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WATERSHED MANAGEMENT FOR MALAVALI VILLAGE

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Abstract

Rapid industrial development, urbanization and increase in agricultural production have led to freshwater shortages in many parts of the Pune district. The availability of groundwater is extremely uneven, both in space, time and depth which will be the case in future also. The present study concerns the impacts of a change in the rainfall regime on surface and groundwater resources in watersheds of Pune district during 2001 to 2012. First, the catchment area is where the part of the land contributes its share of rainwater. Second, the storage is the place where runoff water is held or collected. Third, the target or cultivated area is where the harvested water is used.

Keywords:Rainfall Analysis, Groundwater Fluctuations, Water Resources Development, Runoff control.

1. INTRODUCTION

Strom water collection through impervious surface, is now leading to a great source of watershed management. The studies include recharging the underground are, showing detectable degradation of stream water, river, and reservoirs. This drive where held under the responsibilities of municipal officials. On of motive and key goal of this project was to generate information from nearby locality

1.1 Characteristics of the Study Region

1.1.1 Data Used

Project**Malavali** is a medium size village located in Velhe Taluka of Punedistrict.The total geographical area of village is 283 hectares

1.1.2Specifications:-

Elevation / Altitude**:** 549 meters. Above Sea level. The Average Annual Rainfall 3359 mm Average Annual Temperature 24.2 °C.

1.1.3 Daily Rainfall Data

The Malavali lies on 613m above sea level the climate is tropical in Malavali. Most months of the year are marked by significant rainfall. The short dry season has little impact. The average annual temperature in Malavli is 24.2 °C | 75.5 °F. Precipitation here is about 3359 mm | 132.2 inch per year .The precipitation varies 1411 mm 56 inch between the driest month and the wettest month. The variation in temperatures throughout the year is 7.2 °C | 45.0 °F.

1.1.4 Soil profile

Loam is a combination of sand, silt, and clay such that the beneficial properties from each is included. For instance, it has the ability to retain moisture and nutrients, hence, it is more suitable for farming. This soil is also referred to as an agricultural soil as it includes an equilibrium of all three types of soil materials being sandy, clay, and silt and it also happens to have hummus.

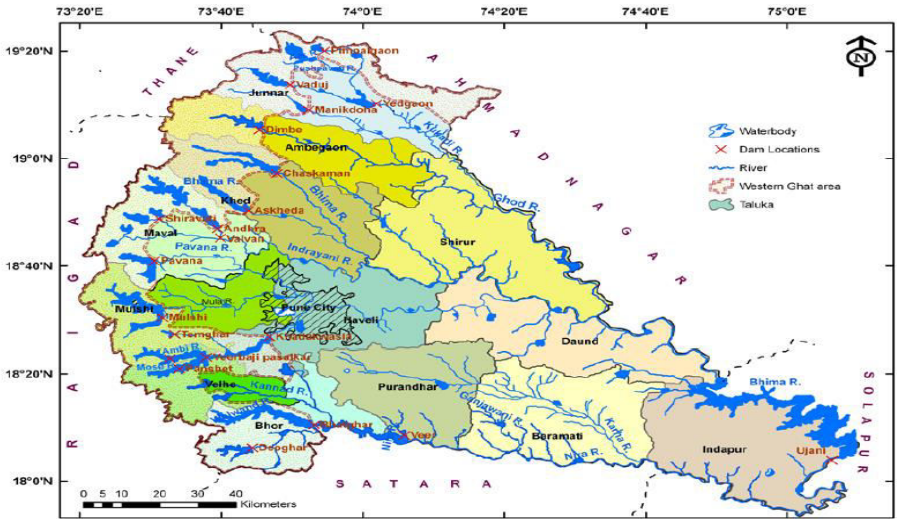


Fig1: Pune District Map Showing Talukas and Major River System

1.2 Methodology

1.2.1 Preliminary Survey

Water streams can be used as a potential runoff Accumulation in wet season to fill up the contour trenches besides using its spacing area. To be able to do it, one may divert the seasonal creek by constructing a dam so that it may overflow to the trenches site. Similarly to the seasonal creeks, temporary roads are Beneficial to accumulate runoff although in a smaller scale and in a shorter period compare to the creeks. Besides, gullies might also increase surface runoff in small scale. Therefore, these water streams are highly to be considered.

