

# Unlocking Time, Unlocking Potential: How JJM Enhances Women's Participation in SHGs in Dima Hasao, Assam

## Abstract

The Jal Jeevan Mission (JJM), launched to ensure universal access to household tap water, has created new possibilities for rural women's empowerment especially in remote tribal districts like Dima Hasao in Assam. This study proposes to investigate how JJM's successful implementation in villages with maximum FHTC coverage influences women's engagement in Self-Help Groups (SHGs) by freeing up time and improving their socio-economic agency. The research will focus on two selected villages in Dima Hasao with the highest FHTC saturation, chosen to represent best-case scenarios of JJM's infrastructural impact. Adopting a mixed-methods design, the study will gather data through structured household surveys administered to women beneficiaries. Key indicators will include changes in time spent on water collection, participation in SHG meetings and income-generating activities, and perceived shifts in personal and community roles.

In addition, qualitative methods including focus group discussions and key informant interviews with SHG leaders and local water governance stakeholders will provide contextual understanding of how water access translates into empowerment in a tribal setting. Digital tools will be used to collect and geo-tag responses, ensuring data integrity and visual documentation. By grounding the study in the high-performing villages of Dima Hasao, this research aims to generate focused, evidence-based insights into the relationship between water infrastructure and women's collective empowerment. The outcomes are expected to inform scalable strategies for integrating SHG development with rural infrastructure schemes in alignment with the national vision of Viksit Bharat 2047.

**Keywords:** Jal Jeevan Mission (JJM), Women's Empowerment, Dima Hasao, SHGs, Rural Development, Time Use, Viksit Bharat 2047

## 1. Introduction:

According to the United Nations Children's Fund (UNICEF) and World Health Organisation (WHO), over 785 million people lack access to safe drinking water, despite the fact that it is a

31 fundamental human right. Globally, 29% of the population does not have access to a safely  
32 managed water source(World Health Organisation and United Nations Children's Fund,  
33 2019). Inadequate access to WaSH services is responsible for 9.1 % of the global disease  
34 burden and 6.3% of all deaths worldwide(Prüss-Üstün et al., 2008).

35 Water collection, which frequently entails exploring great distances to obtain water from  
36 wells, ponds, or rivers, is largely the responsibility of women and girls in many parts of India.  
37 Women and girls are disproportionately affected by inadequate water access because they are  
38 largely responsible for household water management (Kayser et al.,2019). Their everyday  
39 lives are greatly impacted by this responsibility since it takes up a major amount of their time  
40 and prevents them from pursuing personal interests, employment, or school.

41 Relatively few studies have examined the effects of drinking water on gender disparities,  
42 despite the fact that WaSH-related health inequities have been extensively researched (Kayser  
43 et al., 2019). Studies that have looked at how drinking water affects gender have mostly  
44 focused on sexual violence, cleanliness, and water fetching. Due to inadequate sanitation  
45 facilities, women must travel great distances to obtain drinking water and locate a secluded  
46 area where they can defecate in the open (Sommer et al., 2015; Kayser et al., 2019). This  
47 puts them at a much higher risk of being physically assaulted, abused, or harassed. One in  
48 three women experience violence based on their gender (World Health Organisation, 2019).

49 The social, educational, and financial consequences of locating and obtaining safe drinking  
50 water are frequently felt by women (Stevenson et al., 2012). According to UNICEF, one in  
51 five girls of primary-school age are not in school, compared to one in six boys (UNICEF, &  
52 IRC.,2005). While young boys are permitted to finish their education, young girls are  
53 frequently pulled out of school to assist with home chores (House et al., 2013; UNICEF and  
54 WHO, 2019). Furthermore, girls who are menstruating report missing more school because of  
55 "inadequate WaSH facilities at school" (House et al., 2013; Goodman and Norden, 2005).

