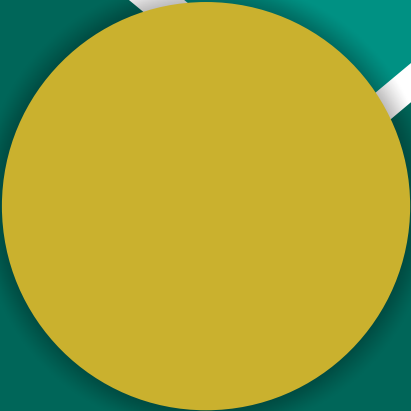


# Rain Water Harvesting for Groundwater Recharge



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Groundwater is contributing to meet more than 50% of crop water requirements in Pakistan, however, depending on climatic conditions and river supplies. On an average, groundwater is being pumped at the rate of 40 to 50 MAF annually, which has resulted in falling of water table at the rate of 1 to 2 m annually; deteriorating its quality, causing secondary salinization, and becoming inaccessible due to increasing cost of pumping. Therefore, there is a dire need to sustain the falling

groundwater levels through artificially recharging aquifer. Groundwater can be recharged in the urban as well as in the rural areas using rainwater.

Average annual rainfall is 380 mm in Faisalabad. Currently rain water becomes part of the sewage water and is conveyed to the drainage system. The pressure on the sewerage system can be reduced by recharging ground water in urban areas as our sewerage system does not keep the capability to handle the both rain water and sewerage water. The quality of rain water is mostly acceptable and can be used directly to recharge the groundwater. Recharge, however, depends on many factors such as quality of injected water, its availability and subsurface lithology.

Keeping in view the above looming scenario of managing rain water as well as recharging groundwater, a rainwater harvesting system has been designed and installed at main campus, University of Agriculture, Faisalabad. The aim is to collect rainwater from the roofs to recharge the groundwater.

## Components of Rainwater Harvesting Setup

Followings are the main components of rainwater harvesting system

1. Catchment area
2. Conveyance pipe (PVC)
3. Downpipe (PVC)
4. Plastic storage tank



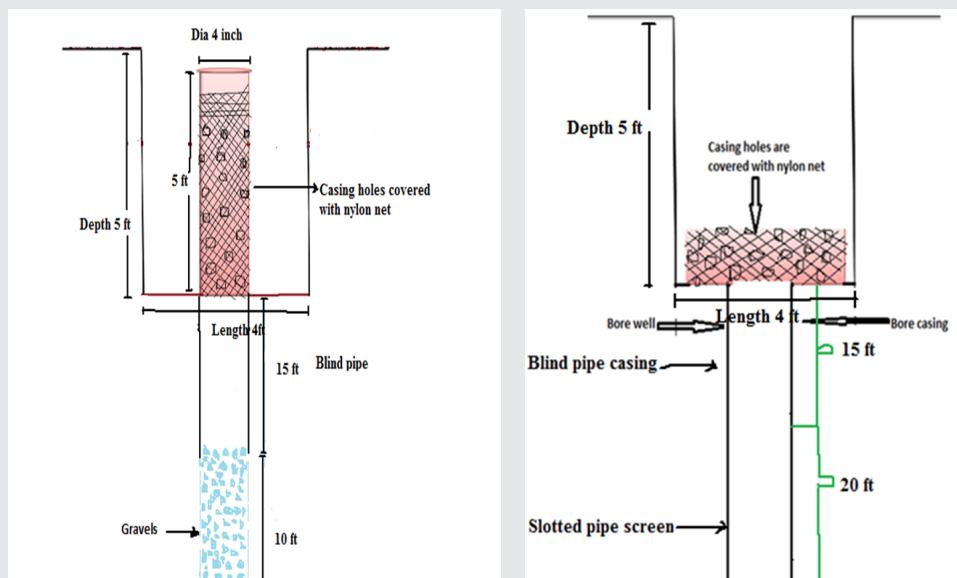
Conveyance pipe around the roof



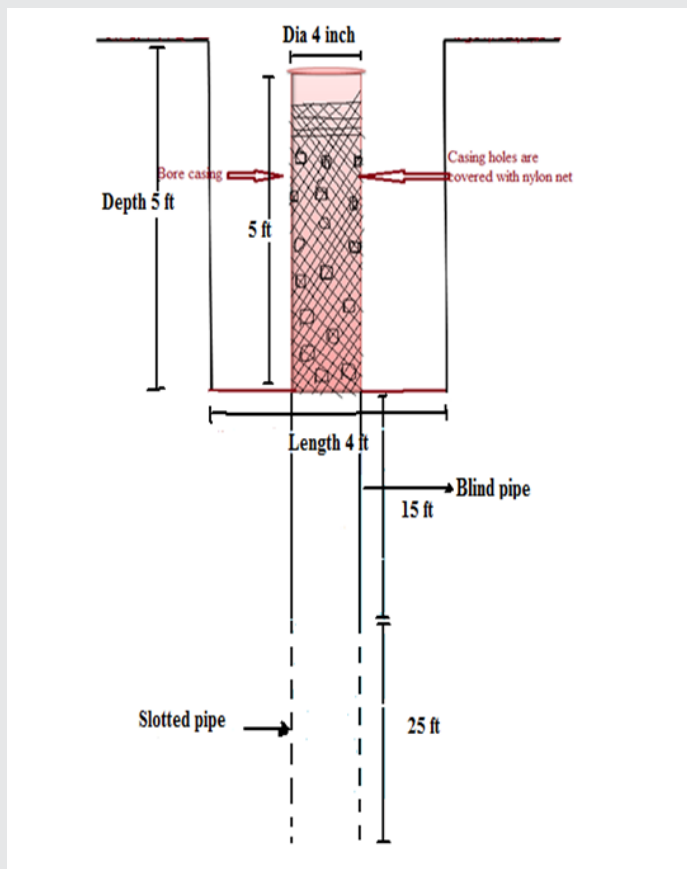
Rain water storage tanks

## Recharging Mechanism:

These are three recharging wells at different depth, detail is given below:



Recharge pits with bore well No.1 and well No.2



Recharge pit with bore well No 3 and rainfall data over years

## Findings:

The 31 years (1983 to 2013) data analysis revealed the following:

- Faisalabad has normal average annual rainfall of 380 mm.
- Maximum daily rainfall of 102 mm was observed having 32 year return period.
- The occurrence of maximum one day rainfall events were found to be 9% in June, 50% in July, 37% in August and 4% in September.
- Both the storage tanks of 2000 gallon capacity were filled with rainfall of just 17 mm over roof area of 627 m<sup>2</sup>.
- Average rainwater harvesting coefficient varied from 0.6 to 0.70 depending on rainfall intensity
- The well No.1 having 15ft blind pipe with 10 ft gravel filled showed recharge rate of 6.5 lpm.
- The well No. 2 having 15 ft blind pipe with 20 ft perforated pipe had recharge rate of 47 lpm.
- The well No. 3 having 15 ft blind pipe with 25 ft perforated showed recharge rate of 52 lpm