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ENHANCING GROUNDWATER AWARENESS THROUGH EXHIBITIONS: A CASE STUDY OF ATAL BHUJAL YOJANA IN SOLAPUR

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Abstract : This research paper delves into the critical issues of groundwater depletion in regions exemplified by Solapur, highlighting the challenges faced and proposing solutions through awareness initiatives, with a specific focus on the Atal Bhujal Yojana (ABY). The study employs a multi-faceted approach, incorporating literature reviews, case studies, and impact assessments to comprehensively address the complex issue of sustainable groundwater management. Groundwater level depletion poses a substantial threat to agricultural practices, livelihoods, and environmental sustainability in drought prone regions of Solapur. Adverse conditions, over-extraction, and traditional farming practices contribute to the challenge, necessitating strategic interventions for sustainable water management. The research employs a combination of literature reviews and case studies to understand groundwater depletion, the significance of ABY, and the impact of awareness initiatives. An exhibition serves as a focal point for information dissemination, integrating banners, standees, models, and interactive elements to engage a diverse audience and communicate the objectives and strategies of ABY. The research reveals the success of ABY interventions through compelling case studies. Farmers and communities have witnessed increased agricultural productivity, improved livelihoods, and community-led initiatives addressing groundwater recharge. The exhibition emerges as an effective tool for increasing awareness, with positive impacts observed in terms of improved knowledge retention and community engagement. This research underscores the importance of continued efforts in groundwater awareness and conservation. By leveraging targeted interventions, community participation, and innovative awareness strategies, the study advocates for a holistic approach to sustainable groundwater management. The results affirm the transformative potential of initiatives like ABY and highlight the need for ongoing collaboration, adaptability, and shared responsibility in addressing the challenges of groundwater depletion for the benefit of present and future generations.

Index Terms - Groundwater Management through Exhibition, ABY, Sustainable Agriculture, Water Conservation Community Engagement

INTRODUCTION

Groundwater is a critical resource, especially in a drought prone area like Solapur, where agriculture heavily depends on it for irrigation. It serves as a lifeline for communities, providing water for drinking, agriculture, and industrial purposes. However, over-extraction and mismanagement pose severe threats to groundwater availability, leading to a range of socio-economic and environmental challenges (Gleeson et.al. 2012). Solapur, like many regions, faces the pressing challenges of groundwater level depletion, diminishing water quality, and adverse impacts on agriculture and livelihoods (Mustaq and Farjana, 2015a). Climate change, population growth, and unsustainable water practices exacerbate these issues, necessitating innovative and sustainable solutions for water management (Hiremath et. al. 2012). Exhibitions serve as powerful platforms of information, education and communication (IEC) for public engagement and education (Mustaq and Farjana 2023b). In the context of groundwater awareness, exhibitions offer an interactive and visually compelling means to communicate complex information to diverse audiences. By creating a physical space dedicated to knowledge dissemination, exhibitions have the potential to bridge the gap between policymakers, experts, and the local community (Heath and Lehn, 2008).

ABY stands as a flagship initiative by the government of India to address the challenges of groundwater management. Launched with the aim of sustainable groundwater resource utilization, ABY adopts a multi-pronged approach encompassing various strategies such as efficient irrigation techniques, aquifer recharge, and community participation. The significance of ABY lies in its potential to transform the groundwater landscape, ensuring not only resource conservation but also the enhancement of agricultural productivity and the overall well-being of communities (Zaveri et. al. 2016). In this research paper, focus is given to the role of exhibitions in raising awareness about ABY in Solapur. By analyzing the exhibition setup and its impact, the aim to use exhibition as a IEC tool and assess the efficacy of this approach in disseminating crucial information about groundwater conservation, irrigation practices, and the broader objectives of ABY.