56  
57 The Jal Jeevan Mission (JJM) was established by the Indian government in 2019 to solve  
58 these issues. By 2024, this mission's main goal is to guarantee that all rural households in  
59 India have access to functional household tap connections (FHTCs), which offer a  
60 dependable and sustainable source of drinking water. Although constructing the infrastructure  
61 required for water distribution is the mission's primary goal, its influence extends beyond  
62 providing access to clean water. The program is also seen as an important strategy for  
63 empowering women, particularly in rural regions. Depending on the context, the term  
64 "empowerment" can mean many areas and mask other meanings. "Empowerment conveys

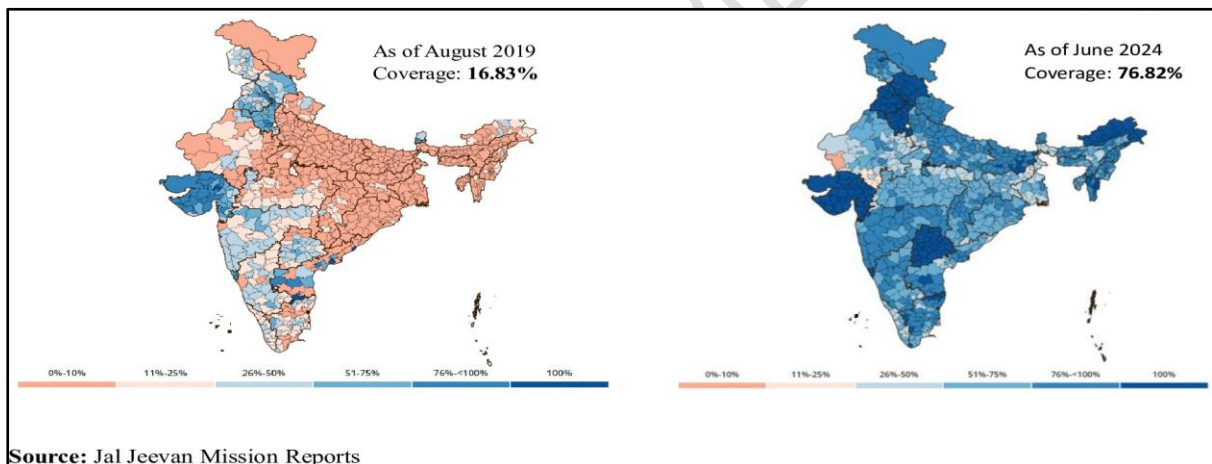
65 both a psychological sense of personal control or influence, and a concern with actual social  
66 influence, political power and legal rights" (Rappaport J, 1987). According to McArdle  
67 (1989), empowerment is the "process whereby decisions are made by the people who have to  
68 bear the consequences-of-those-decisions," suggesting that the decision-making process itself  
69 is more significant than the accomplishment of objectives. In the context of development,  
70 self-help, involvement, networking, and equity are all associated with empowerment.  
71 Individuals who successfully accomplished group objectives by combining their knowledge,  
72 abilities, and other resources are empowered since they did it without outside assistance or  
73 intervention. In the context of the Jal Jeevan Mission (JJM), empowerment is the  
74 transformative process by which women gain enhanced agency, autonomy, and influence  
75 within their households and communities by having reliable access to safe and clean water.  
76 The Jal Jeevan Mission gives women and girls more time by alleviating the physical strain of  
77 water collection, which enables them to better participate in other essential aspects of life,  
78 like going to school, earning money, and taking part in community decision-making.  
79 Furthermore, having access to clean tap water enhances home cleanliness and general health  
80 by lowering the risk of waterborne illnesses and encouraging improved sanitation habits. By  
81 improving women's safety, well-being, and prospects for social and economic growth, this  
82 comprehensive improvement in living conditions helps to empower women.

