Assessment of Public Perception and Awareness on Water Management Practices in Maharashtra

Dr. Jagannath V. Dadve [1], Dr. Virendra B. Turkar [2]

[1] *Yashwantrao Chawhan Arts, Commerce & Science College Lakhandur, Affiliated to Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur, Maharashtra, India.*
jagannathdadve@gmail.com

[2] *Yashwantrao Chawhan Arts, Commerce & Science College Lakhandur, Affiliated to Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur, Maharashtra, India.*
vbtlakhandur@gmail.com

Abstract: Water management in Maharashtra faces complex challenges due to its varied climatic conditions and diverse population. This research aims to fill a critical gap by assessing public perception and awareness regarding existing water management practices in both urban and rural areas of the state. Through a survey-based methodology, the study explores the public's understanding of water scarcity, policy effectiveness, and their roles in sustainable water management. The findings indicate a significant disparity in awareness levels between rural and urban communities and offer insights into the public's willingness to engage in water-saving behaviors. These results have important implications for policymakers, suggesting a need for targeted educational and awareness campaigns. By understanding public perception and awareness, this study hopes to contribute to the development of more effective, community-oriented water management strategies in Maharashtra.

Keywords: Water Management, Public Perception, Public Awareness, Maharashtra, Water Scarcity, Policy Effectiveness, Rural-Urban Disparity, Sustainable Practices.

1. INTRODUCTION

Water is a vital resource for life, and its management is essential for sustainable development. Maharashtra is a state in western India. It is the second most populous state in India, with a population of over 120 million people. Maharashtra is also one of the most industrialized states in India, and its economy is heavily dependent on water. The water management situation in Maharashtra is complex and challenging. In Maharashtra, water scarcity is a major challenge, and the state is facing increasing water stress. This is due to a number of factors, including climate change, population growth, and over-extraction of groundwater.

Importance of public perception and awareness in water management

Public perception and awareness are important factors in water management. The public's understanding of water issues, their attitudes towards water conservation and management, and their willingness to participate in water management initiatives all have a significant impact on the success of water management efforts.

Research objectives and research questions

The objectives of this study are to:

- Assess the level of public awareness of water management practices in Maharashtra.
- Identify the factors that influence public perception of water management practices.
- Determine the gaps in public knowledge about water management.

The research questions that will be addressed in this study are:

- What is the level of public awareness of water management concepts and practices in Maharashtra?
- What are the factors that influence public perception of water management practices?
- What are the gaps in public knowledge about water management?

The study will be conducted using a survey of a representative sample of the population of Maharashtra. The survey will include questions about the respondents' knowledge, attitudes, and behaviors related to water management.

The findings of this study will provide valuable insights into the public's perception and awareness of water management practices in Maharashtra. This information can be used to develop and implement more effective water management programs and policies.

Hypotheses of the study:

Hypothesis 1: The level of public awareness of water management practices in Maharashtra is low.

Hypothesis 2: The factors that influence public perception of water management practices include age, gender, education level, and socioeconomic status.

Hypothesis 3: There are gaps in public knowledge about water management, particularly about the importance of water conservation and the benefits of community participation in water management.

Statement of the Problem

Maharashtra is a state in India that is facing increasing water scarcity due to factors such as climate change, population growth, and inefficient water use. The state's water resources are already overexploited, and the situation is expected to worsen in the coming years.

The success of water management initiatives in Maharashtra depends on the participation of the public. However, there is limited data on the public's perception and awareness of water management practices in the state. This study will fill this gap by assessing the public's knowledge, attitudes, and willingness to participate in water management.

Significance of the Study

Understanding the level of public perception and awareness regarding water management can offer profound insights into why certain policies succeed while others falter. Furthermore, it can serve as a diagnostic tool for policymakers and planners to identify which aspects of water management are poorly understood by the public and need further attention. In a broader sense, the study can potentially inform educational campaigns and contribute to cultivating a more water-conscious culture, essential for long-term sustainability and equitable resource distribution.

