Policy brief

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Harnessing Digitalisation for Water Governance.

Key insights from India

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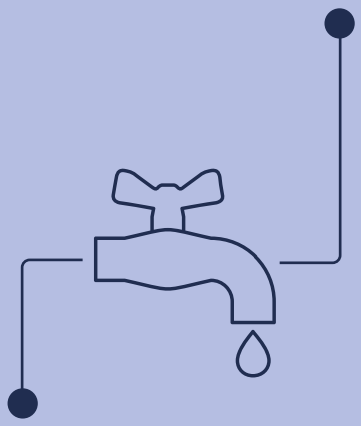

Overview

Water is a vital agricultural resource, accounting for 70 percent of freshwater withdrawals worldwide (World Bank 2020).

With population growth, urbanisation, and climate change as major stressors of water, 54 percent of India is likely to face 'high to extreme high' water stress (WRI 2021).

Farmers, especially smallholder farmers, grapple with consistent water access challenges, putting their livelihoods and water security at risk and leading to significant impacts on health, economies, and ecosystems (NITI Aayog 2019, SIWI).

Digital solutions such as satellite imagery, Geographical Information Systems (GIS), and android-based applications have revolutionised agriculture and water governance. They provide real-time monitoring and data analytics, and facilitate precise irrigation, efficient water management and resource utilisation (Colby 2019).

In India, the adoption of digital tools for water governance has surged over the past two decades. The Bhuvan Portal, for instance, of the government-run National Remote Sensing Centre (NRSC) make spatial data publicly available.

However, digitalisation has its challenges. Many people have no access to digital tools, or to the information generated from their use, with factors such as wealth, gender, geography, or education posing considerable barriers to them. This phenomenon is referred to as the 'Digital divide' (Taylor K. 2022).

Digitalisation can thus unintentionally exacerbate existing social and economic inequalities.

Moreover, the complexities of digital tools and their misalignment with community requirements, indicating a deficiency in participatory design approaches (Pretty et al. 1995), can render these tools inaccessible to end-users. To bridge these challenges and ensure equitable access, particularly for smallholder farmers and women, it is necessary to assess and enhance the effectiveness of digitalisation practices in agricultural water governance.

This policy brief outlines valuable insights from field research conducted in four Indian states (Rajasthan, Gujarat, Odisha, and Maharashtra), under the 'SEWOH Lab' project. It presents lessons and recommendations for policymakers and practitioners to strengthen inclusive water governance, with a focus on using digital tools, as well as the challenges which can hinder its effective and inclusive implementation.

What we did

Under the SEWOH Lab project, we investigated farmers' use of digital tools in water governance. Based on four water governance and agriculture projects in Maharashtra, Rajasthan, Odisha, and Gujarat, we explored the application of various digital tools for planning, monitoring (e.g., water budgeting), and advising. The research involved key informant interviews and focus group discussions with farmers, women self-help groups, village leaders, and project technical staff in the field, as well expert dialogues.

Lessons and Recommendations

LESSON 1: Users' long-term adoption of digital tools is undermined by their complexity and lack of clear benefits.

The four case studies showed that the use of digital tools for managing common water resources was minimal among communities. Farmers heavily rely on project staff and community resource persons (CRPs) to operate these tools, due to their technical complexity. NGOs had developed these tools primarily for the ease of data collection, visualization, and technical understanding of water and natural resources as part of their own project activities.

On the other hand, farmers' usage of the FarmPrecise app, an android-based farm advisory app providing weather information, pest control support and advice on fertiliser input, among other functions, varied based on the perceived benefits of use, highlighting differing preferences toward app-based farm advice. The observation emphasises the importance of balancing an app's 'flexibility' and 'specificity' to suit varying agricultural and water governance contexts.

RECOMMENDATIONS

1. **Conduct a comprehensive need assessment before app development.** Prior to the development of any app, a comprehensive need assessment survey should be conducted to understand the needs of the communities.
2. **Invest in the user-centric design of tools** for greater simplicity and intuitiveness, so that tools have uncomplicated interfaces using clear, concise language and visual elements like graphs and charts for easy navigation and comprehension.
3. **Incorporate a feedback mechanism** that allows users to provide input on the tool's functionality and usability. Regularly gather feedback and make improvements based on user suggestions.

Water challenges in India

India ranks among the countries worst affected by climate change, with severe effects on water. According to the Government of India, by the year 2030, water demand is expected to be two times greater than supply, leading to significant impacts on livelihoods, health, the economy, and ecosystems in the country (NITI Aayog, 2019).

