

**Marathwada Shikshan Prasarak Mandal's
DEOGIRI COLLEGE, AURANGABAD**



REPORT ON ARTIFICIAL RECHARGE OF BOREWELL

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Artificial recharge of Bore well / dug well:-

The area in which Aurangabad is situated suffers from drought conditions frequently. As this region comes under shadow zone, it faces the problems of low rainfall. The average rainfall is only 700mm. The frequent conditions of scarcity of water compels for best management of available water. As a result, Rain Water Harvesting unit is established in the college. The Rainwater Harvesting & Water Management program in Deogiri College Campus is one of the ideal projects of Rainwater Harvesting in this region, the harvested water is artificially recharged into the dug well.

Deogiri College has total area of 12.5 hector i. e. 550000 sq. feet of land area; hence if there is average rainfall of 600mm, the total amount of harvested rainwater in groundwater is 33 million liter. In campus, we have divided rainwater harvesting scheme into two divisions. Roof water harvesting in particular building is carried out. Roof water is collected in horizontal pipes & all the pipes are connected to a large pipe (10 inch) that carries water to the dug well. On the days of high rainfall up to 90 to 100mm per day water is harvested in the dug well. The surplus water increases pressure due to which, water goes into rocks through cracks & joints present in subsurface rock. It is the reason that there is no overflow of rainwater from dug well as subsurface rocks porosity is high so in this process, all roof rainwater is directly percolated in subsurface of rocks. In this way, groundwater potential & water table of area are increased.

Second method of harvesting is surface rainwater recharge. For this purpose we have divided total campus area into three parts depending upon slope of surface. According to this method, three recharge pits are constructed having size of 15x15x10 feet. They are filled with boulder at the bottom, metal up to 3 feet above and then large size of sand 3 feet making a filter bed. First pit is constructed near Dug well in NW corner of campus in which surface water of Senior College Campus, Biotech Campus, Ladies Hostel & parking area is accumulated through subsurface drainage line. Second filter bed is constructed in south part of campus near Junior College gate. There is a bore-well constructed & around which filter bed of size 15x15x10 feet is constructed in which all Junior College surface area water is directed to. Third filter bed is made in SE corner of campus behind engineering workshop where water from the Engineering College is accumulated. In this way, the college saves 33 million liter water in college campus. The water collected in pits artificially recharges the dug well/Bore well which increase the ground water table level.

This is one of the best and ideal Rainwater Harvesting plan in our region. Large no. of farmers, people, school students& researchers visit the college to see this plan. Due to this harvesting during drought year 2013, the two electric pumps of 7.5 HP & 5 HP were continuously yielding water from dug well in summer when maximum dug wells in the region become dry.



**Principal
Deogiri College,
Aurangabad.**



Fig 1:- Recharge Filter bed (15x15x10)near Dug Well



Fig 2:- Recharge Pit of 5x5x7feet near Bore Well



Fig 3:- Dug well in the campus



Fig 4:- Roof water harvesting of College building for artificial recharge of bore well / dug well



Fig 5:- Roof water harvesting of College building for artificial recharge of bore well / dug well



Fig 6:- Roof water harvesting of College building for artificial recharge of bore well / dug well



Fig 7:- Roof water harvesting of College building for artificial recharge of bore well / dug well



Fig 8:- Roof water harvesting of College building for artificial recharge of bore well / dug well



Fig 9:- Pits for roof water collection



Fig 10:- Roof water harvesting of College building for artificial recharge of bore well / dug well



Fig 11:- Roof water harvesting of College building for artificial recharge of bore well / dug well



Fig 12:- Roof water harvesting of College building for artificial recharge of bore well / dug well



M.S.P. Mandal's
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Rain Water Harvesting Project

Total area of Deogiri College campus = 12.5 acres
Total average annual rainfall = 600mm
Total Water Recharge = 33 Million Liters

Geology of the area:

The basaltic lava flow belonging to the Deccan trap is the only major geological formation occurring in Aurangabad. Deccan basaltic flows mainly compact amygdaloidal basalt flows occurs mainly in college campus and the upper layer consists of vesicular and amygdaloidal Zeolitic basalt while the bottom layer consists of massive basalt. The lava flows are individually different in their ability to receive as well as hold water in storage and to transmit it. The difference in the productivity of groundwater in various flows arises as a result of their inherent physical properties such as porosity, permeability & transmissivity. The groundwater occurs under water table condition and is mainly controlled by the extent of its secondary porosity i.e. thickness of weathered rock and spacing of joint and fractures.

In college campus the central part is unsuitable for groundwater artificial recharge due to its hard and compact nature. The NW corner and SE corner of college campus are suitable zone for recharge due to passing of dykes from SE corner and highly weathered sheet jointed basalt in NW corner of campus. Hence dugwell in NW corner of college campus is the most suitable site for artificial recharge in which all surface and roofwater of campus is successfully recharged by using filtered bed.

Methodology:

In campus, we have divided rainwater harvesting scheme into two divisions. In first method roof water is collected through in horizontal pipes & all the pipes are connected to a large pipe (10 inch) that carries water directly to dugwell. Second method of harvesting is surface rainwater recharge. For this purpose we have divided total campus area into three parts depending upon slope of surface. According to this method, three recharge pits are constructed having size of 15x15x10 feet. They are filled with boulder at the bottom, metal upto 3 feet above and then large size of sand 3 feet making a filter bed. First pit is constructed near Dugwell in NW corner of campus in which surface water of Senior College Campus, Biotech Campus, Ladies Hostel & parking area is accumulated through subsurface drainage line. Second filter bed is constructed in south part of campus near Junior College gate. There is a borewell taken & around which filter bed of size 15x15x10 feet is constructed in which all Junior College surface area water is directed to. Third filter bed is made in SE corner of campus behind engineering workshop where water from the Engineering College is accumulated.

The two electric pumps of 7.5 HP & 5 HP is continuously yielding water from dugwell in summer when maximum dugwells in the region become dry.



Recharge Filter bed (15 x 15 x 10) near dugwell



Recharge Pit of 5 x 5 x 7 feet near borewell



Roof Water Harvesting of College Building



Effect of Artificial Recharge in dugwell

Fig 13:- Information bulletin for rain water harvesting project




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