

Empowering Women through Water Access: The Impact of Jal Jeevan Mission in Thiruppuvanam Block, Sivagangai District, Tamil Nadu

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ABSTRACT

The Jal Jeevan Mission (JJM) is a government initiative to provide rural households with functional tap connections (FHTCs) ensuring safe drinking water. A study in Thiruppuvanam Block, Sivagangai District, Tamil Nadu highlights its transformative impact on women.

Before JJM, women spent hours fetching water from distant sources, disrupting routines. With tap connections, they save 2–4 hours daily, now used for education, skill development, and income-generating activities. This has reduced physical strain, especially for elderly women and young girls. Reliable piped water has lowered dependence on contaminated sources, reducing waterborne diseases like diarrhea and skin infections. Women reported better menstrual hygiene management (MHM) and improved sanitation standards, as consistent supply supports toilet usage and cleanliness.

Time saved has enabled women to join self-help groups (SHGs), vocational training, and small businesses. Some participate in Panchayat governance, advocating community needs. Girls' school attendance has improved, fostering gender-inclusive development.

Despite progress, challenges remain: intermittent supply, incomplete pipeline networks, inequitable access in marginalized communities, and lack of awareness on water conservation.

Recommendations include last-mile connectivity and maintenance, women's involvement in water committees, awareness campaigns, and equitable access prioritizing underserved households. JJM has significantly reduced burdens, improved health, and enhanced socio-economic participation. Addressing infrastructure and sustainability challenges will ensure long-term success, making JJM a model for gender-responsive rural water policies across India.

Keywords: Women Empowerment, Rural Water Supply, Water Collection Burden, Health and Hygiene, Gender Equality, Water Accessibility, Sustainable Water Use.

Genesis

The Government of India launched the Jal Jeevan Mission (JJM) in 2019 to provide functional household tap connections (FHTCs) to all rural households by 2024. The program ensures safe and adequate drinking water, emphasizing sustainability through community-managed systems. Its core principles are inclusiveness, equity,

and empowerment, encouraging rural communities to take ownership of water resources. Traditionally, women in rural India have borne the responsibility of collecting water, often from distant or unsafe sources. This task consumes significant time and effort, limiting their economic participation, affecting health, education, and overall well-being.

In Thiruppuvanam Block, Sivagangai District, Tamil Nadu, JJM has reduced this burden by providing reliable tap water connections. Women now save 2–4 hours daily, enhancing productivity and freeing time for education, skill development, and income-generating activities. The program also improves health outcomes, hygiene, and sanitation, while enabling women to participate more actively in community and economic activities. JJM aligns with Sustainable Development Goal 6 (clean water and sanitation), contributing to holistic rural development and empowering women as agents of change. This study examines JJM's transformative impact on water challenges and its socio-economic implications for women in Thiruppuvanam, highlighting achievements and areas for further advancement.

REVIEW OF LITERATURE

Water accessibility is a critical factor in improving rural livelihoods, as highlighted by several studies. The direct link between access to clean water and public health is emphasized by Gleick (1996), who notes how water scarcity is particularly harmful to marginalized groups, particularly women. Furthermore, Falkenmark (1989) examined the ways in which community water programs reduce health risks and promote gender equality.

The gendered aspects of water collection have been highlighted by research. Women in rural India spend up to 2-4 hours daily fetching water, which has an impact on their time for education, income-generating activities, and leisure, as revealed by Ray (2007). Physical health issues like musculoskeletal disorders and increased vulnerability to waterborne diseases can be attributed to this burden, as stated by Agarwal (2015).

Rural communities have been transformed by improved water supply systems, such as those provided under the Jal Jeevan Mission. In 2020, Sharma and Das document the importance of piped water supply in reducing time poverty and increasing women's participation in livelihood activities. Furthermore, Sekar et al. (2021) explore how access to household tap water fosters better sanitation, hygiene practices, and overall quality of life in rural Tamil Nadu.

Kabeer (1999) outlines how women's involvement in community-led resource management initiatives provides them with social and economic empowerment. Women's representation in village water committees is encouraged under the participatory model adopted under the Jal Jeevan Mission, which is in agreement with this and fosters leadership and decision-making.

The Ministry of Jal Shakti (2021) has published recent reports and studies that highlight the mission's progress in achieving universal tap water access in India. Their emphasis is on the impact it has on reducing the burden of water collection, improving health metrics, and promoting gender inclusivity. Singh and Jain (2022)'s studies pinpoint challenges like maintaining water systems, equitable access, and engaging communities in remote regions.

