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## Groundwater Depletion and Drip Irrigation as a Coping Strategy in Hard Rock Areas of Peninsular India

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### Abstract

Groundwater irrigation has been instrumental in achieving food security in the Indian economy. The investment in groundwater development and use has been increasing manifold since four decades. Currently groundwater resource in hard-rock areas is facing threat of overexploitation resulting in secular decline in water table. This has severely impaired the groundwater-based agriculture in the semiarid areas, where there is no assured source of perennial irrigation. Thus groundwater crisis has been persisting in different scale and affecting sustainability of groundwater based agriculture is at stake. This study pertains to hard rock area in eastern Dry Zone of Karnataka of India with groundwater as only source of irrigation. The village is located in proximity to Bangalore city and obviously influenced by urbanisation. The cropping pattern includes cereals, high value vegetables and mulberry a host plant for silkworms. Farmers follow intensive and improved agricultural practices, cultivating new varieties and adopting latest technologies. The intensification of agriculture in response to a strong urban market demand poses threat to groundwater overdraft. This has pushed the groundwater economy to a critical stage in the region. As a response to physical and economic scarcity of groundwater, farmers have been resorting to water use efficient irrigation technologies. The results indicate that, under drip irrigation system, in the case of tomato crop water can be saved to the tune of 23.5 percent over furrow irrigation. Similarly, for potato crop the savings in water was around 42 percent, while in the case of mulberry, it was around 47 percent. Under drip irrigation, the productivity differential is around 20 to 22 percent over furrow irrigation. The water use efficiency in terms of incremental output per acre inch of water used due to drip irrigation is very high in the case of mulberry compared to vegetable crops. The incremental returns accrued due to drip irrigation far exceeded the amortized cost of drip in both vegetables and mulberry. Similarly, the economic efficiency in terms of incremental returns per acre-inch of water is also very high. Drip irrigation induces both physical and economic efficiency exerts, and much lower pressure on groundwater, than at present.

**Keywords:** Drip irrigation, efficiency, groundwater, India