TIGR²ESS
Transforming India's Green Revolution by Research and Empowerment for Sustainable food Supplies

4.2 A Policy Framework for Water Conservation Management informed by Archaeology

South Asia's unique combination of semi-arid and monsoonal environments has historically given rise to diverse cropping systems and water management strategies. TIGR²ESS researchers have shown that urbanisation in early cultures developed in association with a range of successful agricultural interventions. Importantly, understanding how water was stored and distributed from reservoir systems in the past can and has informed new policies for water management in the contrasting agroclimatic regions of Punjab, Haryana and Telangana.

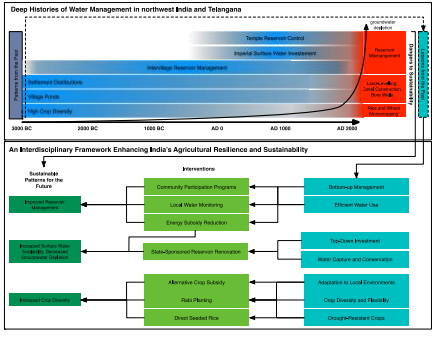
Semi-arid conditions favour diverse agricultural landscapes rather than monocultures

A rich and dynamic agricultural heritage emerged in northwest India over 5000 years in the past. Archaeological evidence indicates that past communities employed many combinations of cropping and water management strategies. An analysis of small water bodies ('village ponds') and irrigation in historical maps indicates that such systems endured until the more recent advance of intensive cropping strategies. One policy challenge is to attract investment for re-establishing elements of these heritage infrastructures, together with more diverse cropping systems, while ensuring that farmer income is protected.

Diversification scenarios require top down investment and buy-in from rural communities

TIGR²ESS researchers have found legacy data preserved on historical maps reveals key patterns in the distribution of ponds, tanks and wells prior to the Green Revolutions. Studies have identified a 75% reduction in the area dedicated to surface water storage in some of the most agriculturally productive parts of Punjab. Restoration and integration of some village ponds for use in agriculture could make a significant contribution to the groundwater deficit in these States.

Studies by researchers based at ICRISAT in Telangana have also identified evidence of massive reservoirs and irrigation systems that were constructed by the Kakatiya Dynasty 100 years ago. TIGR²ESS researchers have been wrking with communities to determine the role they could play in increasing water availability in the area, near Warangal, today. Together with the work in Punjab and Haryana, these TIGR²ESS studies have led to the development of a major interdisciplinary framework for sustainable production patterns, which is being adopted as Policy by State legislatures.



An interdisciplinary research team combined studies, developing a policy framework building on lessons from the past (Green et al., *Environ. Res. Lett.* **15** (2020) 105021)

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