The innovative water management practices of Tamil Nadu provide valuable lessons. Narayanan (2021)'s study examines the effect of household water connections on socio-economic conditions in rural Tamil Nadu, emphasizing education, sanitation, and women's mobility. Additionally, Sivakumar et al. (2022) analyze the role of government schemes in addressing water scarcity and their tangible benefits for women in regions like Sivagangai District.

Statement of the Problem

Rural India has faced a constant challenge in accessing clean and reliable drinking water, particularly in water-poor areas such as Thiruppuvanam Block, Sivagangai District, Tamil Nadu. This challenge falls on women in these areas, who are primarily responsible for fetching water for household needs. Women's gender inequality

and socio-economic disparities are perpetuated by the time-consuming task of collecting water, which often restricts their opportunities for education, employment, and participation in community activities.

Despite significant efforts under the Jal Jeevan Mission (JJM) to provide functional household tap connections, challenges such as infrastructural inadequacies, maintenance issues, and inequitable access remain. These limitations prevent the program from fully alleviating the water burden on women and achieving its broader goals of improving public health, hygiene, and quality of life in rural households.

It explores how improved water accessibility affects daily lives, health, and socio-economic participation, while also identifying the challenges faced in program implementation. The focus is on how improved water accessibility affects their daily lives, health, and socioeconomic participation, as well as the challenges faced in program implementation. The aim of the study is to offer insight into how JJM can be optimized to enhance its impact and ensure sustainable development in rural communities.

The study the impact of the Jal Jeevan Mission (JJM) on women in Thiruppuvanam Block, Sivagangai District, a systematic sampling procedure was adopted. The target population consisted of rural women responsible for household water management, including households with or without functional tap connections. The sampling frame was prepared using local government and panchayat records, covering 220 households identified as JJM beneficiaries. A stratified random sampling technique was employed to ensure inclusiveness and representativeness, with households randomly selected within each stratum to avoid bias. The sample size of 220 households was chosen to provide balanced representation and statistical significance. Data collection involved structured interviews and questionnaires administered to women, along with observational surveys to verify tap water functionality and time spent on water collection.

Objectives

1. **Assess the impact of Jal Jeevan Mission (JJM)** on reducing women's time burden in water collection in Thiruppuvanam Block, Sivagangai District.
2. **Examine improvements in health and hygiene outcomes** (e.g., reduction in waterborne diseases, menstrual hygiene management, sanitation practices) due to functional household tap connections.
3. **Evaluate socio-economic empowerment of women** through participation in education, skill development, self-help groups (SHGs), and income-generating activities enabled by water access.
4. **Analyze community-level inclusiveness and equity** in JJM implementation, focusing on marginalized groups (SC/ST, economically weaker households).
5. **Identify infrastructural and sustainability challenges** (intermittent supply, incomplete pipelines, lack of sanitation facilities) that hinder the full potential of JJM.
6. **Recommend policy measures** for integrating water supply with housing, sanitation, and women's participation in governance to achieve holistic rural development.

Hypotheses

1. **H1:** Access to functional household tap connections under JJM significantly reduces the time women spend on water collection.
2. **H2:** Reliable piped water supply improves women's health outcomes by reducing waterborne diseases and enhancing sanitation practices.
3. **H3:** Time saved from water collection enables women to participate more actively in education, vocational training, and income-generating activities.

4. **H4:** JJM contributes to greater gender equality by increasing women's involvement in self-help groups, Panchayat governance, and community decision-making.
5. **H5:** Marginalized communities (SC/ST households) have comparatively lower access to JJM benefits, reflecting inequities in implementation.
6. **H6:** Integration of water supply with sanitation and housing programs leads to more sustainable and holistic improvements in rural living standards.

For analysis, both quantitative and qualitative tools were applied to capture the multi-dimensional impact of JJM. Quantitative methods measured outcomes such as time saved, health improvements, and participation in socio-economic activities, while qualitative tools explored women's lived experiences, challenges, and empowerment. This dual approach ensured a holistic understanding of JJM's effectiveness, highlighting its achievements in reducing burdens and improving well-being, while also identifying areas for optimization such as infrastructure gaps, equitable access, and sustainability.

