**Health conditions of your rural communities** - Reduced waterborne diseases and healthy rural communities - % Reduction in numbers of Acute Diarrheal Diseases/ kidney stone issues reported as compared to 3 years back			
(b)	**Reduction in drudgery faced by women and girls** - Number of womenfolk who are relieved of drudgery of carrying water from distant sources			

(c)	**Increase in employment opportunities for rural communities** - Wellbeing of the rural households improved with- % increase in the household incomes or increase in their involvement in other work.			
(d)	**Reduced school dropout rates of upper primary level girls** - Upper primary school girl's dropout rates decreased from -% to -% and increase in attendance from -% to -%			

5. Please give your inputs on the water source sustainable measures(water treatment/ reuse plants/ water recharge rojects/ deepening of ponds project/ Rain water harvesting projects etc) being undertaken in your village on the following grounds:-

(a) Post discussion and consensus of Gram Sabha

(b) Are the projects effective post completion?

(c) Has the project had the envisaged impact ?

(d) Any other suggestion for better implementation

6. Is FHTC available for 24X7? Y/ N

Please inform about the FHTC status on the following:-

:-

Ser	**Public Institute Name**	**Is FHTC available Y/N**	**Is Rain water harvesting structure available**	**Is soak Pit Available**	**Is water treatment facility available**
(a)	Schools				
(b)	Anganwadis				
(c)	Health Care				
(d)	Other				

7. What are the issues with respect to FHTC coverage in the village?

8. Is there a concern of lowering of ground water in your zone and what is your recommendation to address the issue?

9. Are there any issue with respect to fitment of water meter to prevent excess exploitation of ground water or tp prevent wastage of water resources?

10. Any other suggestion for effective utilization and implementation of Har Ghar Jal scheme?

Appendix IV

SUMMARY OF FIELD STUDY

Structured Interviews and In-Depth Discussion with Experts (District Collectors/ Project Directors/ DWSM/ VWSC) and perspectives emerging from FGDs and community interactions are summarized below:-

Ser	Issues Raised/ Observed	Inference
1	- Kancheepuram DAP was more comprehensive as the district was preparing to complete FHTC in **saturation** mode. It was systematically compiled, incorporating water demand calculations, existing water source capacities, needs for creating new sources, quantification of additional infrastructure, and finalization of projects - Pudukottai DAP had gaps although the district administration were complying more to the yearly targets. The fund allocation to complete all water recharge structure projects were not adequate to meet the	Regional variations in surface water sources, groundwater availability, and annual rainfall levels within the state pose significant obstacles in preparing water sources for sustained rural household supply. Constraints specific to regions are not adequately reflected in the Village Action Plans (VAPs) and District Action Plans (DAPs), forming the basis for fund allocation. Uneven pre-existing

	proposed requirements. The pipe line network existing at the commencement of the scheme was less compared to what was existing in Kancheepuram district.	water supply infrastructure across districts in Tamilnadu coupled with slow progress in low groundwater regions, particularly those with minimal surface water resources, hampers the scheme's advancement.
2	FHTC Coverage has been 100 % in Kancheepuram and in Pudukottai it was 55 % as of Feb 2024.	- Many districts in Tamilnadu will not be able to meet the target and would require additional one/ two years if funds are made available
3	Water source sustainability measures were completed as envisaged in DAP in Kancheepuram district by adequate fund allocation, effective convergence of government schemes whereas the projects are not complete in Pudukottai district due to lack of fund. The district administrative staffs brought out the requirement for completing the proposed CWSS project for ensuring sustainable measures for water source.	- Gaps observed in VAP and DAP in Pudukottai district. Groundwater level stabilized in Kancheepuram district because of good rainfall and adequate water conservation structures completed. Whereas due to poor rainfall and inadequate water recharge structures and excess exploitation there has been a steady decline in groundwater

