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AWARENESS AND BEHAVIOR CHANGE EVALUATION DURING WATER SCARCITY EVENTS

DR. NARENDRA KUMAR SINGH[1], DR.LALIT SACHDEVA[2], DR. CHAND TANDON[3]

[1]ASSISTANT PROFESSOR, KALINGA UNIVERSITY, RAIPUR, INDIA.
email: ku.narendrakumarsingh@kalingauniversity.ac.in,0009-0008-4195-9660
[2]ASSOCIATE PROFESSOR,KALINGA UNIVERSITY, RAIPUR, INDIA.
email: ku.lalitsachdeva@kalingauniversity.ac.in orcid:0009-0002-2214-282x"
[3]PROFESSOR, NEW DELHI INSTITUTE OF MANAGEMENT, NEW DELHI, INDIA.,
e-mail: chand.tandon@ndimdelhi.org, https://orcid.org/0009-0005-7505-8463

Abstract

The erratic rainfall patterns, coupled with rising population demands, limited water facilities, and existing inadequate water infrastructures, pose an ever-increasing threat to the global sustainability, with the technological solutions available to the problem doing little to help unless the public attitude towards water conservation changes. The focus of this research is on the awareness gaps, behavioral responses, and the communication effectiveness specific to water scarcity. Combining quantitative and qualitative approaches, surveys, and semi-structured interviews, the research captured the responses of 300 people within three drought-stricken districts, both from rural and urban settings. A primary finding from the research indicates that awareness of the problem does not often result in action, particularly where there is no localized outreach and reinforcement. Educational outreach, as well as public service messages, have broad appeal but their impact varies based on demographic and contextual factors. The study offers specific strategies for community leaders and policymakers that focus on education and behavioral change towards water conservation.

Keywords

Water scarcity, behavioral change, awareness campaigns, conservation strategies, public participation, environmental communication

I. INTRODUCTION

1.1 Description of Water Scarcity Events

Water scarcity events are defined as periods when water is available for domestic and agricultural use in a region, but the demand quantitatively exceeds the available supply. Scarcity can take on economic forms, such as lack of water governance, infrastructure, or poor economic systems in a region, and physical forms such as lack of rainfall and depleted aquifers. Regions that are arid and semi-arid experience these events more often, and the events are further intensified by climate change, urbanization, and growing population.

1.2 The Challenge of Awareness and Behavioral Adaptation

Reduction of water scarcity requires adaptation of behaviors, so infrastructure and policy alone are not enough. Increasing awareness, the willingness to change habits, and understanding the consequences of scaled consumption can greatly reduce water use during times of scarcity. Engagement by the public is known to add positive value for water-saving programs, especially when the cultural and community aspects are included.

1.3 The Focus of the Paper

The objectives of this research are: (1) to assess the public awareness level concerning water scarcity events; (2) to evaluate public reactions that result from awareness campaigns or other external actions; and (3) the evaluate of water saving communication campaigns to determine their efficiency. The results are geared to assist policymakers and future frameworks for awareness.

II. LITERATURE REVIEW

2.1 Previous Research on Awareness and Behavior

Research conducted in regions like California, Cape Town, and certain parts of India reveal an inconsistent correlation between awareness and sustainable behavior. Both Fielding et al. (2013) and Willis et al. (2011) demonstrated that even if individuals know about water scarcity, there is often behavioral inertia that thwarts change. Nonetheless, awareness, paired with social incentives or emotional appeals, tends to be a significant behavioral driver.

2.2 Drivers of Change in Awareness and Behavior

The socio-demographic variables of age, education, occupation, and even the urban-rural divide have a considerable bearing on awareness and the adoption of water-saving behaviors. For example, the younger and better educated a person is, the greater the likelihood that the person will have access to information and sustainable practices. Perceived control and risk perception of the community also play a role.

2.3 Promotion of Awareness

Other strategies for raising awareness include public and community service announcements, mobile and SMS alerts, media campaigns, school programs, and community-based service initiatives. Locally targeted, multi-channel campaigns are far more effective compared to single-mode campaigns. Other formats with community theater and games are also being used to raise awareness and improve retention.

III. METHODOLOGY

3.1 Research design

The study used a mix of qualitative and quantitative methodologies to understand the level of public cognition and behavioral change towards water scarcity events. This design was chosen to understand not only statistically the level of awareness and behavioral change, but also the context and emotions that impact the decision. The quantitative part of the study involved conducting surveys measuring the level of awareness, behavioral change, and the comms perception of the communication strategies used. The surveys enabled a broad, uniform assessment of the attributes across a very wide and diverse population.