LITERATURE REVIEW

A comprehensive review of literature on groundwater management reveals a global concern over depleting aquifers and the urgent need for sustainable practices. Internationally, countries have grappled with balancing water demand and supply, emphasizing the significance of effective management strategies. Studies highlight the importance of community involvement, technological innovations, GIS based multicriteria evaluation techniques and policy frameworks in achieving sustainable groundwater use (Singh et. al. 2013, Mustaq and Farjana 2015b and 2023a, Mustaq et.al. 2021). Scholarly works in the field of irrigation techniques and water conservation showcase a spectrum of approaches (Mustaq and Farjana 2015c). From traditional methods to advanced technologies like drip and sprinkler irrigation, the literature demonstrates the diverse strategies available for optimizing water use in agriculture (Evans & Sadler, 2008). The efficiency and cost-effectiveness of these techniques, as well as their adaptability to local contexts, are critical considerations for successful implementation (Mitchell 2019). Examining literature on exhibitions as tools for water awareness reveals a growing trend in using interactive platforms to disseminate information. Case studies from India and abroad demonstrate the effectiveness of exhibitions in engaging diverse audiences, fostering a sense of community responsibility, and promoting water-saving behaviors. Successful exhibitions often employ a mix of visual elements, interactive displays, and educational materials to convey complex concepts in an accessible manner (Grainger et. al. 2020). Understanding the historical context of groundwater level depletion is essential for grasping the severity of the issue. Literature highlights how rapid urbanization, population growth, and unsustainable agricultural practices have led to over-extraction of groundwater resources. Historical data underscores the alarming rates of aquifer depletion and its far-reaching consequences on ecosystems, agricultural productivity, and the overall well-being of communities (Gumidyala et. al. 2018). The literature consistently emphasizes the imperative for adopting sustainable water practices. Research underscores the importance of integrated water resource management, conservation-oriented policies, and community-driven initiatives. Case studies from different regions provide insights into successful models of sustainable water practices, emphasizing the role of governmental support, technological innovation, and community participation in achieving long-term water security (Medd & Marvin 2008, Mustaq and Farjana 2015d). It becomes evident that the challenges posed by groundwater depletion are complex and multifaceted. The literature review sets the stage for a detailed examination of how exhibitions, particularly those centered around initiatives like ABY, can contribute to enhancing awareness and fostering sustainable water practices in regions like Solapur (Singh et. al. 2018, Shaikh et.al. 2016).

ATAL BHUJAL YOJANA

ABY is a pivotal initiative launched by the Government of India to address the critical issue of groundwater depletion. Envisaged as a participatory and community-centric program, ABY aims to ensure sustainable management of groundwater resources in identified areas across the country. In Solapur 114 gram panchayat is considered in ABY. The program places emphasis on a holistic approach that includes both demand-side and supply-side interventions.

The primary objectives of ABY are:

1. To promote sustainable groundwater use through efficient management practices, ensuring that extraction does not exceed recharge.
2. To involve local communities in decision-making processes, encouraging responsible water use, and fostering a sense of ownership over water resources.
3. To adopt modern and water-efficient irrigation technologies such as drip and sprinkler irrigation to enhance agricultural productivity while minimizing water consumption.
4. To enhance the natural recharge of aquifers through various measures, including the construction of structures for rainwater harvesting.

ABY focuses on identified "over-exploited" and "critical" groundwater resource areas in priority states. These areas are selected based on criteria such as the rate of groundwater depletion, agricultural dependency on groundwater, and the socio-economic significance of water resources in the region. By targeting specific areas, ABY ensures a targeted and impactful intervention to mitigate the challenges associated with groundwater level depletion.

Key Components and Initiatives

Empowering local communities to actively participate in the planning and management of water resources. Implementing robust data collection and monitoring mechanisms to assess groundwater levels, quality, and usage patterns. Encouraging the adoption of efficient irrigation techniques, such as drip and sprinkler systems, to optimize water use in agriculture. Investing in the creation of water storage and recharge structures, such as recharge shafts, check dams and percolation tanks, repair of percolation tank, rain water harvesting, dug well recharge to enhance groundwater recharge. Building the capacity of local institutions to manage and regulate water resources effectively.

Importance of Exhibition for Information, Education, and Communication (IEC)

Exhibitions play a crucial role in fulfilling the IEC objectives of ABY. The exhibition format offers a unique opportunity to provide a platform to communicate the objectives, strategies, and benefits of ABY to a diverse audience, including farmers, local communities, and policymakers. In local Marathi language through visual aids, models, and interactive displays, exhibitions can effectively convey complex concepts related to groundwater management, irrigation techniques, and the importance of sustainable water practices in simpler way. Exhibitions facilitate direct engagement with the community, fostering a sense of awareness, responsibility, and participation in the sustainable management of water resources. Exhibitions highlight success stories and tangible outcomes of ABY, inspiring confidence and motivation among stakeholders. In summary, exhibitions serve as powerful tools within the framework of ABY, enabling effective communication, education, and community engagement for sustainable groundwater management in targeted regions.