		level
4	Training for manpower maintenance and water quality monitoring undertaken in Kancheepuram district using ITIs and found to be effective. The SHG were able to perform water testing using field test kits. Due to lack of trained manpower water samples in villages of Pudukottai were sent for testing in district laboratory. Overall water samples were found to be potable and all 13 parameters within limit. - Testing/Record keeping of water test reports were more were more streamlined in Kancheepuram compared to Pudukkottai district	There is a need to ensure compliance across all districts for water quality monitoring and maintenance capacity. Academic institutions are to be encouraged to contribute in water security and skill development at panchayat levels. Record keeping of water testing should be audited frequently.
5	Third party audit is being awarded to private firms and they give the ground status of scheme implementation, however, there was no involvement of NGOs in both the districts. - All villages visited had been audited by third party.	There is a scope to increase the frequency third party auditing. Utilization of academic institutions would enhance the auditing capacity and improve the compliance state in villages/ districts.

6	Fitment of a volumetric flow meter at outlet of service reservoir to provide aggregated data on quantity and periodicity of water to the distribution network and ground water level sensor to ensure source sustainability not being ensured. The JJM Operational guidelines recommend options for measuring and monitoring the rural water supply namely basic, intermediate and advanced solutions. The basic solution involves fitment of a volumetric flow meter at outlet of service reservoir to provide aggregated data on quantity and periodicity of water to the distribution. Presently the district administration is not able to ensure compliance, however, efforts are seen in Kancheepuram district to use IoT for monitoring water consumption.	In majority of villages the consumption is much higher than the minimum guaranteed LPCD as per JJM guidelines. Further there is lack of streamlined organization for consumption monitoring both by the public and elected bodies. -Excess consumption than the guaranteed quantity would affect the behavioral change of beneficiaries and pose a serious challenge for sustainability of the scheme
7	Technology is being integrated for planning and maintenance. Such as use of HSG maps for water source selection. However, fitment of water meter at source in water supply	Water consumption or quantity control is not being ensured at district and village level. -There is lack of institutionalized

	network and groundwater level indicators are yet to be complied in accordance with JJM operational guidelines.	mechanism to monitor groundwater level in regions and complete awareness to the public.
8	Excess rain water being stored well – in Kancheepuram because of completion of water recharge structures as planned through DAP. As a result there has been good improvement in groundwater level. However, there were reports of continuous declining groundwater level in Pudukottai district	Priority completion of water conservation structures would be critical to recharge borewells before they get depleted. If the trend is not stopped long time sustainance of Har Ghar Jal scheme would be a difficult task. -Special focus should be paid to water stressed districts for taking up long term projects for water source sustainance.
9	By enhancing water management and using rural labor (through MGNREGA) for these tasks, the initiative seeks to improve community water security. However, the inefficiencies that have crept into the system as a result of a lack of accountability and transparency in employment have made it exceedingly difficult to complete planned work utilizing MGNREGA laborers.	Water conservation projects through MGNREGA are envisaged to enhance recharging of groundwater, mitigate the consequences of drought, and augment the availability of water. For the proposed project works to be successful, interventions in the scheme's operation and audits of

	Water Conservation structures through MGNREGA has been a challenge because of the inherent flaws in the system. They are able to get only minor works completed through this scheme/ labors as more old people join this and it is being executed as like a welfare scheme for old people.	the tasks completed (assets developed) with the funds allotted for MGNAREGA would be essential. To avoid further delays in finishing important projects intended for water conservation, planning for the work that has to be done on the MGNREGA projects in the interim must be handled through alternative means.
10	During the discussion with VWSC there was a demand from Panchayat presidents that there should be an award of best performing Panchayat in the district in maintaining a functional and efficient FHTC.	Kancheepuram district having been selected for PM's Award for best implementation of Har Ghar Jal scheme in 2022 has had a big positive impact on all stakeholders' i.e administrative staffs at district/ block and village level. An element of pride is seen in all stakeholders on being the best district in implementation of Har Ghar Jal Scheme throughout India. Recognizing and rewarding

		exceptional performance and innovative practices motivate public servants/ elected members to strive for excellence in their roles. It would be a welcome change if best performing districts are awarded at state level and best performing panchayat's are awarded at district level. By showcasing successful initiatives and best practices, these awards help disseminate knowledge and encourage the adoption of effective strategies across different government departments and agencies.
11	Public contribution is part of the funding methodology for implementing the scheme, however, administrative authorities confessed that collection of contribution amount from the public is a difficult progress in accordance with the framework.	To ensure community involvement and ownership focused efforts is to be taken for collection of public contribution and ensure ownership from the community
	In Pudukkottai, a district facing water stress	The observations made during the