2 TEST TO BE PERFORMED

2.1 Moisture Content

The soil moisture content of soil is the quantity of water it contains. Water content is used in a wide range of scientific and technical areas and is expressed as a ratio.

Moisture may be present a adsorbed moisture at internal surface and as capillary condensed water in small pores. At low relative humidity's moisture consists mainly of adsorbed water. At higher relative humidity's liquid water becomes more and more important, depending on the pore size

TABLE NO1: Moisture Content

Description	Sample1 (in gr)	Sample2 (in gr)
Weight of container(W1)	11	11
Weight of container + wet soil(W2)	21	18
Weight of container + Dry soil(W3)	17.75	16.5
Weight of moisture content (W2-W3)	3.25	1.5
Weight of Dry soil (W3-W1)	6.75	5.5

W2-W3X100

_____ =37.72%

W3-W1

2.2 Specific Gravity Test

Specific gravity is the ratio of mass per volume. It is very important for beach and everything including soil. Since soils bare the foundation of all buildings and bridge and roads bit must be determined first in order to know the physical property how strong the sol is to make use of it for building purpose.

That is why ground investigation is carried out with drilling as below as 60-70m down the surface and tested for the condition of soil including specific gravity.

TABLE NO2: Specific Gravity Table

Description	Sample(gr)
Weight of pycnometer	633
Weight of pycnometer Soil	849
Weight+pycnometer+soil +Water	1692
Weight of pycnometer +Water	1590

(W2-W1)

(W4-W1) - (W3-W2)

(849-633)

(1590-633) - (1692-849)

Specific Gravity = 1.8

Fig 2: Soil Sample Collected

3 TECHNIQUE AND TYPES

There are various technique used for groundwater infiltration and for recharging of ground water.

A. Contour Trenches

B. Gully Plug

3.1 Contour Trenches

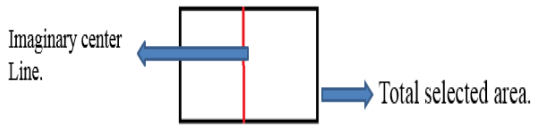
At its simplest, contour trench construction is an extension of the practice of ploughing fields at a right angle to the slope. Contour trenches are ditches dug along a hillside in such a way that they follow a contour and run perpendicular to the flow of water. The soil excavated from the ditch is used to form a berm on the downhill edge of the ditch. The main purpose of contour

trenches are reduce surface water flow velocity, promote infiltration, and prevent pollutants from draining into water bodies (suspended sediments, nitrogen, phosphorous).The measurements of each trench: 60 cm wide x 30 cm deep.

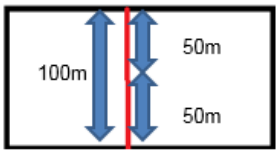
Step By Step Procedure of Contour Trenches

Step 1

1. Select the area where we want to dug trenches.
2. **Note**:- The area should be sloping ground.
3. Then draw a center line with white powder as shown in figure.

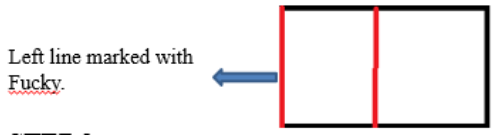


4. Know keep the HYDRO MARKER on centerline and check the sloping ground. **Note:-** these sloping center are important because on these the contour lines are depend. And it should not exceed 50m if exceed 50m then mark the point in slots that is 50,50 etc. as shown in figure.



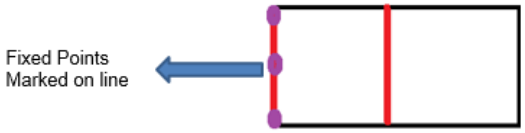
Step 2

Know mark the left line from center with white powder as shown in figure.



Step 3

Know measure the left line with the help of measuring tape and divide the line with some fixed



There is some standard distance recommended to divide the line. Shown in table.