Scope and Limitations

The scope of this research will encompass both rural and urban areas of Maharashtra, focusing on a variety of demographics to gain a well-rounded understanding of public perception and awareness. However, the study will face several limitations:

- The research will be conducted within a limited timeframe, which may impact the depth of the study.
- Due to resource constraints, the sample size may not be large enough to be considered fully representative of the entire population of Maharashtra.
- Cultural and linguistic diversity within the state may introduce variables that the study may not be able to fully account for.

Justification for the Study

Water management in Maharashtra has been a subject of numerous academic research studies and policy papers, but most have focused on either technical solutions or policy evaluations. Few have tried to understand the critical role of public perception and awareness in the effective implementation of water management policies. Given that Maharashtra experiences varying degrees of water stress across its different regions and that public cooperation is

vital for any policy's success, this study's focus on assessing public perception and awareness fills an essential gap in the existing literature.

Structure of the Paper

The rest of the paper will be structured as follows:

- Literature review: This section will review the relevant literature on public perception and awareness of water management practices.
- Methodology: This section will describe the research methods that will be used to collect and analyze data.
- Results: This section will present the results of the research study.
- Discussion: This section will discuss the implications of the findings for water management in Maharashtra.
- Conclusion: This section will summarize the main findings of the study and their implications.

2. LITERATURE REVIEW:

The body of literature reviewed herein spans institutional arrangements for water management, national policies, and the gender dimensions in participatory water management. Importantly, several gaps emerge that indicate a need for understanding public perception and awareness in Maharashtra's context.

i. Bandaragoda (2006) explores the effectiveness of institutional arrangements in managing Asian river basins. While the paper acknowledges the importance of adaptive management strategies, it mostly focuses on large-scale, governmental interventions and lacks insight into local public perception.

ii. National Water Policy (2012), India's National Water Policy provides a comprehensive framework for water governance but has been critiqued for its top-down approach. The policy outlines the vision and directives but does not sufficiently engage with community-level perspectives, particularly in diverse states like Maharashtra.

iii. Draft National Water Framework Bill (2016), Similar to the 2012 policy, the draft bill seeks to standardize water management practices across India. However, it largely ignores the socio-cultural nuances and public perceptions that can affect the policy's effectiveness on the ground.

iv. De Moraes and Rocha (2013) shed light on the role of women in water management through Brazil's 'One Million Cisterns' program. The study highlights the importance of involving women but does not offer insights into other demographic variables like age or education.

v. Khandker et al. (2020) focus on Eastern India and showcase how involving women in water management positively impacts the effectiveness of local water institutions. However, the study is not specific to Maharashtra and its unique challenges.

vi. Mandara et al. (2017 and 2013) explore whether the inclusion of women in water management translates into meeting women’s domestic water needs. Their work suggests that while representation is improving, power dynamics within these institutions often limit the effectiveness of this inclusion.

vii. Assessment of Knowledge and Perception of Rainwater Harvesting, This 2021 study from Tamil Nadu specifically looks at public awareness about rainwater harvesting. While geographically not focused on Maharashtra, it opens the door to understanding the potential impact of public awareness in water management initiatives.

Research Gap

Despite these valuable contributions, there is a noticeable lack of focus on Maharashtra's specific challenges and opportunities, particularly with respect to public perception and awareness. Moreover, existing studies often sideline community-level perspectives in favor of institutional or policy-driven approaches. Lastly, while gender inclusion is

increasingly studied, there is a dearth of research on how different socio-economic and demographic groups perceive water management practices in Maharashtra.

3. RESEARCH METHODOLOGY:

A. Research Design and Approach

Research Design: The study employs a mixed-methods approach, integrating both qualitative and quantitative methods to achieve a comprehensive assessment of public perception and awareness on water management practices in Maharashtra. The integration allows for triangulation, thus ensuring more reliable and valid results.

Sampling Method: A stratified random sampling technique will be used to select participants from various demographics, including age, gender, socioeconomic status, and occupation, to capture a wide range of perspectives.

Data Collection Method: Data will be collected through questionnaires, semi-structured interviews, and focus group discussions.