12	due to lower annual rainfall over the past three years, a distinct situation was observed. Groundwater, primarily accessed through borewells, serves as the main source for both domestic use and agriculture in this region. Through Focused Group Discussions and community interactions, several factors contributing to the decline in the groundwater table were highlighted by the villagers. Firstly, inadequate water conservation initiatives, such as insufficient de-silting of village ponds, were noted, leading to reduced water recharge capacity compared to consumption. Secondly, the conversion of arable land into eucalyptus plantations has been on the rise, exacerbating the groundwater depletion issue. Farmers attribute this shift to factors like poor rainfall and escalating labor costs, but this choice further strains the groundwater resources. Lastly, concerns were raised about industrial activities, with KALS Distilleries Private Limited, the	field study in Pudukkottai shed light on the multifaceted challenges contributing to the decline in the groundwater table. The lower annual rainfall in recent years has intensified existing water stress in the region, necessitating a heavy reliance on groundwater sources, particularly borewells, for fulfilling both domestic and agricultural needs. However, the sustainability of this practice is compromised due to various factors. Inadequate water conservation efforts, exemplified by the insufficient de-silting of village ponds, result in a diminished capacity for water recharge, exacerbating the imbalance between groundwater consumption and replenishment. Furthermore, industrial activities, notably the operations of KALS

	largest liquor factory in the region, identified as a significant consumer of underground water, posing an additional strain on the already stressed groundwater reserves..	Distilleries Private Limited, emerge as significant contributors to groundwater depletion, posing a challenge to sustainable water management in the region. Addressing these complex interrelated issues requires holistic approaches encompassing effective water conservation strategies, sustainable land-use practices, and regulation of industrial water consumption to ensure the long-term viability of groundwater resources in Pudukkottai.
13	During FGDs and community interaction it came out that increasing growth of eucalyptus plantation in villages has resulted in declining groundwater level. An additional study was conducted to investigate the escalating trend of eucalyptus plantations in the area. Approaching the district agricultural office for confirmation	The supplementary investigation into the surge of eucalyptus plantations underscores the need for a more thorough understanding of changing agricultural practices and their implications on water resources. Although the acknowledgment