SLOPE	DISTANCE
0-4%	10 m
4-8%	8m
8-15%	6m
15-33%	4m

Step 4

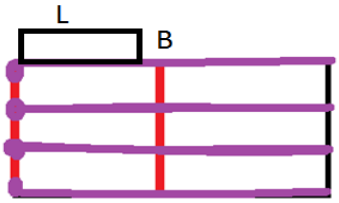
With the help of hydro marker mark the contour lines from each point marked towards center line and Till end line. As shown in figure

SLOPE	DISTANCE
0-4%	100M
4-8%	50M
8-15%	30M
15-33%	20M

Step 5

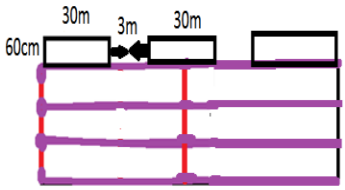
1st contour line

1. Know from first point mark the Standard trench size (LxB).
2. **Note**:- the trench should be marked above contour line from 1st point. As shown in figure.



3. The standard **length** sizes of trench are recommended.

SLOPE	DISTANCE
0-4%	100M
4-8%	50M
8-15%	30M
15-33%	20M

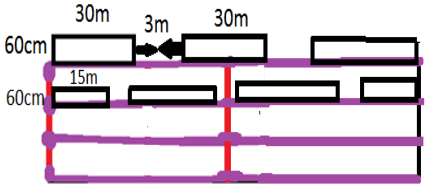


Note:-Breadth size is as 60 cm always Mark the trench with a distance of 3 m in each trench.

Step 6

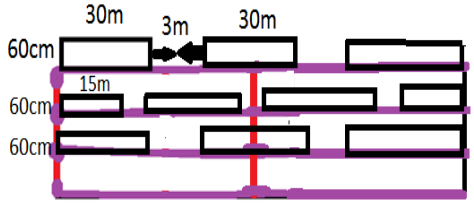
2nd counter line**.**

Mark the trench from 2nd point half of the 1st trench as shown in figure.



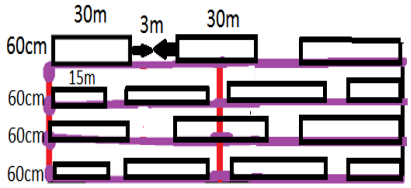
Step 7

3rd contour line same as 1st contour line

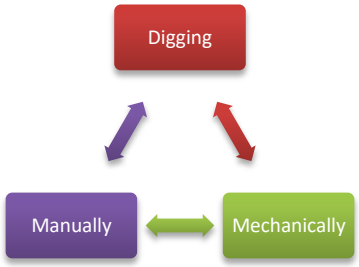


Step 8

4th Contour Line Same as 2nd Contour Line



STEP 9 Digging



3.2Gully Plug

Gully plugs, also called check dams, are mainly built to prevent erosion and to settle sediments and pollutants. Furthermore, it is possible to keep soil moisture due to infiltration. Depending on the topography, amount of precipitation, material and financial resources available, there are several methods to construct a gully plug. They havetobe inspected regularly and any damages must be repaired.

Basic design principles-The size and shape of a drainage area, as well as the length and gradient of its slopes, have an effect on the run-off rate and amount of surface water. Therefore, all topographic characteristics should be studied in detail before gully-plugging work begins. There are several designs for how check dams should be constructed. The kind of gully plug that should be constructed depends on the local situation (what kind of material is available, slope gradient, is it a permanent solution, what tasks are intended). In gully control, temporary structural measures such as

Fig no 3 gully plug

4 Result And Discussion

TABLE NO1- Every soil has some moisture content in it itself. Soil sample collected from malavali is clayey loamy soil. Which has moisture content of 37.72%?

TABLE NO2- The specific gravity of soils and soil refers to the mass of solids in soil compared to the mas of water at the same volume. The soil sample collected has specific gravity of 1.8.

FIG NO1- Fig shows the map of various districts showing representation of Water body, Dam location, River, Western Ghats areas, Talukas.

FIG NO2- Fig shows the soil sample collected from malavali village for performing various test.

FIG NO3- Fig shows gully plug acting as barrier for water.

CONCLUSION

By Doing This Technique The Ground Water Table Is Being Increasing. Specific Gravity of the Soil Was Found to Be 1.89%.Content Of Water in Soil Collected from Village Is Found As 6.75mm.

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