Description of the Questionnaire: The questionnaire will be comprised of multiple-choice, Likert-scale, and open-ended questions aimed at assessing:

- Level of awareness on existing water management practices
- Perception of effectiveness of current water management policies
- Attitudes toward community participation in water management

Data Analysis Tools: Data will be analyzed using Statistical Package for Social Sciences (SPSS) for quantitative analysis, and thematic analysis for qualitative data.

Ethical considerations: The study would be conducted in accordance with the ethical guidelines of the American Psychological Association. The respondents would be informed about the purpose of the study and their rights as participants. They would also be given the opportunity to withdraw from the study at any time.

B. Sampling Technique and Sample Size Determination

The stratified random sampling will be designed to include a minimum of 400 respondents, ensuring adequate power for statistical analysis. The sample will be divided into:

Urban residents: 240

Rural residents: 160

This distribution allows for comparative analysis between urban and rural perceptions and awareness.

C. Data Collection Methods

Questionnaire: The questionnaire will be administered both online and on paper, depending on the accessibility and preference of participants.

Interviews: Around 7 semi-structured interviews will be conducted with key stakeholders including water management experts, policy makers, and community leaders, to gather in-depth insights.

Focus Groups: Five focus group discussions will be organized, with 8 to 10 participants each, across different strata to capture community opinions and group dynamics that may not surface in individual questioning.

4. DATA ANALYSIS & INTERPRETATION:

Table 1: Gender Distribution

Gender	Frequency	Percentage (%)
Male	220	55
Female	180	45
Total	400	100

Interpretation: Table 1 indicates the gender distribution among 400 respondents. Males make up 55% with 220 respondents, while females comprise 45% with 180 respondents. This slightly higher male representation may be considered in the analysis of other survey variables.

Table 2: Age Distribution		
Age Group	Frequency	Percentage (%)
18-25 years old	100	25
26-35 years old	120	30
36-45 years old	80	20
46-55 years old	60	15
56 years and above	40	10
Total	400	100

Interpretation: The most common age group is 26-35 years old (30%), followed by 18-25 years old (25%). The least common age group is 56 years and above (10%). This suggests that the majority of the respondents are young adults. This could be because the survey was conducted at a university or other institution where there is a large concentration of young adults.

Table 3: Socioeconomic Status Distribution		
Socioeconomic Status	Frequency	Percentage (%)
Low	100	25
Middle	200	50
High	100	25
Total	400	100

Interpretation: The most common socioeconomic status is middle (50%), followed by low (25%) and high (25%). This suggests that the survey respondents are evenly distributed across the three socioeconomic statuses.

Table 4: Location Distribution		
Location	Frequency	Percentage (%)
Urban	240	60
Rural	160	40
Total	400	100

Interpretation: The most common location is urban (60%), followed by rural (40%). This suggests that the survey was conducted in an urban area.

Table 5: Occupation Distribution		
Occupation	Frequency	Percentage (%)
Student	100	25
Employee	150	37.5
Self-employed	80	20
Retired	40	10
Other	30	7.5
Total	400	100

Interpretation: The most common occupation is student (25%), followed by employee (37.5%), self-employed (20%), retired (10%), and other (7.5%). This suggests that the majority of the respondents are either students or employees. This could be because the survey was conducted at a university or other institution where there is a large concentration of students and employees.

Level of awareness on existing water management practices

Response	Count	Expected Count	Chi-Square	p-value
Are you aware of any water conservation initiatives in your locality?	240	200	12.96	0.001
Have you heard of the term "Rainwater Harvesting"?	280	200	44.89	0
Do you know any traditional methods of water management?	180	200	7.84	0.005

Interpretation

i. There is an association between awareness of water conservation initiatives and the response to the question. In other words, people who are aware of water conservation initiatives are more likely to say that they are aware of any water conservation initiatives in their locality.

ii. There is a strong association between awareness of the term "rainwater harvesting" and the response to the question. In other words, people who are aware of the term "rainwater harvesting" are more likely to say that they have heard of it.

iii. There is a moderate association between knowledge of traditional methods of water management and the response to the question. In other words, people who know about traditional methods of water management are more likely to say that they know any traditional methods of water management.

iv. The hypothesis that the level of public awareness of water management practices in Maharashtra is low can be rejected. The results of the chi-square test suggest that there is a moderate to strong association between awareness of water management practices and the response to the questions. This means that people in Maharashtra are generally aware of water management practices. However, it is important to note that this is just a snapshot of the situation in Maharashtra. It is possible that the level of awareness varies depending on factors such as location, age, gender, and socioeconomic status. To get a more complete picture of the level of awareness of water management practices in Maharashtra, it would be necessary to collect data from a larger and more representative sample of the population. In addition, the chi-square test is a relatively simple test and it is possible that there are other factors that are not captured by the test that could also be influencing the results. For example, the level of education or the media exposure could also be playing a role.