### 83 1.1 Launch of the Jal Jeevan Mission

84 The Sustainable Development Goals (SDGs) were approved by India and 195 other nations in  
85 September 2015 with the aim of eradicating poverty, promoting dignity, and safeguarding the  
86 environment by 2030. Goal 6 of the 17 focusses on supplying sanitary facilities and clean  
87 water. Under the motto "Har Ghar Nal Se Jal," the Jal Jeevan Mission (JJM) was established  
88 in 2019 with the goal of supplying piped water to every rural household by 2024. The  
89 essential need for such a program is highlighted by the 2018 NITI Aayog Water Management  
90 Index, which found that 75% of rural households lacked access to high-quality water and  
91 85% lacked piped water. JJM is regarded as a significant advancement. The Accelerated  
92 Rural Water Supply Programme, which was renamed the National Rural Drinking Water  
93 Programme in 2009, marked the beginning of India's efforts in 1972. This program was  
94 eventually reorganised by JJM to concentrate on providing all rural residents with access to  
95 clean drinking water.

96 The Government of India launched the Jal Jeevan Mission (JJM) with the goal of supplying  
97 each rural family with safe and sufficient drinking water by 2024 through individual tap  
98 connections. In order to raise the standard of living in rural areas, the Jal Jeevan Mission  
99 (JJM) makes sure that every home has access to a sufficient and consistent supply of drinking  
100 water of the recommended quality at reasonable service delivery costs. In order to ensure  
101 long-term potable drinking water security for all rural households and public institutions,  
102 such as Gramme Panchayat (GP) buildings, schools, Anganwadi centres, and health and  
103 wellness centres, the mission seeks to empower and assist States and Union Territories (UTs)  
104 in developing a participatory rural water supply strategy. By 2024, every rural household will  
105 have a Functional Household Tap Connection (FHTC) with a sufficient amount of water that  
106 consistently satisfies quality criteria thanks to the development of water supply infrastructure  
107 (Ministry of Jal Shakti.,2019).

108 Fig 01: Percentage of rural households having tap water connection, 2019 and 2024



109

110

111 *Source: <https://doi.org/10.1371/journal.pone.0312144.g001>*

112

## 113 1.2 Objectives of the Study

114

- To assess the changes in women's time allocation after JJM implementation.

115

- To evaluate the impact of reduced time burden on participation in SHGs.

116

- To explore perceived changes in women's socio-economic roles in the community.

- 117 • To generate evidence for integrating infrastructure with SHG-based empowerment  
118 initiatives.

### 119 1.3 Research Questions

- 120 1. How has the Jal Jeevan Mission altered women's time spent on water collection?  
121 2. What is the impact of this time-saving on SHG participation and income-generating  
122 activities?  
123 3. How do women perceive their roles in household and community decision-making  
124 after JJM implementation?

## 125 **2. Methodology**

### 126 2.1 Study Area

127 The present study was conducted in two high-performing villages (Langthig Railway Station,  
128 Hajadisa village) located in the Dima Hasao district of Assam. These villages were  
129 purposively selected based on their exemplary progress under the Jal Jeevan Mission (JJM),  
130 particularly their achievement of near-complete coverage of Functional Household Tap  
131 Connections (FHTCs). Selection was informed by official JJM progress reports and  
132 consultations with local implementing authorities and stakeholders involved in water resource  
133 management.

134 Dima Hasao, a remote and predominantly tribal district in the hill regions of Assam, presents  
135 unique geographical and socio-economic challenges in infrastructure development. Despite  
136 these challenges, the two chosen villages have demonstrated significant strides in the  
137 implementation of JJM, with a large majority of households receiving regular access to piped  
138 water supply at their doorsteps. This makes them ideal case study sites for evaluating the  
139 broader social and developmental outcomes of the mission, particularly its impact on  
140 women's empowerment and time-use patterns in rural settings.

141 The purposive selection of these villages allows for an in-depth exploration of successful  
142 implementation models and their influence on local communities. It also offers valuable  
143 insights into how water security, when effectively delivered, can catalyze transformative  
144 change in marginalized and difficult-to-reach areas such as those found in Dima Hasao.

