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"Analysis Of Water Balance and Its Effect on Tube well Efficiency"

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Abstract – *Malgaon is located in latitude 16⁰52′05.8″* N, *74⁰42′55.8″ E. The Malgaon Grampanchayat, which is located near the lake, is in charge of this lake. The lake has a surface area of roughly 4,225.00 Sq.m. The canal water flows from the north-west side of the lake, which has an uneven shape. The north-east corner of the lake is bordered by building, and the rest of the lake is surrounded by highways.*

1.INTRODUCTION

Lakes are either natural or manmade. Lakes are important part of ecosystem and play important role in microclimatic control, perform various environmental, social, economic functions. The water level is one of the most essential determinants of the distribution. The importance of lake morphometry in understanding the ecology of lake systems has long been recognized. For individual lakes that are the focus of research and management, bathymetry surveys are some of the first data collect.

From this data volume is usually calculated using bathymetric contour maps and planimeters. Lake volumes can also be estimated with modern GIS methods if maximum depth is known. From by the study of research paper it is possible to calculate changes in elevation surrounding lakes, which is likely similar to the change in depth within lakes as the same processes formed the surroundings topography and the lake basins, thus we assume that lake basins surrounded by steep topography are likely to have a steeper slope and greater changes in depth.

Table -1: Introduction to Malgaon Lake

Name of Lake	Malgaon Lake
Location	Malgaon
Area	4,225.00 Sq.M
Type	Natural Lake
Irrigation Source	No
Source Of Drinking Water	No
Tourism Potential	Good

2. METHODOLOGY

2.1 Public Data Survey

To analyze the current state of Malgaon Lake, a detailed public survey was carried out. The available literature on lakes was examined in order to have a better grasp of the subject. The questionnaire based on the lake and its effects was prepared. Various people's perspectives on the lake's water were collected.

2.2 Field Survey

The majority of mapping surveying is done with total stations. To determine how much more water can be stored in the lake, all data was collected, including the lake's area, surrounding elevations, exact depth of the lake, and volume.

2.3 Procedure

RL points are determined after a total station survey. The water levels at these locations are known. AutoCAD creates contours, and the area covered by these contours is calculated.

To calculate the volume of a lake, various stages and procedures must be performed.

- Counting squares with the same method. Calculate the area located within the various individual contour lines by placing a grid of small squares on a bathymetry chart of the lake.
- The next stage is to compute the water volume layer by layer, beginning with the top layer. The top and bottom of the first layer (A top and B bottom) (A bottom). Fill in the blanks using the equation supplied.

Equation

V=h(Atop+Abottom) +in square root (Atop x Abottom) /3

- After calculating the volume of the top layer, use the same method to determine the volume of the second- deepest layer, and so on for each layer of the lake.

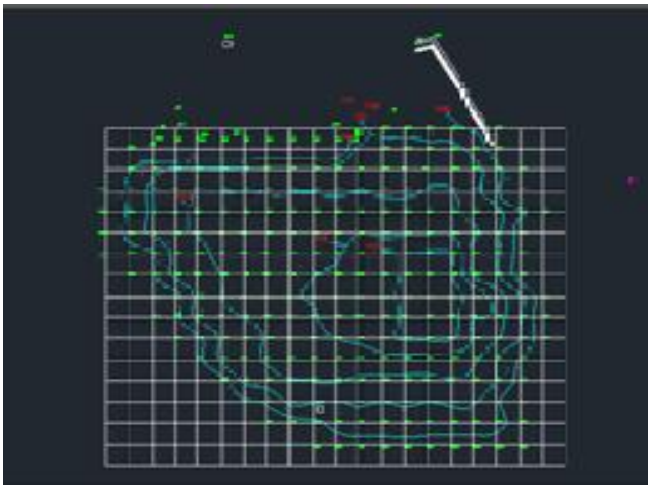

Fig -1: Contour map of Malgaon Lake

2.3 Calculation

By using above procedure, we get the following volumes:

1. V1=1559.76 cubic meter.
2. V2=1044.62 cubic meter.
3. V3=417.47 cubic meter.
4. V4=86.81 cubic meter.

Total volume of lake is 3108.66 cubic meter.

To calculate capacity of lake in liters

Formula-

=L(m) x W(m) x D(m) x 1000 liters/(cubic meter)

=Volume x 1000 liters

=3108.66 x 1000

=31,08,660 liters.

When completely filled with water.

- Water available at current situation

  H=10 feet = 3 m

  Hence the volume of lake = 2447.65 cubic meter.

  Water available at current situation is 24,47,650 liters.

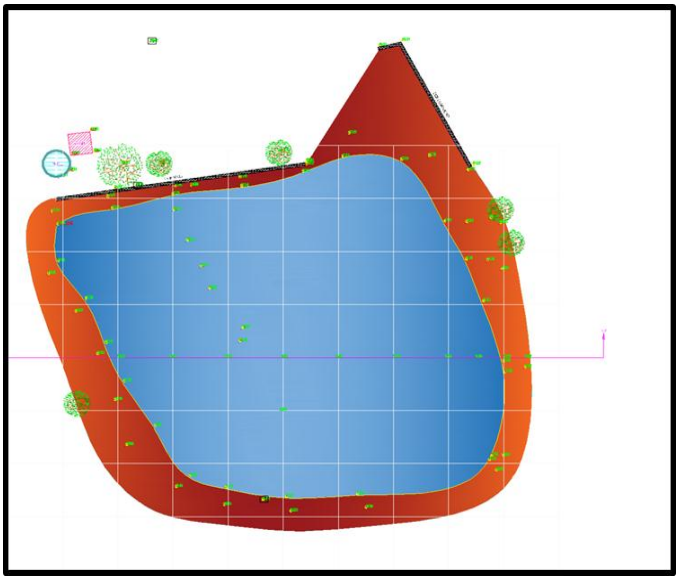

Fig -2: Topography of the Malgaon lake

Watershed area filled with water during the survey

Surrounded area of Malgaon lake

Need of Research

When the depth of lake is increased it will automatically affect the capacity of lake hence more water will be stored in the lake. But no one has focused toward this topic so there was not enough data available if anyone plan to do such work in future. That's why we have decided to work on this and providing all the necessary data to the gram panchayat of the village. It would be very useful for them in future.

3. CONCLUSIONS

According to nearby people's opinions, villagers face water scarcity problem during summer season. So, to overcome this problem the depth increment is much necessary. After increasing the depth of lake by 20% to 40% automatically capacity of lake will be increased hence water scarcity issue of village is solved.

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BIOGRAPHIES

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2nd Author Photo	**Miss. Rutuja B. Kamble** is presently final year civil engineering student with strong academic background.
3rd Author Photo	**Miss. Asiya M. Pirjade.** is presently final year civil engineering student with outstanding academics.
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