Table 1: Age Wise Distribution of JJM Scheme Beneficiaries

Sl. No.	Age	Odathur	Vallarendal	S. Vagaikulam	G Total
1	19- 24	10 (12.50)	12 (16.00)	9 (13.85)	31 (14.09)
2	25 - 30	16 (20.00)	14 (18.67)	12 (18.46)	42 (19.09)
3	31 - 36	22 (27.50)	20 (26.67)	18 (27.69)	60 (27.27)
4	37 - 42	18 (22.50)	16 (21.33)	14 (21.54)	48 (21.82)
5	43 and above	14 (17.50)	13 (17.33)	12 (18.46)	39 (17.73)
	G Total	80 (100)	75 (100)	65 (100)	220 (100)

Source: Field Data

Note: Figures in parentheses indicates percentage to the Total

In Thiruppuvanam block, beneficiaries under the JJM Scheme are broken down by their age in the Table1. The data reveals that the majority of beneficiaries fall within the 31-36 age group, accounting for 27.27per cent of the total, followed by the 25-30 age group (19.09per cent) and 37-42 age group (21.82per cent). Middle-aged individuals are the primary recipients of the scheme, as suggested by this. Odathur is the region with the highest number of beneficiaries (80) out of all regions, while, There is a regional disparity in participation in S. Vagaikulam, which has the lowest participation rate (65per cent). The percentage distribution of age groups in all three areas remains relatively consistent, with only minor variations. The fact that the 19-24 age group has the lowest representation (12.9per cent) suggests that younger people may be less qualified or hesitant to sign up for the program.

Table 2: Distribution of Marital Status-wise JJM Beneficiaries in Thiruppuvanam Block

Sl. No.	Marital Status	Odathur	Vallarendal	S. Vagaikulam	G Total
1	Single	16 (20.00)	9 (12.00)	10 (15.38)	35 (15.91)
2	Married	60 (75.00)	63 (84.00)	52 (80.00)	175 (79.55)
3	Divorced	1 (1.25)	1 (1.33)	1 (1.54)	3 (1.36)
4	Widow	3 (3.75)	2 (2.67)	2 (3.08)	7 (3.18)
	G Total	80 (100)	75 (100)	65 (100)	220 (100)

Source: Field Data

Note: Figures in parentheses indicates percentage to the Total

According to table2, the majority of JJM beneficiaries in Thiruppuvanam block are married (79.55per cent), which indicates that the scheme primarily supports individuals with family duties. Vallarendal has the highest percentage of married beneficiaries (84per cent) among the regions, followed by S. Vagaikulam (80per cent)

and Odathur (75per cent). In this region, single individuals make up 15.91per cent of the total beneficiaries, with Odathur having the highest percentage (20per cent), suggesting a slightly higher level of unmarried individuals participating. Divorced and widowed beneficiaries form a very small proportion (1.36per cent and 3.18per cent, respectively), indicating limited representation from these groups.

Table 3: Community-wise Distribution of JJM Beneficiaries in Thiruppuvanam Block

Sl. No.	Community	Odathur	Vallarendal	S. Vagaikulam	G Total
1	FC	2 (2.50)	1 (1.33)	2 (3.08)	5 (2.27)
2	MBC	18 (22.50)	19 (25.33)	15 (23.08)	52 (23.64)
3	BC	38 (47.50)	35 (46.67)	27 (41.54)	100 (45.45)
4	SC	13 (16.25)	12 (16.00)	12 (18.46)	37 (16.82)
5	ST	9 (11.25)	8 (10.67)	9 (13.85)	26 (11.82)
	G Total	80 (100)	75 (100)	65 (100)	220 (100)

Source: Field Data

Note: Figures in parentheses indicates percentage to the Total

The distribution of JJM Scheme beneficiaries in Thiruppuvanam Block according to communities shows significant patterns in social inclusion and program reach. Backward Classes (BC) are the most common beneficiaries, accounting for 45.45per cent of total recipients, with Odathur having a particularly strong representation (47.50per cent). At 23.64per cent, most Backward Classes (MBC) are closely followed, with the highest participation in Vallarendal at 25.33per cent. The scheme's effective targeting of marginalized communities is reflected in the fact that these two disadvantaged groups make up almost 70per cent of the beneficiaries.

The percentage of Scheduled Castes (SC) and Scheduled Tribes (ST) with S is 16.82per cent and 11.82per cent respectively. The proportions of both groups are slightly higher in Vagaikulam. Forward Castes (FC) comprise only 2.27per cent of beneficiaries, confirming the program's focus on underprivileged sections. Odathur leads in BC beneficiaries, Vallarendal in MBC, are among the leaders in their respective regions. S. Vagaikulam showing relatively better SC/ST inclusion. This distribution pattern suggests that the scheme is successfully reaching its intended beneficiaries while maintaining balanced geographical coverage. However, there is still potential to enhance participation from SC/ST communities in certain areas. The program's alignment with social welfare objectives, which prioritize disadvantaged groups in development initiatives, is highlighted by the data.