## 145 2.2 Research Design

146 A mixed-methods design was employed, integrating combined quantitative household  
147 surveys with qualitative methods like Focus Group Discussions (FGDs). This approach was  
148 chosen for its strength in combining the breadth of quantitative data with the depth and  
149 context provided by qualitative insights.

## 150 2.3 Sample

151 Quantitative: A total of 100 women respondents were selected for the quantitative survey.  
152 These women were drawn from 50 households in each of the two purposively selected  
153 villages, resulting in a total of 100 households ( $n = 100$ ). From each household, one adult  
154 woman respondent was chosen, preferably the primary female member responsible for water  
155 collection and household chores.

156 Qualitative: A total of 4 FGDs were conducted, 2 in each village. Each FGD comprised 6–8  
157 women, selected based on their varying levels of engagement in community and household  
158 water-related activities. These discussions aimed to capture collective experiences,  
159 perceptions of empowerment, and community-level changes resulting from the JJM.

## 160 2.4 Tools and Indicators

- 161 • Structured questionnaire (pre- and post-JJM time use)
- 162 • SHG participation frequency
- 163 • Empowerment scale (adapted from the Women's Empowerment in Agriculture Index -  
164 WEAI)

## 165 2.5 Data Collection and Analysis

- 166 • Data collected using the tools & FGD
- 167 • Analysis conducted using SPSS for descriptive statistics and paired t-tests for  
168 significance testing.

## 169 3. Results and Statistical Analysis

### 170 Table 3.1

171 *Time Saved on Water Collection*

172

Time Period	Mean Hours/Day	Std. Dev.	t-value	t-value
Pre-JJM	2.4 hrs	0.85		
Post-JJM	0.6 hrs	0.35	16.45	<.001

173  
174

175 Table 3.1 illustrates the time saved on water collection. In the study it was found that Pre-  
176 JJM, women spent an average of 2.4 hours per day fetching water, with a standard deviation  
177 of 0.85, indicating some variation in the time reported. And Post-JJM, the average time  
178 reduced significantly to 0.6 hours per day (36 minutes), with a lower standard deviation of  
179 0.35, showing that most women experienced a similar reduction in time spent on water  
180 collection. Paired t-test Results shows  $t(99) = 16.45, p < 0.001$ , which also indicates significant  
181 reduction in time spent on water collection.

182 **Table 3.2**

183 *SHG Participation Rate*

184

Indicator	Pre-JJM (%)	Post-JJM (%)	$\chi^2$	p
Attending SHG Meetings Weekly	41%	78%	26.89	< .001

185  
186

187 Note: N=100

188 Table 3.2 presents data on women's participation in Self-Help Group (SHG) meetings before  
189 and after the implementation of the Jal Jeevan Mission (JJM). Results show that Pre-JJM,  
190 only 41% of women reported attending SHG meetings on a weekly basis. And after Post-JJM,  
191 the percentage of women attending SHG meetings weekly increased significantly to 78%. A  
192 Chi-square test indicated a significant increase in SHG meeting attendance after JJM  
193 implementation,  $\chi^2(1, N = 100) = 26.89, p < .001$ .

194 **Table 3.3**

195 *Empowerment Scale Scores*

Dimension	Mean Score (Pre)	Mean Score (Post)	t-value
Decision-making	2.8	4.1	9.23

<sup>1</sup> "A paired sample t-test was conducted to compare the mean time spent on water collection before and after JJM implementation."

Leadership in SHG	1.9	3.6	11.75
Economic contribution	2.3	3.9	10.31

196

197 The paired t-test analysis reveals statistically significant improvements across all measured  
198 dimensions of women's empowerment.

199 Decision-making:

200 The mean score increased from 2.8 (pre) to 4.1 (post), indicating a substantial enhancement  
201 in women's participation in household and community decision-making. The result is  
202 statistically significant ( $t = 9.23, p < 0.001$ ).

