International Journal of Agricultural Engineering, Vol. 4 No. 1 (April, 2011) : 113 -119

A Case Study :

Design of roof top rainwater harvesting system at CAET, Akola

V.G. NIMKALE, **H. SANCHAVAT** AND S.B. JAJOO

Received : January, 2011; Accepted : February, 2011

See end of the article for authors' affiliations

Correspondence to:

H. SANCHAVAT
Department of Renewable Engineering and Technology, College of Technology and Agricultural Engineering, Maharana Pratap University of Agriculture and Technology, UDAIPUR (RAJASTHAN) INDIA
Email : hiteshsanchavat@rediffmail.com

ABSTRACT

Groundwater is the great hidden component of the hydrological cycle. The depleting resource of ground water is matter of great concern to human society. Though ground water is renewable resource but it has also reached to critical stage, therefore, its appropriate management has assumed great significance. Hence, along with natural recharge, all possible means of artificial recharge should be used with different technologies and methods available. The rainwater harvesting technique is important which was adopted in this study. Building of College of engineering and technology, Akola was selected for design of roof top harvesting system. In this study, the total rainfall collection in recharge pit, cost of construction of system per m^2 of slab area, recharge cost per m^3 of water and the total area of CAET building and the estimated volume of water recharge under study were calculated. If we design recharge pit considering 40 mm rainfall depth, 82.58 % of total rainfall will be collected in recharge pit. Cost of construction per m^2 of slab was Rs. 2.78/- and recharge cost of m^3 of water was Rs. 0.88/-. The total area of CAET building was 5403 m^2 and estimated annual volume of water recharge from this area was 3414.76 m^3.

Nimkale, V.G., Sanchavat, H. and Jajoo, S.B. (2011). Design of roof top rainwater harvesting system at CAET, Akola. *Internat. J. Agric. Engg.*, **4**(1) : 113-119.

Key words : Rain fall intensity, Water harvesting

In most of the area the water supply sector is facing number of problems and constraints. The rapid pace of growth of population and consequent urbanization has led to stress on available water resources due to over use of surface supplies and over exploitation of ground water. Dependence on ground water, to meet various requirements is so heavy that water levels are declining rapidly so dug wells and bore wells are even drying up. Failure of monsoon makes the situation worse (Murthy *et al.,* 2000). As surface water sources fail to meet ever increasing demands, ground water resources are tapped, often unsuitable levels. The rapid urbanization has also introduced reduction in original permeable ground surface for natural recharge of rainwater (Rao *et al.*, 2000).

The imbalance between excess withdrawal of ground water and the insufficient replenishment of ground water adversely affected the water table. This is controlled to some extent by adopting used of every drop of water judiciously, efficiently and water recharge techniques. Along with the natural recharge, all the possible means of artificial recharge should be used with different technologies and methods available (Mehta *et al.,* 2008) The roof top rain water harvesting system is one of them and adopted here. In order to harvest, the roof of the building college of Agricultural Engineering and Technology, Akola was considered. The Average annual rainfall of Akola is 790 mm. For study the daily rainfall data of 33 years of Akola were analysed, interpreted for design of RWH system at college (Taneja *et al*., 2003).

Rainfall analysis:

Daily rainfall data for the period from 1971 to 2003 were collected from Meteorological department, Dr. PDKV, Akola. The annual rainfall of the area is 790 mm, which is received nearly in 36 days concentrated over the months June to October. To design the roof top rainwater harvesting system, daily rainfall were analyzed on following lines. Distribution of daily rainfall amount. Average rainfall depth in different intensities during June to October. Then decide the depth of rainfall to be considering for the design of recharge pit.

Distribution of daily rainfall:

The daily rainfall of 33 years period (1971–2003) during different months of rainy season were analysed and classified the distribution of daily rainfall amount. The Table 1 indicates distribution of daily rainfall amount of Akola during *Kharif* season. Daily rainfall amount is