Abstract

Groundwater irrigation played an important role as an input in modern agricultural development. Groundwater irrigation has been instrumental in enhancing food security and mitigating poverty in developing countries. Groundwater irrigation provides opportunities to increase net irrigated area leading to increase in crop intensity and productivity thereby improving household welfare condition. However, groundwater irrigation also contributes to depletion of groundwater aquifers leading to negative outcomes such as socio-economic and environmental externalities. This study examined the level of groundwater use and its determinants on the farm and livelihood and environmental implications of groundwater over-exploitation using PRA approach in two taluks facing high and low well interference problem in Karnataka. The findings of the study are as follows: First, the groundwater irrigation promoted water intensive high value crops which are hydrophilic. Interestingly, short term food crops are consuming more water than perennial plantation crops. Hence, differential levels of groundwater utilization on the farm. Second, progressive lowering of water table was accountable for increasing cost of irrigation in both the areas resulted in declining net returns and loss of investment due to high rate of well failure. The progressive lowering of water table had severe impact on household economy due to its interlinkages with livelihood system. Agriculture continues to be one of the preferred livelihood strategies in all the study villages due to lower share of non-farm income which is characterised by low effective demand. However, low private net returns from well irrigation are worrisome in all these villages. Because of high probability of well failure, the debt burden of the household increased substantially. This had a spillover effect on the rural agrarian system. Third, in contrast to earlier studies, the brunt of resource degradation externality is borne equally by all categories of farmers. But small and marginal farmers suffer the most. As the problem of resource scarcity aggravates, the impact will be spread across all categories of farmers. This is due to competitive extraction by farmers. The replacement cost will be higher for medium and large farmers as they dominate in the ownership of bore wells. The concern of the small and marginal farmers due to negative externality is substantiated in the situation where the interference is apparent. The increasing inertia in resource management among users has worsened the resource stock in terms of bankruptcy of aquifers and increasing cumulative well interference. Fourth, the environmental problems of groundwater depletion suggest that there is an urgent need to strengthen the resource base by augmenting supply through proper mechanisms. Thus, groundwater resource management must go well beyond environmental impact assessment and minimise externalities to become an integral component of national and local action to improve the environment and human security. This not only promotes the quality of the environment but also improves the welfare of households, provides opportunities to expand their water dependent livelihood activities and enhances incremental gains from agriculture and allied activities.