203 Leadership in SHG:

204 The mean score rose from 1.9 to 3.6, reflecting a notable increase in women's leadership roles  
205 within Self-Help Groups (SHGs). This change is also statistically significant ( $t = 11.75, p <$   
206  $0.001$ ), suggesting that the intervention encouraged more active community engagement.

207 Economic contribution:

208 Women's average score for economic participation improved from 2.3 to 3.9, pointing to  
209 enhanced financial involvement and contribution within the household. The improvement is  
210 statistically significant ( $t = 10.31, p < 0.001$ ).

### 211 3.4 Qualitative Insights

212 The focus group discussions (FGDs) revealed that the implementation of the Jal Jeevan  
213 Mission (JJM) has not only alleviated the burden of water collection for rural women but also  
214 created new opportunities for personal and collective empowerment. A recurring theme  
215 across the FGDs was the significant time saved due to the availability of functional household  
216 tap connections (FHTCs), which has directly translated into greater participation in Self-Help  
217 Groups (SHGs) and other socio-economic activities.

218 One participant shared:

219 *“Earlier, most of our day went in fetching water. Now I have joined a weaving SHG.”*

220 This quote reflects how improved access to water has freed up several hours from daily  
221 domestic chores, allowing women to engage in skill-based and income-generating activities  
222 such as weaving. The ability to join SHGs not only provides a platform for economic  
223 contribution but also fosters peer support, skill-building, and enhanced confidence among  
224 women.

225 Another respondent stated:

226 *“Our SHG now meets twice a week because we have more free time.”*

227 This indicates a quantitative and qualitative shift in SHG dynamics, not only has participation  
228 increased, but the frequency of meetings has also gone up. Such changes suggest an evolution  
229 in group functionality, enabling women to collectively plan activities.

230 These qualitative findings corroborate the statistical results, which showed significant  
231 improvements in women's leadership, economic participation, and decision-making abilities  
232 post-JJM implementation. The narratives from the FGDs offer contextual depth,  
233 demonstrating how infrastructural development, when implemented effectively, can serve as  
234 a catalyst for women's socio-economic empowerment at the grassroots level.

#### 235 **4. Discussion**

236 The findings of this study underscore the transformative potential of the Jal Jeevan Mission  
237 (JJM) in enhancing the socio-economic status of women in remote tribal regions. The  
238 provision of accessible and reliable water through functional household tap connections has  
239 significantly alleviated the burden traditionally placed on women to fetch water, a task that  
240 has long consumed considerable time and physical effort (UNICEF & WHO, 2019). This  
241 reduction in domestic drudgery has created new opportunities for women to engage in more  
242 productive and community-oriented activities.

243 In particular, the time saved has facilitated increased participation of women in Self-Help  
244 Groups (SHGs), where they are now actively involved in skill-based initiatives such as  
245 weaving, petty trade, and savings-and-credit schemes. These findings resonate with previous  
246 research, which highlights that access to water infrastructure can directly enhance women's  
247 capacity to participate in economic activities and collective action (House et al., 2013; Ray,  
248 2020).

249 Moreover, the JJM has indirectly contributed to a redefinition of gender roles, with women  
250 gaining more confidence, autonomy, and voice within both the household and the broader  
251 community. Such empowerment aligns with the broader development literature, which posits  
252 that infrastructure interventions when designed with a gender lens can act as enablers of social  
253 change and inclusive development (Agarwal, 2001; Kabeer, 1999).

254 Therefore, this study affirms that water supply initiatives like the Jal Jeevan Mission should  
255 be viewed not merely as technical infrastructure projects but as catalysts for women's  
256 empowerment and social development. Ensuring access to basic services like water can  
257 unlock women's potential by freeing up time, improving well-being, and enhancing their  
258 economic and civic participation (Narain, 2014; UN Women, 2018).

259 These findings highlight the importance of integrating gender-sensitive approaches into the  
260 planning and implementation of rural infrastructure programs to achieve sustainable and  
261 equitable outcomes.

