

Avoiding the Tragedy of the Water Commons: Promoting Sustainable Groundwater Management in Maharashtra

POLICY BRIEF: February 2020

Context:

- Groundwater is an invisible common pool resource. However, competitive individual extraction of groundwater through dug wells and bore holes has led to a decline in groundwater levels creating a 'tragedy of the commons' situation.
- Lack of awareness and knowledge about the features of aquifers and groundwater dynamics restricts the understanding of its common pool nature that numerous households and even villages share the same aquifer for their water needs.
- To avoid overexploitation and steer public behaviour towards sustainable use of groundwater resources, there is a need for policy to focus on promotion of water management as a common resource as opposed to private ownership.

Key Recommendation:

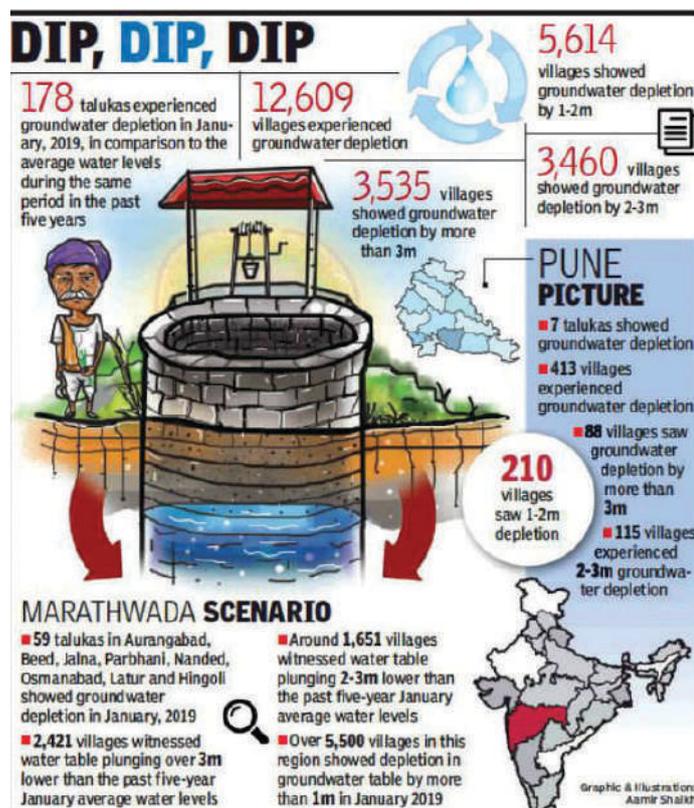
Generally water scarcity, particularly for agriculture and domestic use, is addressed through extraction of groundwater resources, thus treating groundwater as a private good. Hence, there is urgent need for enhancing community knowledge using participatory tools to enable a sustainable and equitable management of groundwater. The CoDriVE-VI tool developed by WOTR has immense potential in this regard to inform villagers on the groundwater resource and bring them together for sustainable aquifer management.

Introduction:

India relies heavily on groundwater for its domestic and irrigation needs and extracts around 25 per cent of the global groundwater supply. A water crisis is underway in semiarid India, and is already experienced in the hard rock aquifers of the basaltic region of Maharashtra. According to the Groundwater Survey and Development Agency (GSDA), out of 353 talukas in Maharashtra

water levels have dropped from 1 to 3 meters in villages spread across 245 talukas, during the last 5 years (GSDA, 2019).

This study, applying the CoDriVE-VI tool, demonstrates how the use of participatory mapping exercises can be an effective educational tool for communities to understand the complex nature of hydrology and aquifer recharge mechanisms and the collective nature of the groundwater resource. It motivates them for sustainable groundwater management.



Objectives:

- Using participatory mapping as an educational tool for villagers to enable spatial learning through identification and visualization of underground aquifers, and to use this information to prepare water budgets and balances.
- To elicit community perspectives on this crucial resource, so as to enable them to collectively manage and use groundwater more sustainably.

Methodology:

The participatory mapping tool is applied in 11 villages in the Ahmednagar and Jalna districts of Maharashtra, where the surface and sub-surface characteristics of each village are delineated. In the Bhokardan block in Jalna district, the aquifer is collectively shared by 14 neighbouring villages.

Using the Co-Drive- Visual Integrator (CDVI), a participatory 3D modelling tool, community members from the respective villages were facilitated to co-create the 3-D model of the

surface and sub-surface characteristics, combining indigenous spatial knowledge with the topographical and geophysical information. The CDVI-3D model is prepared based on advanced GIS technology and geophysical data software and local information collected from the local stakeholders. The purpose of these workshops is to facilitate an understanding of the common-pool nature of groundwater and the water balance between demand and supply of groundwater.



Research Results:

- The participatory mapping exercise enabled participants to develop a deeper understanding of the hydrological structures of groundwater sources shared by their villages.
- The role of Village Water Management Teams was strengthened post workshops. At the aquifer level in Bhokardan block, an Aquifer Management Committee was formed.
- The Village Water Management Teams in each village initiated voluntary monitoring of rainfall and groundwater levels and prepared seasonal crop planning on the basis of water availability using the water budgeting tool.
- The villages were able to form collective institutional rules for governance and management of the shared aquifer including rules that inhibited cultivation of water intensive crops based on water availability, as also limiting the depth of boreholes.

Policy Recommendations:

This study offers the following recommendations for policy action and programmatic design,

- Application of this tool contributes to the implementation of the Maharashtra Groundwater Act 2009.
- An understanding of the unseen underground water availability by the local villages, will help:
 - Villages around an aquifer to focus on management of water resources, at the village / cluster levels, and is likely to be more effective for sustainable management of groundwater resources.
 - It mobilizes villagers to formulate and implement rules such as ban on bore well, limiting the depth of dug / bore wells to reduce over-exploitation of groundwater resources, plan crop cultivation.
- Implementation of various educational programs that promote behavioral change for better groundwater management.

References:

1. GSDA, 2019, Report of Predicted Water Scarcity for drinking water for 2019-2020, <https://bit.ly/36vjgLT>

Additional Sources:

1. The manual published on the CDVI tool is available at: <https://bit.ly/37XnjSM>
2. The WOTR blog on CDVI is available at: <https://bit.ly/31ln9IH>

