

GROUNDWATER GOVERNANCE IN THE INDO-GANGETIC BASIN: INTERPLAY OF HYDROLOGY AND SOCIO-ECOLOGY IN INDIA

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Abstract only

The Indus-Gangetic basin covers a very large tract of fertile agricultural lands in India and the production surplus from this basin meets food deficits of several other populous basins of the country. Though blessed with a vast network of dams, canals and strong irrigation bureaucracy, the surface irrigation systems have lost their historical supremacy to the more informal, demand-based and equitable groundwater irrigation. However, the development, the use, the sharing and groundwater markets and the agricultural production and social benefits produced by the groundwater resource are not uniform and seem to depend heavily upon the prevailing hydrology and socio-ecology of the given region/ state in this vast basin. IWMI lead 'Groundwater Governance in Asia' project through its cross cutting research component conducted a number of focussed studies in the varying agro-eco regions of Punjab (Hoshiarpur), and Haryana (Kurukshetra) of Indus basin, and Uttarakhand (Haridwar), Bihar (Vaishali) and West Bengal (Hooghly, Burdwan, Bankura) states in the Ganges basin for better understanding of the groundwater governance issues and adaptations at the local level. In a hydrological setting where all the irrigation needs are met by groundwater (Hoshiarpur, Punjab) two distinct patterns of groundwater access, viz., shared wells and groundwater markets have evolved. Whereas a shared resource helped farmers to have equitable access to groundwater as well as improvement in crop and water productivity; even a very competitive groundwater market did not allow the water buyers to realize the same levels of water productivity as obtained by well owners who also made good profits by selling water from tube wells. The government policy of providing free electricity for the farm sector has provided incentives to the farmers to install additional tube wells leading to competitive exploitation by the farmers.

In most canal command areas, the inequitable and irregular canal water supply lead to shrinkage of canal irrigated area and groundwater irrigation is playing an important role (Kurukshetra, Haryana) and more so in tail end water courses (72-97 %). With the flat rate tariff regime of electricity the difference in cost of water for paddy and wheat is negligible, whereas amount of water used for paddy is 5-6 times higher than that of wheat. Compared to electric submersible pumps, the cost of water for diesel operated tubewells is higher by 7-11 times for paddy and 1.5 -2.0 times for wheat. The analysis showed that the gross margin was highest for basmati rice, followed by coarse rice and wheat and explained that under the prevailing flat rate of electricity and higher returns for paddy groundwater use shall continue to expand and water tables to further decline. There is an urgent need to look into this serious issue.

In the groundwater abundant state of Bihar, only about 36% of groundwater resources have been developed due to small and fragmented holdings, low number of water extraction mechanisms (WEM), high cost of energy and low investment capacity of small and marginal farmers (Vaishali district). Though the number of shallow tube wells has increased exponentially, the number of pump sets has not increased in proportion to the number of borings and economically backward farmers continue to extract groundwater through rented pumps, albeit at exorbitant costs. Further, most of the WEMs owners use purchased diesel as the motive power, the escalating diesel costs and high demand for irrigation has lead to rapid increase in water prices in the region. Even with abundant groundwater availability, inequity in ownership and access, non-existent rural electrification and rising energy costs have resulted in economic scarcity of groundwater and thus a very slow pace for its further mobilisation. Even the classical success stories of community tubewells in Vaishali is approaching its extinction due to weak institutional and policy support and overriding social dynamics.

Besides better understanding of these three widely varying interplay of groundwater hydrology and socio-ecology in the Indus-Gangetic basin the paper shall suggest suitable physical, socio-economic and policy and institutional mechanisms for sustainable groundwater governance in these settings of the basin.

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