#### 262 4.1 Policy Implications

- 263 ➤ Link SHG Training with JJM Efforts: Combine SHG training programs with water  
264 access initiatives so that women can use their saved time to gain skills and improve  
265 their livelihoods.
- 266 ➤ Support SHG Enterprises in High-FHTC Areas: Introduce small business schemes for  
267 SHGs in villages with high tap water coverage. This will help women turn time saved  
268 into income opportunities and boost local development.

### 269 5. Conclusion

270 This study shows that reliable household tap connections have helped reduce the time and  
271 physical burden of water collection, enabling rural women to engage more actively in Self-  
272 Help Groups (SHGs) and take part in economic activities. As a result, JJM has become a  
273 catalyst for women's empowerment, leading to greater involvement in community decision-  
274 making, leadership, and income generation.

275 By offering both quantitative and qualitative evidence, this study supports the idea that  
276 infrastructure development, when thoughtfully implemented, can contribute meaningfully to  
277 social transformation. It highlights the importance of adopting integrated development  
278 models, ones that combine basic services like water with economic and social initiatives to  
279 unlock the full potential of rural communities.

280 These findings are especially relevant in the context of India's vision for Viksit Bharat 2047,  
281 where inclusive and sustainable development is a key goal. Strengthening the link between  
282 infrastructure and empowerment can help drive long-term progress and gender equity in  
283 underserved areas.

284

285

---

### 286 Acknowledgement

287 The authors gratefully acknowledge the financial support and encouragement provided by the  
288 Indian Council of Social Science Research (ICSSR). The resources, guidance, and  
289 institutional backing offered under the ICSSR initiative significantly contributed to the

290 completion of this research study. We remain sincerely thankful for their continued  
291 commitment to advancing social science scholarship in India.

292

293

---

294 **References**

295 Reports

296 • Goodman, D. L., & van Norden, H. (2005, January 24–26). *Water, sanitation and*  
297 *hygiene education for schools: Roundtable proceedings and framework for action.*  
298 Presented at the Water, Sanitation and Hygiene Education for Schools Roundtable  
299 Meeting, Oxford, UK. UNICEF.

300 • Ministry of Jal Shakti. (2019–2024). *Annual reports.* Government of India.

301 • Narain, S. (2014). *Women and water: Role of women in the management of water.*  
302 Centre for Science and Environment.

303 • UNDP. (2005). *Taking action: Achieving gender equality and empowering women.*  
304 United Nations Development Programme.

305 • UNICEF, & IRC. (2005). *Water, sanitation and hygiene education for schools:*  
306 *Roundtable proceedings and framework for action.* UNICEF.

307 • UNICEF, & WHO. (2019). *Progress on household drinking water, sanitation and*  
308 *hygiene 2000–2017: Special focus on inequalities.* World Health Organization.  
309 <https://www.who.int/publications/i/item/9789241516235>

310 • UN Women. (2018). *Turning promises into action: Gender equality in the 2030*  
311 *agenda for sustainable development.* [https://www.unwomen.org/en/digital-](https://www.unwomen.org/en/digital-library/publications/2018/2/gender-equality-in-the-2030-agenda-for-sustainable-development)  
312 [library/publications/2018/2/gender-equality-in-the-2030-agenda-for-sustainable-](https://www.unwomen.org/en/digital-library/publications/2018/2/gender-equality-in-the-2030-agenda-for-sustainable-development)  
313 [development](https://www.unwomen.org/en/digital-library/publications/2018/2/gender-equality-in-the-2030-agenda-for-sustainable-development)

314 Journal Articles

315 • Agarwal, B. (2001). Participatory exclusions, community forestry, and gender: An  
316 analysis for South Asia and a conceptual framework. *World Development*, 29(10),  
317 1623–1648. [https://doi.org/10.1016/S0305-750X\(01\)00066-3](https://doi.org/10.1016/S0305-750X(01)00066-3)