EXHIBITION DESIGN:
Banners:

Figure 1. Banner of Atal Bhujal Yojana Overview

Figure 2. Banner of groundwater recharge through trench

Figure 3. Banner of micro-irrigation measures and water conservation measures

The banners are strategically placed to provide an immediate overview of ABY and its key components (Palcu et.al.2017). Each banner is designed with clarity and visual appeal. Clearly articulating the primary goals of the program, including sustainable groundwater management, community participation, and the promotion of efficient irrigation techniques (Figure 3). Highlighting the progress and impact of ABY through the Disbursement Link Indicators 1 to 5, providing a visual representation of the program's effectiveness in achieving its goals. Illustrating various recharge measures such as trenches and their groundwater recharge (Figure 2). These visuals serve to educate visitors about the diverse strategies employed to enhance groundwater recharge. Banners serve as concise and attention-grabbing sources of information. By incorporating visual elements, they make complex concepts accessible, ensuring that visitors can quickly grasp the core objectives of ABY and its measurable impact. Comprehensive displays and banners navigate through the intricacies of water budgeting and other crucial aspects of sustainable water management. Providing a roadmap for farmers and stakeholders to optimize water resources through effective budgeting and conservation practices.

STANDEES:

Standees are strategically positioned throughout the stall, providing detailed insights into specific aspects of ABY (Jaggi et.al. 2020). Dedicated standees explain the benefits and techniques associated with micro-irrigation systems like drip and sprinklers, emphasizing water efficiency and increased agricultural productivity. Information on the practice of mulching is presented, showcasing its role in retaining soil moisture, preventing erosion, and promoting sustainable farming practices (Mustaq and Farjana 2023c). Standees offer in-depth information on specific components of ABY, allowing visitors to delve deeper into topics of interest. The visual representation aids in conveying technical details in a visually appealing and comprehensible manner.

The standee on aquifer recharge time vividly illustrates the critical relationship between depth and percolation, shedding light on the intricate dynamics of groundwater replenishment (Figure 4). As one delves deeper into the subsurface, the percolation process undergoes a discernible deceleration. This phenomenon is intricately tied to the diminishing number of features and openings within the geological formations at greater depths. With each descent, the intricate network of fractures and conduits gradually diminishes, leading to a proportional reduction in the rate of recharge. Consequently, the standee visually conveys that deeper locations exhibit a minimum recharge rate, emphasizing the importance of understanding these nuances in managing and sustaining groundwater resources effectively.

1. Recharge Activities (Supply Side Measures):

Our standees showcase impactful supply-side measures aimed at recharging groundwater (Figure 6). Through visual displays, visitors can explore various techniques and initiatives designed to replenish aquifers and restore balance to the water table (Drèze & Hussherr, 2003). Illustrating the construction and functioning of recharge shafts, emphasizing their role in directing rainwater into aquifers. Highlighting the combined effect of recharge shafts with trenches in enhancing groundwater recharge.

Figure 4. Standee of aquifer recharge percolation rate

Figure 5. Standee of different water saving methods

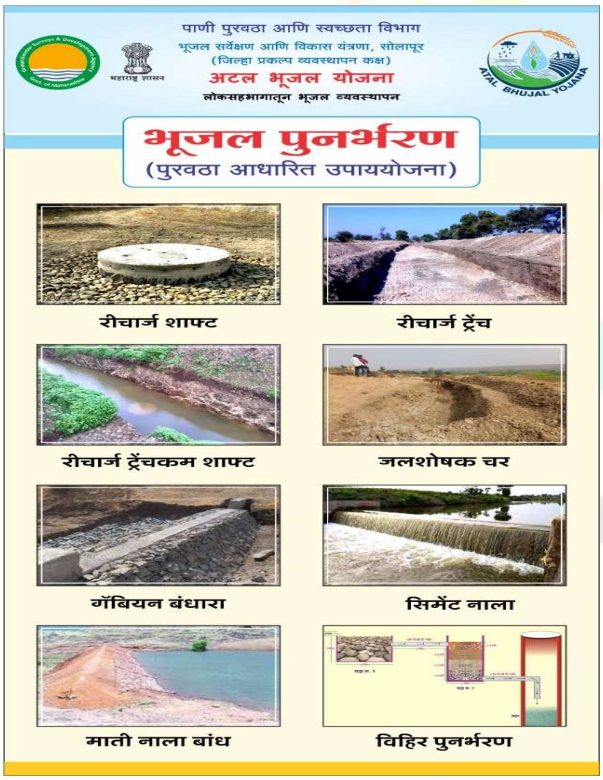

Figure 6. Standee of various recharge measures

Showcasing the construction and effectiveness of cement nala bunds in diverting and storing rainwater.

