

RAINWATER HARVESTING SYSTEMS TO RECHARGE DEPLETED AQUIFERS IN WATER SCARCITY REGIONS OF INDIA: CASE STUDIES

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Abstract

Groundwater is a primary source of fresh water in many parts of the world. Groundwater withdrawals can easily surpass net recharge in arid and semi-arid regions where people depend on fresh groundwater for domestic and irrigation needs. Pollution and mismanagement of surface waters can cause over-reliance on groundwater in regions where annual rainfall is abundant. Due to urbanization and rapid decline of groundwater, recharge pit and tubewells were constructed to harvest rainwater from the rooftop and pavements in the Vasant Kunj region, New Delhi which is underlain by the Aravali quartzite and a subsurface cum check dam was made across the Kalangi (ephemeral) River in the Sullurpet region which is located in semi-arid areas of Andhra Pradesh, India. The Kalangi River basin is occupied with crystalline rocks (granite and granitic gneiss rocks) of Archean age. Owing to over exploitation of groundwater and less rainfall in the past years in the Kalangi River basin, adjacent saline water from the Pulicate salt water lake has started intruding in the river subsurface, polluting the available fresh groundwater resources. To prevent this a subsurface dam cum check dam was constructed in the traditional manner by digging a trench across the Kalangi River and using local earth material near Sullurpet town and also a groyne was constructed at the confluence to prevent surface flow of Pulicate lake saline water into the Kalangi River bed. The water storage capacity calculated after the subsurface dam construction is 3 mcf at Holy Cross School. Watershed management systems would improve groundwater levels in the urban areas and augment base flow storage at the subsurface dam which ultimately facilitated domestic water supply and agricultural activities.

Keywords: Groundwater, urbanization, mismanagement, Kalangi river, check dam, rainwater harvesting.