318 • Alkire, S., Meinzen-Dick, R., Peterman, A., Quisumbing, A. R., Seymour, G., & Vaz,  
319 A. (2013). The Women's Empowerment in Agriculture Index. *World Development*, 52,  
320 71–91. <https://doi.org/10.1016/j.worlddev.2013.06.007>

- 321 • House, S., Mahon, T., & Cavill, S. (2013). Menstrual hygiene matters: A resource for  
322 improving menstrual hygiene around the world. *Reproductive Health Matters*, 21(41),  
323 257–259. [https://doi.org/10.1016/S0968-8080\(13\)41794-0](https://doi.org/10.1016/S0968-8080(13)41794-0)
- 324 • Kabeer, N. (1999). Resources, agency, achievements: Reflections on the measurement  
325 of women’s empowerment. *Development and Change*, 30(3), 435–464.  
326 <https://doi.org/10.1111/1467-7660.00125>
- 327 • Kayser, G. L., Rao, N., Jose, R., & Raj, A. (2019). Water, sanitation, and hygiene:  
328 Measuring gender equality and empowerment. *Bulletin of the World Health  
329 Organization*, 97(6), 438–440. <https://doi.org/10.2471/BLT.18.223305>
- 330 • McArdle, K. (1989). Women, power and community development: A learning event in  
331 Tanzania. *Community Development Journal*, 24(2), 100–108.  
332 <https://doi.org/10.1093/cdj/24.2.100>
- 333 • Malapit, H., Quisumbing, A., Meinzen-Dick, R., Seymour, G., Martinez, E. M.,  
334 Heckert, J., Rubin, D., Vaz, A., & Yount, K. M. (2019). Development of the project-  
335 level Women’s Empowerment in Agriculture Index (pro-WEAI). *World Development*,  
336 122, 675–692. <https://doi.org/10.1016/j.worlddev.2019.06.018>
- 337 • Prüss-Ustün, A., Bartram, J., Clasen, T., Colford, J. M., Cumming, O., Curtis, V.,  
338 Bonjour, S., Dangour, A. D., De France, J., Fewtrell, L., Freeman, M. C., Gordon, B.,  
339 Hunter, P. R., Johnston, R. B., Mathers, C., Mäusezahl, D., Medlicott, K., Neira, M.,  
340 Stocks, M., ... Cairncross, S. (2014). Burden of disease from inadequate water,  
341 sanitation and hygiene in low- and middle-income settings: A retrospective analysis of  
342 data from 145 countries. *Tropical Medicine & International Health*, 19(8), 894–905.  
343 <https://doi.org/10.1111/tmi.12329>
- 344 • Rappaport, J. (1987). Terms of empowerment/exemplars of prevention: Toward a  
345 theory for community psychology. *American Journal of Community Psychology*,  
346 15(2), 121–148. <https://doi.org/10.1007/BF00919275>
- 347 • Ray, I. (2020). The feminization of agriculture and the role of water access.  
348 *International Journal of Water Resources Development*, 36(2–3), 398–424.  
349 <https://doi.org/10.1080/07900627.2019.1678719>
- 350 • Sommer, M., Ferron, S., Cavill, S., & House, S. (2015). Violence, gender and WASH:  
351 Spurring action on a complex, under-documented and sensitive topic. *Environment  
352 and Urbanization*, 27(1), 105–116. <https://doi.org/10.1177/0956247814564528>

353 • Stevenson, E. G. J., Greene, L. E., Maes, K. C., Ambelu, A., Tesfaye, Y. A.,  
354 Rheingans, R., & Hadley, C. (2012). Water insecurity in 3 dimensions: An  
355 anthropological perspective on water and women's psychosocial distress in Ethiopia.  
356 *Social Science & Medicine*, 75(2), 392–400.  
357 <https://doi.org/10.1016/j.socscimed.2012.03.022>

358 Guidelines

359 • National Rural Livelihoods Mission (NRLM). (n.d.). *NRLM guidelines*. Ministry of  
360 Rural Development, Government of India.

361

UNDER PEER REVIEW IN IJAR