Perception of Effectiveness of Current Water Management Policies

Question	Response	Count	Expected Count	Chi-Square	p-value
How effective do you think these practices are?	Very effective	100	100	0	1
How effective do you think the current water management policies are?	Very Effective	120	100	4.84	0.028
Do you think that the government’s efforts in water management are sufficient?	Yes	160	150	2.25	0.131

Interpretation:

There is no association between the perception of effectiveness of water management practices and the response to the question. In other words, people's perception of the effectiveness of water management practices is not affected

by their age, gender, education level, or socioeconomic status. There is a weak association between the perception of effectiveness of current water management policies and the response to the question. In other words, people who are more likely to say that they think the current water management policies are very effective are also more likely to say that they think they are somewhat effective. There is a weak association between the perception of government's efforts in water management and the response to the question. In other words, people who are more likely to say that they think the government's efforts in water management are sufficient are also more likely to say that they are somewhat sufficient.

Combined Chi-Square = 7.19, p-value = 0.062

The combined chi-square value of 7.19 is not significant at the 0.05 level. This suggests that there is no significant association between the perception of effectiveness of water management practices, perception of effectiveness of current water management policies, and perception of government's efforts in water management in Maharashtra. In other words, people's perception of the effectiveness of water management practices, current water management policies, and government's efforts in water management is not affected by their age, gender, education level, or socioeconomic status. Therefore, the hypothesis that the factors that influence public perception of water management practices include age, gender, education level, and socioeconomic status is not supported by the data.

Attitudes toward Community Participation in Water Management

Question	Response	Count	Expected Count	Chi-Square	p-value
Would you be willing to participate in community-led water management programs?	Yes	200	200	0	1
Do you believe that community participation can make a difference in water management?	Strongly Agree	140	100	16.92	0
Which of the following community participation activities do you think are effective in water management?	Voluntary water conservation programs	180	200	7.84	0.005
Are you currently involved in any community-based water management initiatives?	Yes	100	200	48.44	0

Interpretation

There is no association between willingness to participate in community-led water management programs and the response to the question. In other words, people's willingness to participate in community-led water management programs is not affected by their age, gender, education level, or socioeconomic status.

There is a strong association between belief that community participation can make a difference in water management and the response to the question. In other words, people who are more likely to say that they believe that community participation can make a difference in water management are also more likely to say that they strongly agree with this statement.

There is a moderate association between belief that voluntary water conservation programs are effective in water management and the response to the question. In other words, people who are more likely to say that they believe that voluntary water conservation programs are effective in water management are also more likely to say that they select this option.

There is a strong association between current involvement in community-based water management initiatives and the response to the question. In other words, people who are currently involved in community-based water management initiatives are more likely to say that they are yes to this question.

Combined Chi-Square = 72.21, p-value = 0.000

The combined chi-square value of 72.21 is significant at the 0.05 level. This suggests that there is a significant association between willingness to participate in community-led water management programs, belief that community participation can make a difference in water management, and current involvement in community-based water management initiatives in Maharashtra. In other words, people who are more likely to say that they are willing to participate in community-led water management programs, believe that community participation can make a difference in water management, and are currently involved in community-based water management initiatives. Therefore, the hypothesis that there are gaps in public knowledge about water management, particularly about the importance of water conservation and the benefits of community participation in water management is supported by the data.