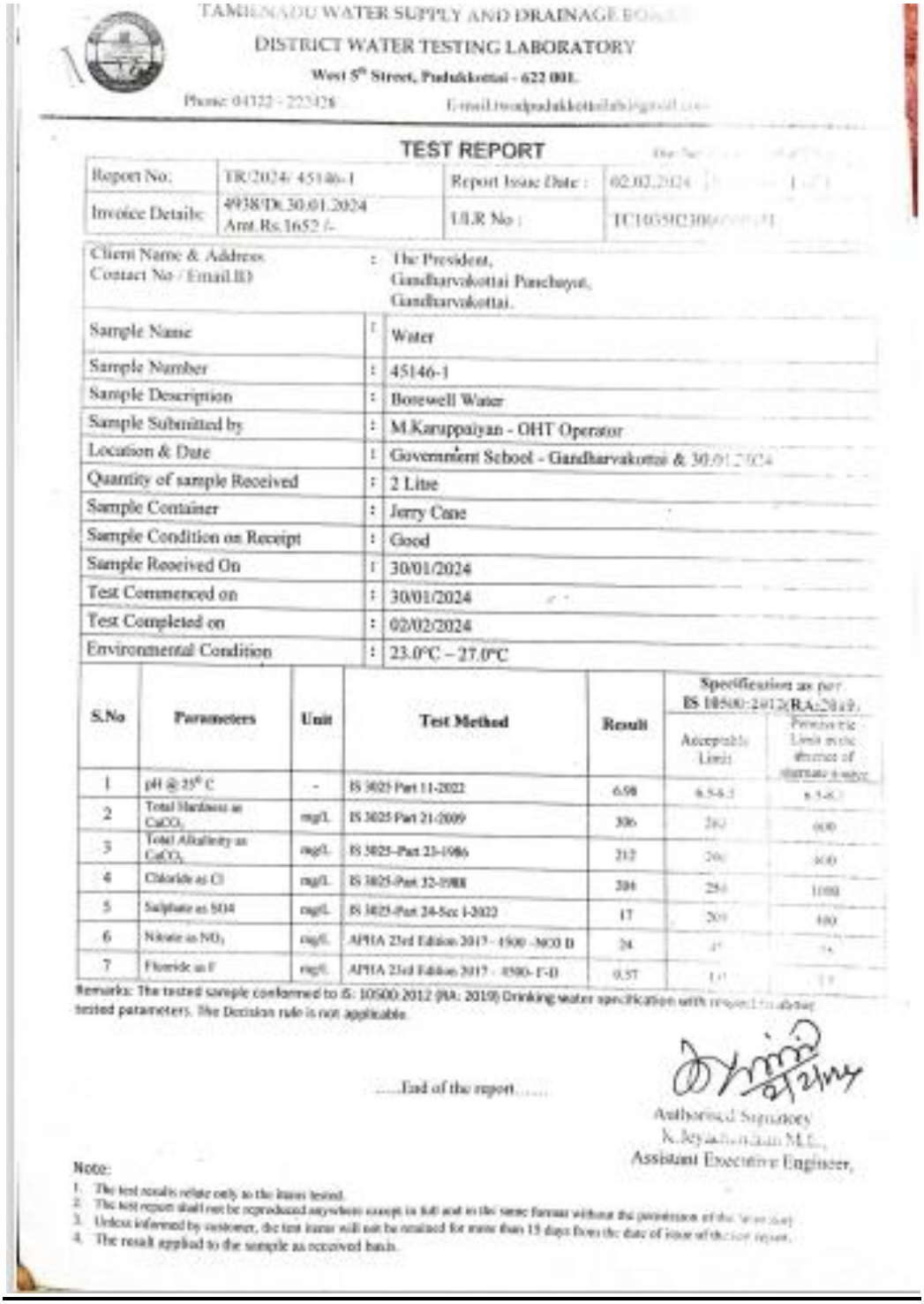
	of community-revealed facts regarding farmers converting cultivable land to eucalyptus farms due to a decade-long decrease in rainfall yielded acknowledgment of the increasing prevalence of eucalyptus cultivation. However, it was noted that there hasn't been a comprehensive examination into the shifting crop patterns or the potential ramifications of groundwater depletion resulting from the expansion of eucalyptus plantations. While eucalyptus cultivation is known for its low water requirements, concerns persist regarding its impact on the groundwater table.	from the district agricultural office confirms the rising trend, the absence of a detailed analysis on shifting crop patterns and the correlation with groundwater depletion presents a critical knowledge gap. While eucalyptus cultivation is perceived as a water-efficient alternative, the potential adverse effects on groundwater levels warrant urgent attention. Addressing this gap in research is essential for informed decision-making and the implementation of sustainable water management strategies to mitigate the long-term consequences of agricultural practices on water availability in the region.
14	It was noted and observed during field visit that the successful attainment of the primary goals set forth by the Jal Jeevan Mission's	The study's affirmation of the Jal Jeevan Mission's Har Ghar Jal scheme's accomplishments

	Har Ghar Jal scheme, despite encountered challenges. Notable achievements include enhancements in rural health, alleviation of burdensome tasks for women and girls, augmentation of employment prospects, and a decline in the dropout rates among upper primary school girls.	underscores the efficacy of targeted interventions in addressing critical socio-economic challenges in rural areas. By improving access to clean water, the scheme not only enhances public health but also empowers women and girls by reducing their workload and facilitating their participation in education and economic activities. Moreover, the observed decrease in dropout rates among upper primary school girls signifies the scheme's positive impact on promoting gender equality and fostering inclusive development. These outcomes highlight the importance of sustained investment in initiatives aimed at ensuring universal access to clean water and sanitation for realizing broader