The qualitative aspect of the study included conducting semi-structured interviews with some of the key informants to capture the drivers of the behavior, the social and emotional narratives behind water scarcity, and the reasons why people do not adopt water-saving practices. Mixing qualitative and quantitative methods crosschecked and increased the accuracy and reliability of the findings and helped in developing practical, evidence-based actionable strategies. This is essential in behavioral studies for the environment, in which human responses entail observable behavior and mental frameworks.

3.2 Selection of Participants

The study was conducted in three districts which were selected by the local water management authorities as most susceptible to chronic water scarcity problems.

The selection criteria for these districts included documented cases of drought over a period of time, the rate of groundwater depletion, and a history of municipal water usage restrictions. A sample of 300 participants was selected and a stratified sampling method was used to capture all socio-demographic segments of the society. The stratification criteria included the following:

Geographic: Urban and rural community boundaries

Demographic: Young (18–30), middle-aged (31–50), and seniors (51 and older)

Level of education: Ranges from no formal education to university degree holders

This stratification enhanced the surveys' ability to capture public opinion and water-related behavior on a broader and more diverse spectrum. In addition to these survey respondents, 15 key informants were selected and targeted to answer qualitative questions through in-depth interviews. This group included:

The municipal officers in charge of enforcing the water policies

The school teachers that dealt with the environmental education

The NGO representatives who run campaigns to save water

These informants provided crucial insights on institutional frameworks, policy communication, and community engagement. All participants granted informed consent, and the study was conducted in compliance with social scientific ethical norms.

3.3 Data Collection Methods

The data gathering method was created to fit the twofold goals of the study: measuring awareness, as well as understanding the behaviors driving the motivations. In the case of the quantitative aspect, a survey instrument was created, and a pilot test was conducted to a small sample for clarity and for consistency. Its final version had:

The Likert scale awareness of water severity ranged from 1 (strongly disagree) to 5 (strongly agree)

Behavioral frequency questions like water reuse, usage of buckets, and practices of wasteful avoidance.

Assessment questions evaluating the perceived effectiveness of awareness strategies utilizing media, educational, and community programs.

Participants' data were captured using direct interviews conducted by enumerators to help respondents with low literacy levels and correct them during the interpretation process.

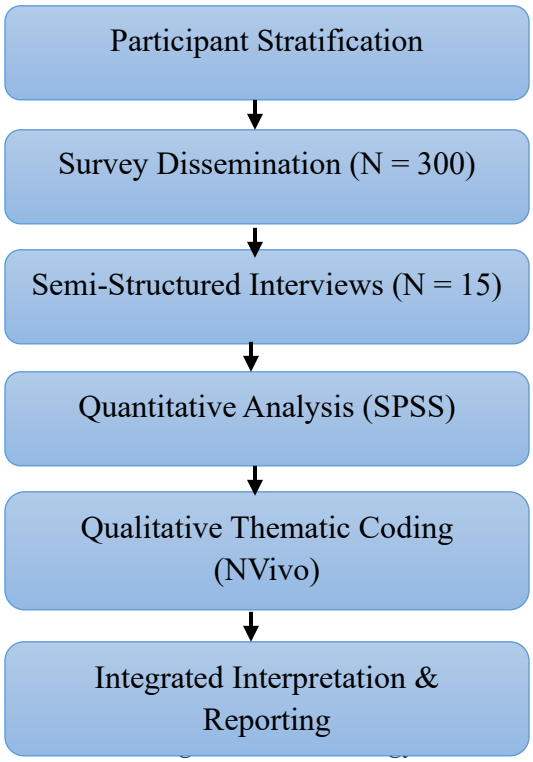
For the qualitative aspect, semi-structured forms of interviews were conducted. These centered on:

Emotional responses to water shortage events.

Community dialogues in relation to water usage and conservation. Individual obstacles and incentives to alter water-related behaviors.

With participant consent, the interviews were recorded, transcribed word for word, and thematically analyzed using qualitative data analysis software (NVivo) which aided in the identification of urban-rural differentiating repeating contrasts and recurring patterns alongside the psychological and social aspects of behavioral change.

