

4.3 Groundwater Management to Build Climate Resilience: Lessons from Dryland Agriculture in India

Groundwater provides the essential irrigation support required to mitigate climate risks in dryland farming. However, managing groundwater is challenging because it is a common pool resource and its use unregulated. The lack of effective resource governance leads to its over-extraction.

The situation is compounded by increasing climate risks, in particular variability in rainfall, rising temperatures and desertification, so that traditionally rainfed dryland agricultural livelihoods have become more vulnerable. In the absence of effective groundwater water management, water table levels are likely to drop, this can cause crop failure and reduce or even eliminate sources of drinking water.

TIGR²ESS researchers evaluated the impact of strategies to manage groundwater in semi-arid dryland agricultural regions which cover nearly two-thirds of cultivated land in India. Their research focussed on a water budgeting tool's potential to build local capacity (at village level) for groundwater management.

The tool is a visual aid displayed in a public space in the village, keeping track of monthly rainfall, the consequent recharge in the groundwater levels, and an appropriate selection of crops for the water-balance.

Local champions are trained to measure and record rainfall received and the resulting recharge. If the recharge levels are low, the tool suggests farmers cultivate low irrigation demanding crops. In a year of

good rainfall they may revise their crop choices. The crops suggestions are the recommended by local agricultural extension agencies.

The tool informed a seasonal intensification or de-intensification plan subject to groundwater availability, reducing both the risks to farmers' income and of overexploiting groundwater.

Crop diversification is the dominant cropping pattern. Farmers endowed with more wells include a high value horticultural crop along with dryland commercial crops in their crop choice. Amongst farmers with high to medium irrigation needs, 31-42% perceived the tool as useful in planning the irrigation requirements.

This research shows the importance of local institutions, such as agricultural extension agencies, to groundwater governance. It highlights the need for dynamic interaction between governance systems and resource users, and for government policies to favour such strategies so that effective groundwater management is possible in the future.



“The demand for the development intervention should arise from the community”

**Senior officer,
Agricultural Extension Office.**

FUNDING CALL	Growing Research Capacity: UKRI GCRF
COUNTRY:	India
TITLE:	Transforming India's Green Revolution by Research and Empowerment for Sustainable food Supplies (TIGR ² ESS)
GRANT NO:	BB/P027970/1
LEAD INVESTIGATOR:	Prof Shailaja Fennell,
PARTNERS:	WOTR (Watershed Organisation Trust)
https://tigr2ess.globalfood.cam.ac.uk/	