Given India's diverse geography, climate and population, water governance spans across multiple sectors and states, and involves a complex interplay of social, economic, political and legal aspects. One major challenge is equitable water distribution. For example, in Maharashtra, 1.1 million sugarcane farmers, who occupy just four percent of agricultural land, consume 70 percent of available water (MoA India 2013). Furthermore, access to water, is closely tied to the size of land holdings, favouring larger farms. Therefore, the water governance challenge lies in fair and sustainable distribution and regulation of water resources, with a particular focus on the largest water consumer, agriculture.

LESSON 2: Alongside investments in infrastructure, social innovations are key to ensuring last-mile connectivity and mitigating the 'digital divide'.

Our case studies have shown that the digital divide is exacerbated by factors like gender, age, and education level, creating disparities in technology access and digital literacy. For example, android-based agricultural apps require functional smartphones, limiting access for farmers, especially the elderly and women. According to the 2023 Mobile Gender Gap Report (WRI 2023), there is a 40 percent gender gap in internet adoption in India.

Bridging this divide necessitates investments in more than digital infrastructure alone.

There is an opportunity to enhance digital literacy and education by acknowledging technology's varying impacts on marginalised groups, and developing inclusive and participatory project designs, leveraging social-analogue systems like CRPs (see text box) to bridge the digital divide in agricultural water governance.

RECOMMENDATIONS

1. **Align digitalisation to social needs to address the digital divide.** Given that specific social groups face structural exclusion due to factors like class, caste, ethnicity, gender, and age, ensure that decision-making bodies in water governance include representatives of all members of communities in developing and using tools to enhance awareness and promote sustainable water use.
2. **Provide training on digital and e-literacy.** Implement programs to improve digital literacy among communities that lack access to digital resources and e-literacy. Additionally, context-specific training must be adopted so that the end-users can relate to the benefits of using a certain digital tool.

Photo: Community resource person "Jal Bandhu" at the Gram Vikas project site monitoring the water level in a well.
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Community Resource Persons

Common across the case studies was the role of community resource persons (CRPs), often young tech-savvy, educated people who help the farmers use the digital tools or to access the information generated from the digital tools. In effect, they function as the interface between the village communities and project implementers. The function of CRPs varies depending on the project activities and the type of digital tools used. For example, for crop water budgeting, they help to collect crop and cultivation area data, after which they input this data and conduct analysis in support of the cropping plans, develop water health cards, and promote water literacy to their fellow villagers. For groundwater monitoring, they measure water level data and input these into digital databases, since the farmers lack the technical skills in doing so.

Their dedication and commitment are noteworthy, even after the project's conclusion and the absence of monetary compensation, signifying a positive force in sustaining the use of digital tools after the end of projects.

LESSON 3: Digital tools can improve water governance, but they should not replace participatory processes.

Our scoping research has shown that digital tools complement but do not replace participatory processes involving stakeholders and local communities in water governance.

Integrating traditional knowledge into digital technologies leads to contextually relevant and innovative solutions for water governance.

This insight is exemplified by the success of 3D aquifer models, a physical representation of an aquifer where farmers can see the various geophysical layers. This signifies that digital solutions should be integrated into social-ecological frameworks and participatory 'analogue' approaches, prioritising predefined social goals, consensus-building, and specific decision-making.

RECOMMENDATIONS

1. **Strike a balance between the use of digital tools and participatory processes** in water governance for effective decision-making and inclusive management, acknowledging the importance of incorporating end-users' preferences and needs beyond the development of data-driven insights.
2. **Merge local knowledge and digitalisation** by involving communities in technology development, leveraging their traditional knowledge for informed decision-making and co-design.

The SEWOH Lab

Berlin-based TMG Research gGmbH leads the implementation of the SEWOH Lab (2020-2025), which seeks to analyse the linkages between digital and social innovations for achieving Sustainable Development Goal 2. Together with partners in Africa and India, the SEWOH Lab explores, applies, and evaluates the potential of digital innovation in three key areas: urban food systems, women's access to land, and nature-based solutions. Its primary focus lies on smallholder farmers and marginalised land users, including women. It is supported by the German Federal Ministry for Economic Cooperation and Development (BMZ).

The SEWOH Lab workstream with a focus on participatory water governance is implemented in Maharashtra, by the non-governmental organisation SOPPECOM (Society for the Promotion of Participative Ecosystem Management). The goal is to strengthen local institutions, such as Water User Associations, and watchdog organizations like farmer social movements, for more equitable and sustainable water management, with the help of digital tools.

SEWOH LAB

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