3.4 Flowchart of Methodology



The systematic research methodology utilized for this investigation is presented in Figure 1. The first step in the investigation was participant stratification which was conducted based on the demographic criteria of age, education, and region. Quantitative surveys were administered to a sample of 300 participants from three drought-prone districts. At the same time, semi-structured interviews were held with 15 important stakeholders for the purpose of obtaining qualitative data. Quantitative data from the surveys were analyzed in terms of the statistical trends with the aid of SPSS, and qualitative data from the interviews were analyzed thematically with the aid of NVivo software. The data analysis results from both qualitative and quantitative data were then merged for interpretation and final reporting, which facilitated a comprehensive interpretation of the provided information in relation to the participants' awareness and behaviors during water scarcity situations.

IV. RESULTS

4.1 Awareness Levels During Water Scarcity Events

Table 1: Distribution of Awareness Levels

Level of Awareness	Number of Respondents	Percentage
High	82	27.3%
Moderate	143	47.7%
Low	75	25.0%

As shown in Table 1, participants can be classified into three distinct categories based on their awareness regarding the water shortage events—high, moderate, and low. Close to 50% of the participants were classified as having moderate awareness, whereas only 27.3% were classified as having high awareness. This shows the alarming level of ignorance, even in water-stressed regions.

4.2 Factors Influencing Behavior Change

Table 2: Common Behavior Change Triggers

Behavior Change Trigger	Frequency	Effectiveness Rating (1–5)
Government Policy	110	4.2
Media Campaigns	132	3.8
Peer Influence	88	3.5
Personal Experience	115	4

The surveyed external determinants are examined in Table 2 within the context of people's willingness and ability to change their water usage behavior. Media and government initiatives were cited as the most common triggers, whereas personal experiences coupled with policy enforcement received the most effectiveness ratings, indicating the primacy of authority and an actual impact in motivating change.

4.3 Strategy Effectiveness

Table 3: Communication Strategy Reach and Impact

Strategy	Reported Reach (%)	Behavior Change Success Rate (%)
Public Service Announcements	76	55
School Education	63	49
Community Meetings	58	41
Digital Apps	45	39

Table 3 evaluates the extent of coverage and effectiveness of various awareness strategies in relation to behavior change. Public service announcements promoted the behavior most effectively and reached the largest audience, followed by the school education programs. Community meetings and digital applications were less effective, particularly in regions with low levels of technological access and little to no formal infrastructure.

4.4 Correlation of Demographics with Awareness and Behavior

Table 4: Correlation of Key Factors

Factors	Awareness Correlation	Behavior Change Correlation
Age	0.31	0.27
Education Level	0.58	0.54
Occupation	0.22	0.18
Urban/Rural Setting	0.41	0.37

Table 4 illustrates the statistical relations between demographic variables such as: age, education, occupation, location, and the corresponding levels of awareness and behavior change. The participant's education did have the most significant positive correlation with awareness and the adoption of water-saving behaviors.

V. DISCUSSION

As the findings suggest, awareness of an issue does not automatically translate into behavioral change, particularly concerning sustainable practices during times of water scarcity. As observed, most participants demonstrated moderate awareness, but only individuals with firsthand experience or exposure to policy-driven frameworks had significant behavioral changes. It was also noted that formal education and community outreach had a far greater impact than digital outreach, particularly in rural areas.

An effective water scarcity management policy must integrate regulatory frameworks with highly localized and relational communication strategies. Community ownership, cultural relevance, and an enduring structural support frame for behavioral change initiatives that center localized, community-driven messaging.

Further study is needed to explore the use of behavioral economics, such as nudges and rewards, as well as real-time feedback tools like smart meters, to foster longer-term conservation habits. Policy design will also benefit from an understanding of the emotional, contextual, and informational barriers to policy enactment.

VI. CONCLUSION

This study illustrates the importance of understanding the issue of water scarcity as a behavioral issue, in addition to a resource issue.

The levels of awareness diverge significantly, and behavior modification is not a reflexive action even with consciousness. Core insights indicate that education coupled with prior experience and community-based messaging, are critical factors in changing behavior. Resulting government policies, as well as traditional outreach, are still the most effective, although digital outreach channels present prospects for scaling up.

Addressing future water crises, policymakers and other stakeholders must invest in outreach that is more inclusive and localized, as well as psychologically tailored, to encourage localized community participation. Any public education campaigns must be aimed to not only present some information, but also to change user behavior relative to the use of water. Efforts aimed toward the future need to be analyzed not only for coverage, but in terms of the behavioral change achieved in the long run.

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