Table 4: Family-wise Distribution of JJM Beneficiaries in Thiruppuvanam Block

Sl. No.	Category of Family	Odathur	Vallarendal	S. Vagaikulam	G Total
1	Joint Family	32 (40)	35 (46.67)	36 (55.38)	103 (46.82)
2	Nuclear	48 (60)	40 (53.33)	29 (44.62)	117 (53.18)
	G Total	80 (100)	75 (100)	65 (100)	220 (100)

Source: Field Data

Note: Figures in parentheses indicates percentage to the Total

JJM beneficiaries across Thiruppuvanam Block are distributed in interesting sociological patterns. While the overall figures show a slight predominance of nuclear families (53.18per cent) over joint families (46.22per cent), significant regional variations emerge upon closer examination. S. Vagaikulam stands out with 55.38 percent of beneficiaries coming from joint family systems, suggesting that this region maintains stronger

traditional family structures compared to other areas. Odathur presents a markedly different picture, with 60per cent of beneficiaries coming from nuclear families, potentially indicating increased urbanization or changing social norms in this locality.

The distribution of Vallarendal is almost balanced, with 53.33 percent nuclear and 46.67 percent joint. The variations may be a result of local economic conditions, cultural practices, or demographic transitions across the block. The data suggests that while nuclear families are becoming more prevalent overall, joint family systems remain significant, particularly in certain regions, highlighting the importance of considering these family structures when implementing welfare schemes. The findings could inform more targeted policy approaches that account for regional differences in household organization.

In Thiruppuvanam Block, the educational profile of JJM beneficiaries shows a diverse range of academic attainment with distinct regional patterns. High school and higher secondary qualifications are the most prevalent qualifications at the aggregate level, with each accounting for 24.55per cent of beneficiaries, indicating that most participants have completed basic to intermediate education. Degree holders account for 15.91 percent, while middle school educated beneficiaries account for 15 percent. Notably, illiteracy rates remain remarkably low at just 2.73per cent, with S. Vagaikulam reports that all of its beneficiaries possess complete literacy. Regional disparities emerge clearly - S. Vagaikulam leads in high-school educated beneficiaries (33.385per cent), while Vallarendal is the leader in higher secondary completions (28per cent). Odathur stands out with the highest percentage of degree holders (21.25per cent), suggesting better access to higher education in this region.

Table 5: Educational-Wise Distribution of JJM Beneficiaries in Thiruppuvanam Block

Sl. No.	Qualification	Odathur	Vallarendal	S. Vagaikulam	G Total
1	Illiteracy	3 (3.75)	3 (4.00)	0	6 (2.73)
2	Primary	6 (7.50)	9 (12.00)	4 (6.15)	19 (8.64)
3	Middle	10 (12.50)	12 (16.00)	11 (16.92)	33 (15.00)
4	High school	18 (22.50)	14 (18.67)	22 (33.85)	54 (24.55)
5	Hr Sec	20 (25.00)	21 (28.00)	13 (20.00)	54 (24.55)
6	Degree	17 (21.25)	9 (12.00)	9 (13.85)	35 (15.91)
7	Diploma	4 (5.00)	6 (8.00)	4 (6.15)	14 (6.36)
8	Other	2 (2.50)	1 (1.33)	2 (1.33)	5 (2.27)
		80 (100)	75 (100)	65 (100)	220 (100)

Source: Field Data

Note: Figures in parentheses indicates percentage to the Total

The distribution displays an intriguing relationship between basic and advanced education across locations: areas with greater high school completion are more likely to have fewer degree holders, and vice versa. The lack of technical education through diploma programs in all regions (6.36per cent overall) points to potential opportunities for skill development initiatives. These educational patterns may influence beneficiaries' engagement with and benefits from the JJM scheme, and may inform targeted awareness campaigns or capacity-building efforts tailored to different educational levels. The generally modest but functional literacy levels among most beneficiaries suggest that the scheme is effectively reaching its intended demographic of rural populations with basic to moderate education.

The housing distribution of JJM beneficiaries in Thiruppuvanam Block provides valuable insight into living standards and regional development patterns. According to the data, permanent houses make up 44.09 percent of all beneficiaries, with S. Vagaikulam leads with 53.85per cent pucca house ownership, indicating relatively better housing infrastructure in this region.