2. Drip and Sprinkler Irrigation (Demand Side Measures):
The standees focus on sustainable farming practices through drip and sprinkler irrigation (Figure 5). Visitors learn about the benefits and implementation of these demand-side measures, which optimize water usage and lead to increased agricultural productivity. Emphasizing how drip and sprinkler irrigation methods maximize water efficiency by delivering water directly to the roots. Illustrating how these methods contribute to improved crop yields and reduced water wastage

Posters:
Posters are designed to showcase detailed information about the various initiatives under ABY (Hess et. al. 2020). Posters feature real-life success stories, highlighting instances where the implementation of ABY has led to increased groundwater levels and improved livelihoods. Posters serve as educational tools, offering a comprehensive understanding of the technical aspects of ABY. They also incorporate real-world examples to instill confidence in the community about the program's potential positive outcomes (Figure 7,8,9)

Leaflets:
Concise leaflets are distributed to visitors, summarizing key information about ABY (Oshagh et. al. 2011). Leaflets include quick facts about ABY, its coverage areas, and the importance of sustainable groundwater management (Figure 1 and 2). Leaflets provide contact information for further inquiries or collaboration opportunities. Leaflets serve as take-home materials, allowing visitors to revisit essential information. They act as a quick reference guide and provide a means for interested individuals to follow up with the organizers. The posters and leaflets complement the

exhibition by providing information on various millet products, their nutritional values, and guidelines on forming farmer producer companies (Figure 7,8). Advocating for the cultivation of millets and other diverse crops for enhanced nutrition and sustainable agriculture (Figure 9). Guiding farmers on the process of forming farmer producer companies for collective benefits and improved market access.

Our leaflet celebrates the Millet Year while emphasizing the importance of diverse cropping patterns in the water security plan. Visitors can learn about diverse cropping patterns by illustrating the benefits of incorporating millets and other diverse crops in agriculture to promote sustainable water usage. Emphasizing how strategic planning, as outlined in the water security plan, ensures a resilient and secure water future for agriculture.

Figure 7. Poster and Leaflet about FPO general information

Figure 8. Poster and Leaflet about FPO registration

Figure 9. Poster and leaflet about Millets and its benefits

Models:

Physical models are showcased to provide a tangible representation of key ABY interventions (Hughes, 1997). Physical models of recharge shafts are displayed to give visitors a hands-on experience of how these structures function in enhancing groundwater recharge. Miniature models of drip and sprinkler systems demonstrate their practical applications and showcase the efficiency of these technologies (Figure 10). Models offer a tangible and interactive experience, allowing visitors to visualize the practical aspects of ABY interventions. They enhance understanding and engagement, particularly for those who may find visual aids more impactful than textual information. In summary, the exhibition design is meticulously crafted to cater to diverse learning preferences and levels of technical understanding. Each visual element serves a specific purpose in conveying information effectively and engaging the audience in the objectives and strategies of ABY. The exhibition features two insightful models that shed light on critical aspects of water management and agriculture practices:

Model No. 1: The Greener Part and The Dry Part:

The model village showcase of successful water security plan implementation at greener part. The greener part of village shows the illustration of initiatives taken by villages for rainwater harvesting, depiction of awareness programs conducted at the village level, the positive impact of micro-irrigation systems adopted by villagers and display of structures showcasing effective water conservation efforts by villagers. The dry part of the village showcase of unimplementation of water security plan, unimplementation of rain water harvesting structures, no awareness in local people, use of traditional flood irrigation system and no effective water conservation planning (Figure 10).

