

Farmponds for Horticulture: Boon or Curse? Analysing Impact on Farm Profitability, Resource Sustainability and Social Welfare

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Abstract

“Farm pond” is currently a topic of much debate in Indian agriculture. Farm pond is a dug out pond with plastic lining used to extract ground water and store it for use in scarcity months primarily for irrigating annual horticulture crops. It is very popular with farmers and is being promoted by the government on a large scale through subsidies. Some regard the farm pond as a miracle drought-proofing tool which enables farmers to invest in high-return orchards by ensuring provision of life-saving irrigation in summer months. Others consider it an unsustainable and exploitative tool that allows more affluent farmers to stock up a scarce resource at the cost of others. Most views and available studies of farm ponds in literature are only based on short term experiences. This paper offers a system dynamic analysis of farm ponds in terms of their hydrological, economic and social impact.

Farmers invest in farmponds where groundwater availability is uncertain in order to shift to cultivating high-value water-intensive horticulture crops. Attracted by the economic success of the initial adopters, more farmers build farmponds. However, farmponds have low efficiency as a significant amount of groundwater is lost to evaporation. As more farmers build new farmponds and change their cropping pattern, groundwater extraction exacerbates causing further uncertainty in groundwater availability. This first impacts the non-farm pond owning farmers forcing more of them towards investing in farmponds if they can afford to do so. As this cycle continues, ground

water levels fall to a level where eventually even the farmpond owning farmers are impacted due to high cost of water, thereby making everyone worse off compared to the initial state.

The model is based on extensive field work across several villages and combines hydrological modeling, economics and farmer strategies. We show that farm ponds initially offer great economic returns but this is so only as long as their number is within a limit that is governed by the hydrology of the area. We also show that it is unlikely that a state of equilibrium can be achieved at this critical sustainable threshold without regulation because economic incentives continue to drive farmers to invest in private farmponds even as groundwater levels fall thereby leading to the tragedy of the commons. Communication with communities and policy makers using models such as this is crucial to bring clarity to the contentious use of farmponds and impact policy.

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