

The second Green Revolution

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Just over a month ago, Ambassador Kenneth Quinn, the Chairman of the World Food Prize called me to say that I had won the Inaugural Norman Borlaug Award for Field Research and Application. I will receive this award later this week at a ceremony in Des Moines, Iowa. As the father of Green Revolution, Norman Borlaug is much loved and respected in India. So this news was covered by almost all major newspapers, from the Times of India and the Hindustan Times to the Economic Times and Dainik Jagaran.

I started working on groundwater and irrigation issues in 2001 when I joined the IWMI-Tata Programme in Anand, Gujarat. As a part of that work, I helped design a survey of groundwater users in South Asia and the survey results surprised me. I realised that groundwater economies in eastern India were very different from those elsewhere in the country. This made me curious and I wanted to understand the role of groundwater in the agrarian economies of eastern India better. So, when I went to Cambridge, I decided to work on policy and institutional issues regarding access to groundwater in West Bengal. After my PhD, I joined the **International Water Management Institute** in Sri Lanka and continued this work.

We found that, after showing high growth in the mid 1980s and early 1990s, West Bengal's agricultural economy had slowed down with an adverse impact on farmers' incomes and livelihoods. In recent years, it has barely registered 1% annual growth. The groundwater economy contracted too. For example, according to the Minor Irrigation Census, the number of groundwater wells declined by over 100,000 from 2001 to 2007 – entirely unprecedented in India. This is a paradox given that the same

minor irrigation census shows that in 80% of the villages, groundwater is available within less than 10 metres and that groundwater levels recover sufficiently after the monsoon season due to high rainfall (1,500-3,000 mm per year) and the alluvial nature of the aquifer [underground layer of water-bearing rock]. Yet, farmers found it difficult to pump water from aquifers for their crops. Why was this so?

We discovered that the reason was that farmers were facing high energy costs for pumping groundwater because of their dependence on diesel pumps and the fact that diesel prices have been increasing quite rapidly since the early 2000s. In West Bengal, only 17% of all pumps are electrified, compared to a national average of over 60%. The electrification of pumps would have been an easy solution, especially since West Bengal has been an electricity surplus state for a long time now. However, we found that farmers faced two difficulties in connecting their pumps to the electricity grid. First was the Groundwater Act of 2005 which required all farmers to procure a permit from the groundwater authority before they could apply for a connection. This process of getting a permit was fraught with red tape and corruption and often led to harassment of farmers by unscrupulous officials. And then, even if a farmer managed to get a permit from the groundwater authorities he had to pay the full capital cost of electrification of tube wells which was often much beyond the capacity of small and marginal farmers owning less than half a hectare of land.

We presented our research findings to Dr Mihir Shah, Member of the Indian Planning Commission, and with his help we took our results and recommendations to the top bureaucrats in Bengal. We suggested removing the permits system in all places where the groundwater situation is safe. We also suggested rationalising the capital costs of initial electrification. In addition, we suggested that funds from the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) should be used in a targeted manner for the excavation of ponds in districts with alluvial aquifers. The government accepted most of these suggestions. On 9th November, 2011, via an administrative order, the Secretary of Water Resources changed the law whereby farmers residing in safe areas and wanting to install pumps with less than 5 Horse Power would no longer require a permit from the groundwater department. Similarly, the West Bengal State Electricity Board has also come out with a circular saying that farmers will have to pay a one-time fixed cost for electrification and this cost will be around Rs. 10,000 or so. They will, of course, then continue to pay a metered tariff. Here, let me emphasise that West Bengal has one of the best agricultural electricity governance regimes in India. Unlike other states where farmers get free and unmetered electricity, in Bengal, electric pumps are metered and farmers pay quite high electricity tariffs for pumping groundwater. This gives them an incentive to make efficient use of groundwater and electricity.

With both these policy changes in place, it is expected that farmers will have easier access to groundwater and will be able to intensify their cropping systems, earn more and emerge out of poverty. Together these have the potential to drastically change the nature of agriculture in West Bengal and usher in a second Green Revolution. The state has 7 million land holdings, of which 5.6 million are less than one hectare in size and belong to small and marginal farmers. Thus the possible implications for agricultural output and poverty reduction of these two policy changes are huge. I also think that these policies are replicable in many parts of the eastern Indian states of Bihar and Assam with similar hydro-geological conditions. By providing timely, adequate and reliable irrigation, groundwater helps in reducing poverty.

Aditi Mukherji (<http://www.gatescambridge.org/our-scholars/Profile.aspx?ScholarID=3719&keywords=aditi&search=Search>) [2003] did a PhD in Geography and is currently a senior researcher with the **International Water Management Institute (IWMI) in New Delhi.*