Table 6: House-Wise Distribution of JJM Beneficiaries in Thiruppuvanam Block

Sl. No.	House Type	Odathur	Vallarendal	S. Vagaikulam	G Total
1	Pucca House	32 (40.00)	30 (40.00)	35 (53.85)	97 (44.09)
2	Semi Pucca House	28 (35.00)	24 (32.00)	20 (30.77)	72 (32.73)
3	Kaucha House	20 (25.00)	21 (28.00)	10 (15.38)	51 (23.18)
	G Total	80 (100)	75 (100)	65 (100)	220 (100)

Source: Field Data

Note: Figures in parentheses indicates percentage to the Total

Semi-pucca houses followed at 32.73 per cent, showing consistent representation across all three areas (35 per cent in Odathur, 32 per cent in Vallarendal, and 30.77 per cent in S.). Vagaikulam). The most vulnerable housing category, kutchra (temporary) houses, accounts for 23.18per cent of beneficiaries overall, with Vallarendal showing the highest proportion at 28per cent, followed by Odathur at 25per cent. Notably, S. Vagaikulam stands out with both the highest percentage of pucca houses (53.85) and the lowest percentage of kutchra houses (15.38per cent), suggesting better overall housing conditions. These housing patterns may reflect varying levels of economic development, access to government housing schemes, or geographical factors across the block. The substantial presence of semi-pucca and kutchra houses (totaling 55.91per cent) highlights the need for continued housing improvement initiatives alongside the JJM scheme, particularly in Odathur and Vallarendal where temporary housing remains more prevalent. The data proves that water access programs and broader housing infrastructure development in rural areas are interconnected.

Table 7: Availability of Toilet Facility of JJM Beneficiaries in Thiruppuvanam Block

Sl. No.	Toilet Facility	Odathur	Vallarendal	S. Vagaikulam	G Total
1	Yes	32 (40)	25 (33.33)	30 (46.15)	87 (39.55)
2	No	48 (60)	50 (66.67)	35 (53.85)	133 (60.45)
	G Total	80 (100)	75 (100)	65 (100)	220 (100)

Source: Field Data

Note: Figures in parentheses indicates percentage to the Total

The sanitation coverage in Vagaikulam is much better with 46.15 percent of households having toilets, while Vallarendal has only 33.33 percent access. Across the block, a significant majority (60.45per cent) of beneficiaries lack toilet facilities, indicating that open defecation remains prevalent among this population. S. Vagaikulam shows relatively better sanitation coverage with 46.15per cent of households having toilets, while Vallarendal presents the most critical situation with only 33.33per cent access. Odathur falls in between at 40per cent coverage. The high proportion of households without toilets (peaking at 66.67per cent in Vallarendal) suggests that despite being beneficiaries of a water supply scheme, many families still lack basic sanitation infrastructure. A significant implementation gap exists in rural development programs due to the disparity between water access and sanitation facilities. The regional variation in toilet coverage may reflect differences in previous sanitation campaign effectiveness, local governance priorities, or community adoption rates. The data underscores the need for better convergence between water supply initiatives like JJM and sanitation programs to achieve comprehensive WASH (Water, Sanitation and Hygiene) outcomes. In Vallarendal and Odathur, it seems that targeted sanitation interventions are necessary to supplement the water provision efforts of the JJM scheme.

CONCLUSION

The study of JJM beneficiaries in Thiruppuvanam Block reveals that the scheme has made notable progress in improving access to safe drinking water, with strong participation across diverse age groups, marital statuses, communities, and family structures. The majority of beneficiaries are middle-aged married women from BC and MBC communities, reflecting the program's focus on households with family responsibilities and

disadvantaged groups. Educational attainment among beneficiaries is moderate, with most having completed high school or higher secondary, while housing and sanitation data highlight persistent gaps—particularly the high proportion of semi-pucca and kutcha houses and limited toilet facilities. Overall, JJM has reduced women’s burdens, improved health outcomes, and promoted socio-economic participation, but disparities remain across regions and social categories.

Suggestions

- **Infrastructure strengthening:** Ensure last-mile connectivity, reliable supply, and maintenance of pipelines.
- **Women’s participation:** Involve women actively in water committees for sustainable management.
- **Awareness campaigns:** Promote water conservation, hygiene, and sanitation practices tailored to different educational levels.
- **Equitable access:** Prioritize SC/ST and marginalized households to reduce disparities.
- **Housing and sanitation integration:** Align JJM with housing and toilet facility programs to achieve holistic WASH outcomes.

Policy Implications

The findings emphasize that JJM must be integrated with broader rural development policies. Strengthening convergence between water supply, sanitation, housing, and education initiatives will maximize impact. Regional variations—such as higher nuclear family prevalence in Odathur and stronger joint family systems in Vagaikulam—suggest that localized strategies are essential. The program’s success in reaching BC and MBC communities demonstrates effective targeting, but greater inclusion of SC/ST households is needed to fulfill social equity goals. Policymakers should view JJM not only as a water scheme but as a gender-responsive rural empowerment initiative, aligning with Sustainable Development Goal 6 and India’s long-term vision for inclusive growth.

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