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Figure 10. Physical model of implemented and unimplemented water security plan

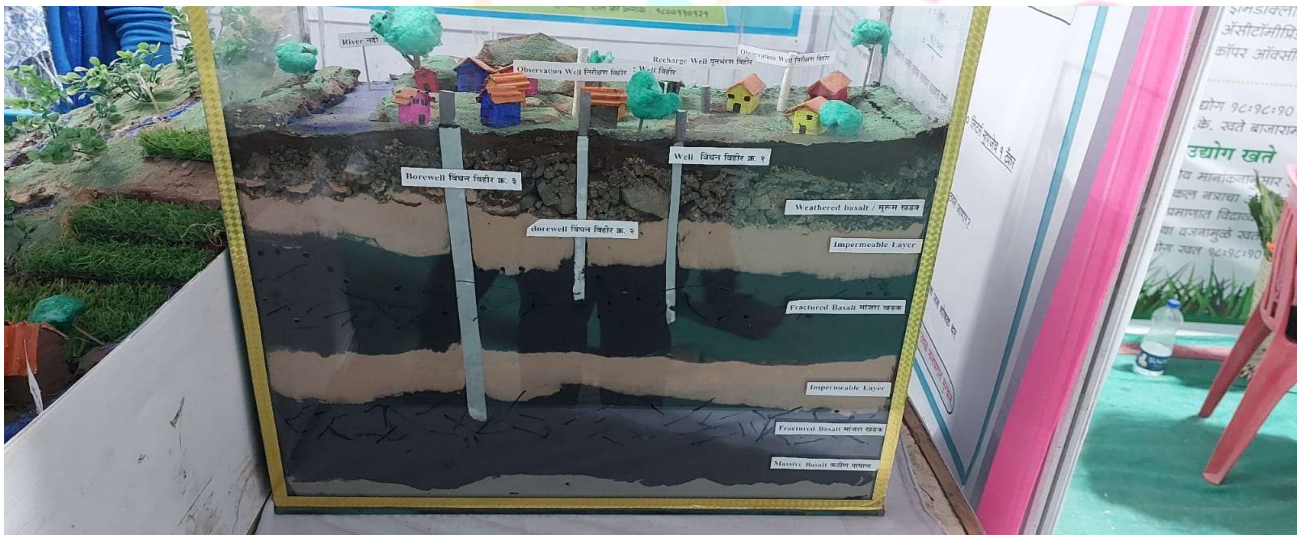

Figure 11. Physical model of various basaltic aquifer condition

Model No. 2: Basaltic Aquifer Conditions Model

Detailed insights into both shallow and deeper basaltic aquifer conditions, highlighting their characteristics and water-holding capacities (Figure 11). Delve into the challenges posed by basaltic terrain and adverse groundwater conditions through informative model. Explaining the unique characteristics of basaltic aquifers and their storage capacities. Showcasing strategies employed to overcome adverse groundwater conditions, such as targeted recharge initiatives and sustainable water management practices (Shaikh et. al. 2019).

In summary, the exhibition's content aims to deliver key messages on water management, irrigation techniques, groundwater recharge, and sustainable agriculture in a visually engaging and informative manner. The diverse range of visual elements ensures that visitors gain a comprehensive understanding of ABY and related initiatives.

Impact Assessment:

Recorded diverse attendance, including farmers, local community members, policymakers, and students. Conducted surveys to gather information on visitors' backgrounds, understanding of groundwater issues, and awareness levels regarding ABY. Organized interactive sessions within the exhibition space, allowing visitors to ask questions, share experiences, and provide feedback. Monitored participation rates and engagement levels during these sessions. Distributed feedback forms to visitors to collect qualitative insights on the clarity of information, relevance of content, and overall satisfaction with the exhibition. Encouraged visitors to provide suggestions for improvement and share their key takeaways. Tracked social media metrics, including the reach, engagement, and feedback received on platforms such as Facebook, Twitter, and Instagram. Utilized online surveys to gather responses from those who engaged with the exhibition remotely. Noted a noticeable increase in awareness levels regarding ABY and groundwater management among visitors, as reflected in post-exhibition surveys and feedback. Evaluated the duration of time spent by visitors at different sections of the exhibition to measure engagement levels. Assessed the level of participation in interactive sessions, noting the number of questions asked and discussions initiated. Conducted post-exhibition interviews to gauge