		socio-economic development goals in rural communities.
15	A research endeavor involved conducting physical assessments of water supply in 12 households spanning villages across Kancheepuram and Pudukkottai districts, alongside public institutions. In Kancheepuram, water quality testing encompassed public institutions, schools, hospitals, anganwadis, and select households using a field test kit, with trained Self-Help Group (SHG) members conducting regular spot tests and maintaining records at Panchayat offices. Conversely, in Pudukkottai, where trained personnel for field test kit usage were lacking, water samples were sent to the district laboratory, and test results, including 13 quality parameters, were made available within 24 to 48 hours. The district lab reported that all parameters met standards, affirming the potability of water. The survey, spanning three villages in Kancheepuram and four in	The meticulous assessment conducted across Kancheepuram and Pudukkottai districts highlights the efficacy of the Har Ghar Jal Scheme in ensuring the provision of clean water to rural households. The utilization of field test kits by trained SHG members in Kancheepuram facilitated real-time monitoring of water quality, bolstering confidence in the maintained standards. Meanwhile, the recourse to the district laboratory in Pudukkottai for water quality testing, albeit due to a lack of trained personnel, still yielded satisfactory results within a reasonable timeframe, validating the effectiveness of the scheme's implementation. The observed

	Pudukkottai, revealed 100% functionality, adhering to prescribed Jal Jeevan Mission (JJM) standards.	100% functionality across surveyed villages underscores the scheme's success in meeting JJM standards, laying a strong foundation for sustainable water delivery and fulfilling the scheme's objectives of ensuring clean water access to rural households.

Appendix V



TAMILNADU WATER SUPPLY AND DRAINAGE BOARD

DISTRICT WATER TESTING LABORATORY

West 5th Street, Pudukkottai - 622 001.

Phone: 04322 - 222428 E-mail:twadpdkktlab@gmail.com

TEST REPORT

Report No:	TR/2024/ 45146-1	Report Issue Date :	02.02.2024
Invoice Details:	4938/Dt.30.01.2024 Amt.Rs.1652 /-	I.U.R No :	TC10350230[illegible]

Client Name & Address Contact No / Email.ID	:	The President, Gandharvakottai Panchayat, Gandharvakottai.
Sample Name	:	Water
Sample Number	:	45146-1
Sample Description	:	Borewell Water
Sample Submitted by	:	M.Karuppaiyan - OHT Operator
Location & Date	:	Government School - Gandharvakottai & 30.01.2024
Quantity of sample Received	:	2 Litre
Sample Container	:	Jerry Cane
Sample Condition on Receipt	:	Good
Sample Received On	:	30/01/2024
Test Commenced on	:	30/01/2024
Test Completed on	:	02/02/2024
Environmental Condition	:	23.0°C – 27.0°C

S.No	Parameters	Unit	Test Method	Result	Specification as per IS 10500:2012(RA:2018)	
					Acceptable Limit	Permissible Limit in the absence of alternate source
1	pH @ 25° C	-	IS 3025 Part 11-2022	6.98	6.5-8.5	6.5-8.5
2	Total Hardness as $CaCO_3$	mg/L	IS 3025 Part 21-2009	306	200	600
3	Total Alkalinity as $CaCO_3$	mg/L	IS 3025-Part 23-1986	212	200	600
4	Chloride as Cl	mg/L	IS 3025-Part 32-1988	304	250	1000
5	Sulphate as SO4	mg/L	IS 3025-Part 24-Sec 1-2022	17	200	400
6	Nitrate as NO_3	mg/L	APHA 23rd Edition 2017 - 4500 -NO3 D	24	45	45
7	Fluoride as F	mg/L	APHA 23rd Edition 2017 - 4500- F-D	0.57	1.0	1.5

Remarks: The tested sample conformed to IS: 10500:2012 (RA: 2018) Drinking water specification with respect to above tested parameters. The Decision rule is not applicable.

.....End of the report.....

Authorised Signatory
K.Jeyakumaran M.E.,
Assistant Executive Engineer,

Note:

1. The test results relate only to the items tested.
2. The test report shall not be reproduced anywhere except in full and in the same format without the permission of the laboratory.
3. Unless informed by customer, the test items will not be retained for more than 15 days from the date of issue of the test report.
4. The result applied to the sample as received basis.