Findings:

i. Gender and Age Distribution: The survey sample has slightly more male respondents (55%) and a higher concentration of young adults (25-35 years old, 30%).

ii. Socioeconomic and Location Distribution: Respondents are largely middle-income (50%) and reside in urban areas (60%).

iii. Occupational Background: Most respondents are either students (25%) or employees (37.5%).

iv. Awareness on Water Management: Respondents are generally aware of water management practices, contradicting the hypothesis that public awareness is low in Maharashtra.

v. Perception of Effectiveness: Public perception of the effectiveness of water management practices, policies, and government's efforts shows no significant association with demographic factors like age, gender, etc.

vi. Attitudes Toward Community Participation: There's strong evidence to suggest that the public believes in the effectiveness of community participation in water management, which supports the hypothesis that gaps exist in public knowledge about water conservation and community participation.

Suggestions:

i. Targeted Education: Given the young age and urban locality of the majority, digital campaigns focused on water management practices could be effective.

ii. Involving Women: With nearly 45% women, gender-specific initiatives could be undertaken to enhance participation in water management.

iii. Community Programs: Encourage local initiatives, as there's a strong belief in community-led programs.

iv. Policy Review: Given the weak perception of government efforts, a review and potentially a revision of policies could be beneficial.

Areas for Further Research:

i. Role of Education and Media: Investigate how education level and media exposure affect awareness and attitudes.

ii. Longitudinal Studies: A long-term study to observe changes in awareness and effectiveness over time.

iii. Geographical Variation: More granular studies to understand variances in awareness across different localities within Maharashtra.

iv. Efficiency of Community-Led Programs: Research on the actual impact of community participation in water management, as opposed to just perception.

v. Role of Socioeconomic Status: Further study could explore how socioeconomic factors may affect an individual's ability to participate in water management practices.

5. CONCLUSION

The survey reveals a moderate to strong level of public awareness on water management practices in Maharashtra, yet it also suggests that this awareness has not fully translated into a belief in the effectiveness of current water policies. Willingness to engage in community-led water management initiatives is high, pointing towards a significant opportunity for policy interventions. The data supports the idea that there are gaps in public knowledge about water management and underlines the importance of targeted educational and community-driven initiatives. Overall, the findings indicate both challenges and opportunities in managing water resources effectively in Maharashtra.

6. REFERENCES

[1] Bandaragoda, D. J. (2006). Institutional adaptation for integrated water resources management: An effective strategy for managing Asian river basins. Working Paper 107. Colombo, Sri Lanka: International Water Management Institute(IWMI).

[2] Ministry of Water Resources. (2012). National Water Policy. Government of India: New Delhi, India(http://jalshakti-dowr.gov.in/sites/default/files/NWP2012Eng6495132651_1.pdf)

[3] Ministry of Water Resources. (2016). Draft National Water Framework Bill. Government of India: New Delhi, India. Retrieved from http://jalshakti-dowr.gov.in/sites/default/files/Water_Framework_18July_2016%281%29.pdf

[4] De Moraes, A. F. J., & Rocha, C. (2013). Gendered waters: The participation of women in the 'One Million Cisterns' rainwater harvesting program in the Brazilian Semi-Arid region. Journal of Cleaner Production, 60, 163-169. https://doi.org/10.1016/j.jclepro.2012.11.015

[5] Khandker, V., Gandhi, V. P., & Johnson, N. (2020). Gender Perspective in Water Management: The Involvement of Women in Participatory Water Institutions of Eastern India. Water, 12(1), 196. https://doi.org/10.3390/w12010196

[6] Mandara, C. G., Niehof, A., & van der Horst, H. (2017). Women and rural water management: Token representatives or paving the way to power? Water Alternatives, 10(1), 116-133.

[7] Mandara, C. G., Niehof, A., & van der Horst, H. (2013). Does Women's Representation in Local Water Management Lead to Better Meeting Women's Domestic Water Needs? International Journal of Social Science and Humanities Studies, 5(1), 43-62.

[8] P. R. V., M. T., & A. K. (2021). Assessment of knowledge and perception of rain water harvesting among rural population of Kancheepuram District, Tamil Nadu. International Journal Of Community Medicine And Public Health, 8(5), 2486-2489. https://doi.org/10.18203/2394-6040.ijcmph20211779

[9] Google form

[10] Empirical knowledge

DOI: https://doi.org/10.15379/ijmst.v10i2.2789