visitors' understanding of ABY's objectives, key components, and the role of supply and demand-side measures. Utilized surveys to assess the retention of information by asking specific questions related to the exhibition content. Analyzed feedback forms to identify areas of strength and areas that may require improvement. Categorized feedback into positive comments, constructive suggestions, and recurring themes to inform future exhibitions. Monitored any observable changes in behavior or practices related to water conservation and sustainable agriculture reported by farmers and community members post-exhibition. Exhibited a positive response from visitors, with a majority expressing appreciation for the interactive and informative elements of the exhibition. Indicated improved knowledge retention among visitors through post-exhibition assessments and interviews. Observed a significant online presence and engagement, with social media platforms serving as effective channels for extending the exhibition's reach. Identified specific areas for improvement based on feedback, including the need for additional hands-on activities, more detailed information on certain topics, and increased promotional efforts for future exhibitions.
The impact assessment indicates a positive influence on awareness, understanding, and engagement levels among exhibition visitors. The data collected and feedback received will be instrumental in refining future exhibitions, ensuring they remain effective tools for disseminating information about ABY and sustainable groundwater management. Continued monitoring and feedback mechanisms will contribute to the ongoing success and improvement of similar awareness initiatives

Case Studies and Success Stories:
Case Study 1: Sustainable Agriculture and Increased Income
Location: Solankarwadi, Madha tahsil, Solapur District

Prior to the implementation of ABY, Solankarwadi, Madha tahsil, Solapur faced challenges related to declining groundwater levels and traditional farming practices that were water-intensive and less productive. The introduction of ABY brought about transformative changes. Farmers in Solankarwadi embraced micro-irrigation systems, transitioning from traditional flood irrigation to drip and sprinkler methods facilitated by ABY initiatives. Groundwater surveys and development agency organized awareness programs at the village level, educating farmers on efficient water management, crop diversification, and the benefits of micro-irrigation. The adoption of micro-irrigation resulted in improved water efficiency, leading to increased crop yields and a significant reduction in water usage. With higher crop yields and reduced water costs, farmers experienced an increase in income. The financial gains allowed them to invest in farm infrastructure and diversify their agricultural activities.

Case Study 2: Community-Led Groundwater Recharge
Location: Bhend, Madha tahsil, Solapur District

A group of villages facing critical groundwater level depletion came together under the ABY program to implement community-led groundwater recharge initiatives. Villagers collaborated to construct recharge shafts with trenches, loose boulder structure, contour trenches etc. enhance the natural recharge of aquifers during the monsoon season. The community actively participated in ABY exhibitions, workshops, learning about the importance of groundwater recharge and sustainable water practices. The implementation of recharge shafts and trenches led to a noticeable improvement in groundwater levels, ensuring a more reliable and sustainable water supply for the community. The collaborative effort fostered a sense of ownership and responsibility within the community. Villagers became actively involved in monitoring and maintaining the recharge structures.

Caste study 3: From Water Scarcity to Water Security
Location: Londhewadi, Madha tahsil, Solapur

ABY intervention in Londhewadi, Madha tahsil, marked by chronic water scarcity, brought about a remarkable transformation in the agricultural landscape. ABY facilitated the development and implementation of comprehensive water security plans tailored to the specific needs and challenges of Londhewadi. Through awareness programs and incentives and exhibition of farmers were encouraged to diversify crops, including the cultivation of millets, contributing to sustainable water usage. The strategic water security plans, coupled with diversified cropping patterns, resulted in a more resilient and secure water future for agriculture. The promotion of millet cultivation not only improved water efficiency but also contributed to improved nutrition and diversified income sources for farmers.

These case studies and success stories exemplify the tangible impact of ABY on communities in Solapur. Through targeted interventions, ABY has played a pivotal role in enhancing livelihoods, improving groundwater levels, and fostering sustainable agricultural practices.

Challenges and Lessons Learned:
The technical nature of groundwater management and irrigation techniques posed a challenge for some visitors who may not have had a background in these subjects (Knegt & Vincent, 2001). To overcome this, interactive sessions were conducted, and exhibition guides were available to explain concepts in simpler terms (Figure 12). Additionally, informative standees, models, posters and leaflets were designed with a focus on visual clarity (Figure 1 to 10). Visitors often had limited time to explore the exhibition due to other commitments or the bustling nature of the event. To maximize engagement, strategically placed highlights, such as interactive models and attention-grabbing banners, were designed to convey key messages quickly. The information was structured in a way that visitors could grasp the main points even during brief interactions. The exhibition attracted a diverse audience, ranging from farmers to policymakers, each with different levels of familiarity with water management concepts. The content was designed with varied audience backgrounds in mind. Interactive elements allowed visitors to choose the level of detail they wanted, and exhibition guides were trained to gauge the audience's understanding and adapt explanations accordingly. Engaging with online audiences who were not physically present at the exhibition was a challenge.

Figure 12. Interactive sessions to increase the awareness about ABY

Social media platforms were leveraged to share regular updates, live streams, and virtual walkthroughs of the exhibition. Online surveys were conducted to gather remote feedback and insights.

Lessons Learned and Insights:

Interactive elements, such as models and Q&A sessions, proved highly effective in engaging visitors and conveying complex information. Future awareness campaigns should prioritize hands-on, interactive components to enhance visitor participation and understanding. The diverse audience highlighted the importance of adaptability in communication. Exhibitors needed to tailor explanations based on the audience's background and level of familiarity with water management concepts. Flexibility in communication strategies and materials is vital to cater to the varying knowledge levels of the audience. The online component of the exhibition demonstrated the potential to reach a broader audience beyond the physical event. Future campaigns should incorporate a strong online presence, utilizing social media, virtual exhibitions, and webinars to extend reach and engagement. The importance of real-time feedback was highlighted for ongoing improvements. Establishing continuous feedback mechanisms, such as live polls, on-site feedback forms, and post-event surveys, ensures that adjustments can be made promptly for a more effective exhibition. Recognizing that individuals have diverse learning styles, the exhibition design aimed to cater to visual, auditory, and hands-on learners. Future campaigns should incorporate a mix of visual aids, interactive displays, and auditory elements to create a well-rounded and inclusive learning experience. In conclusion, the challenges faced during the exhibition provided valuable insights for refining future awareness campaigns. The lessons learned underscored the importance of adaptability, interactivity, and the integration of online components for a more comprehensive and effective outreach strategy.

Conclusions:

The research on groundwater awareness through the exhibition focusing on ABY in Solapur has yielded valuable insights into sustainable water management, the impact of awareness initiatives, and strategies for fostering community engagement. The study highlighted the multifaceted challenges associated with groundwater depletion in regions like Solapur, including adverse conditions, over-extraction, drought prone area and the critical importance of sustainable water practices. ABY has demonstrated significant success in addressing groundwater challenges. Case studies and success stories showcased tangible outcomes, such as increased agricultural productivity, improved livelihoods, and community-led groundwater recharge initiatives. The exhibition design, incorporating banners, standees, models, and interactive elements, proved to be an effective tool for disseminating information about ABY. It facilitated engagement, improved understanding, and contributed to increased awareness among diverse audience segments. Challenges faced during the exhibition, including technical complexity and diverse audience backgrounds, provided valuable lessons. The importance of adaptability, enhanced interactivity, and a continuous feedback mechanism emerged as crucial elements for future awareness initiatives.

Future exhibitions should prioritize enhanced interactivity, tailored information sessions, and pre-event engagement strategies to cater to diverse audience needs and learning styles. Inclusivity should be ensured through the availability of multilingual materials, and the integration of online learning modules can extend the impact of awareness campaigns beyond physical events. Recommendations for sustainable groundwater management include community-based monitoring, integrated watershed management, incentive programs, and capacity-building initiatives for local institutions. The research underscores the critical need for sustained efforts in groundwater awareness and conservation. Groundwater, a finite and essential resource, plays a pivotal role in the livelihoods of communities, agricultural practices, and overall environmental sustainability. The success stories and positive outcomes associated with ABY demonstrate the potential for transformative change through targeted interventions and community engagement. Continued efforts are imperative to address ongoing challenges, adapt to evolving circumstances, and expand the reach of awareness initiatives. The recommendations provided offer a roadmap for refining future exhibitions, ensuring they remain dynamic, inclusive, and effective tools for promoting sustainable groundwater management. In conclusion, the research advocates for a holistic and community-driven approach to groundwater conservation. By leveraging innovative awareness strategies, fostering community participation, and implementing sustainable practices, we can collectively work towards securing the future

of groundwater resources and promoting resilience in water-dependent communities. The journey toward sustainable water management is an ongoing commitment that requires collaboration, adaptability, and a shared sense of responsibility for the well-being of present and future generations.

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