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MONITORING AND GIS MAPPING OF GROUND WATER LEVEL, NATEGAON AREA, KOPARGAON.

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Abstract:- *The global awareness regarding the over exploitation of the limited resources, at the expense of causing severe damages to the ecological system and environmental degradation resulted in evolving methodology for optimum land and water utilization. These necessitate an integrated approach for the optimal development of available resources minimizing hazards to environment. Nategaon is a developing village in Tal-kopargaon, Dist.-Ahmednagar,Maharastra, in India. Groundwater is a major source of water supply for the area which is reflected by regular extraction of groundwater through ever increasing number of municipal, industrial and private bore wells. Monitoring of Groundwater levels and quality is useful to understand the impact of uncontrolled drilling of bore wells, point and Non point sources of pollutants. Such studies provide early indicators of changes in groundwater resource and help to understand how to protect it. Interrelated nature of land and water resources invariably call for the integrated development of total resources available in a sustainable manner with watershed as a basis hydrological unit for development planning. GIS map showing groundwater depth and level are developed and compared with surface relief map. These maps are very useful for urban planning and sustainable groundwater usage.*

Key words: *GIS, Mapping, Ground Water Table.*

Introduction

India is the largest groundwater user in the world groundwater has to play a significant role in the India's economy, environment and standard of living. The Government has no direct control over the ground water use of millions of private bore well owners both in rural and urban areas.

Hence according to that problem we are decided to work on the project **"Monitoring and GIS mapping of ground water level"** for that we are selecting Nategaon region, This area always suffering from water scarcity, drinking water problem in every summer season. And also adversely effects on yield of crop, industrial area also facing the same problem of shortage of water.

It is need of the day to know about water level in bore well, this will be useful to know the availability of water according to that we are planning water management to overcome the scarcity of water

Objectives:

1) To locate the geographical locations of the study points.
2) To find out water levels for various open wells in a selected area.
3) Mapping of study area using QGIS.

Study Area:

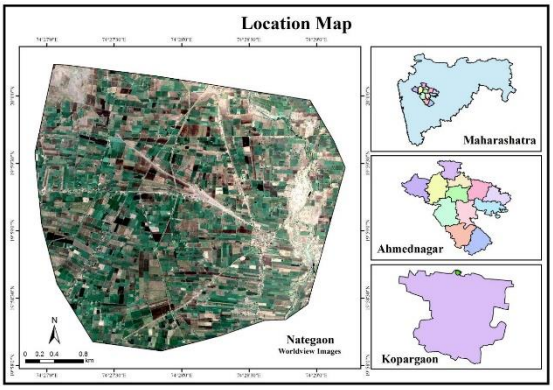


Fig.1 shows the field measurement

Nategaon is village in kopargaontaluka in Ahmednagar in district of maharastra state, India. It belongs to Nashik Division. It is located 118km towards north from district headquarters Ahmednagar and 13 km from kopargaontaluka and 233km from state capital Mumbai. The latitude 19.98215 and longitude 74.47664 of the geo co-ordinate of the Maharashtra.

Data source:

1) Nategaon area map
2) Nategaon village information.
3) Data used and Software, Instrument.
   a) GARMIN GPS-60
   b) Google Earth pro
   c) QGIS

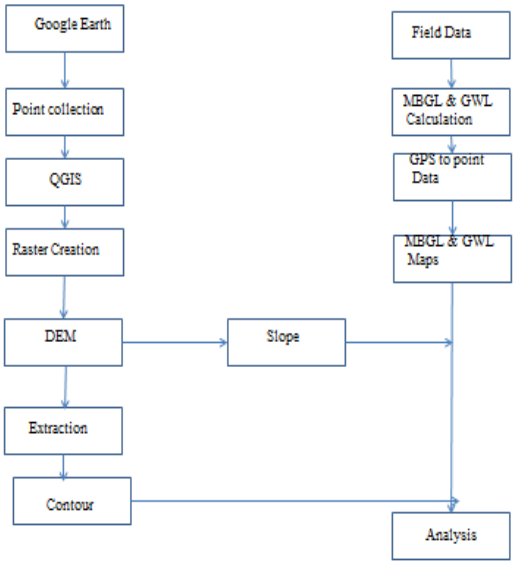
METHODOLOGY:

Based on field observation 43 Open wells were selected forgroundwater depth measurement. The selected bore wells are distributed throughout the city with one bore well located in each municipal ward. Spatial coordinates of the sampling bore wells were measured on site using a hand held global positioning system (GPS) instrument GARMIN GPS-60.Groundwater depth of the sampling bore wells were measured during Pre monsoon season in the year 2017. Method consists of partially opening cover of the bore well/ hand pump and inserting a rope attached with a weight (spanner) at the lower end, through the casing of the bore well. This method is similar to the standard procedure described for measuring groundwater depth using a steeltape.

Fig.2 shows the field measurement process.

Depth to groundwater level was measured in meter with the casing of the well as reference point and then deduced to exact ground level. Google earth is used to register ground level profile of the study area and ground level above mean sea level of the sampling bore wells. The groundwater level in MSL was obtained by deducting groundwater depth from the ground level in MSL.

The same work we carried out with the help of Google earth pro and QGIS.



1. **Flow chart of Methodology**
2. Steps to be performed for mapping. Google Earth images in QGIS 2.8 with OpenLayers Plugin.

The steps to do this are :
1) Localize and download the image from Google earth Pro.
2) Install the Open Layers plugin in QGIS (if it is not installed)
3) Add the Google Satellite layer of the Open Layers plugin to the QGIS map.
4) Open downloaded image in the QGIS Georeferenced.
5) Add control points the image using similar points in the Google Satellite layer….
Geo referenced images can be used in QGIS or other software like ArcGIS

Results and Discussion:

- This Map shows the exact location of study area.
- These map we have plotted with help of Google earth,
- in which we have get Lat, Long, Elevation of study area
- In these we have plotted DEM OF whole Nategaon village
- Using QGIS SOFTWARE.
- This map shows the 3D view of terrain surface.
- These map we have used for only taking info. About the
- Variation in ground level, and finding the height of G.L.

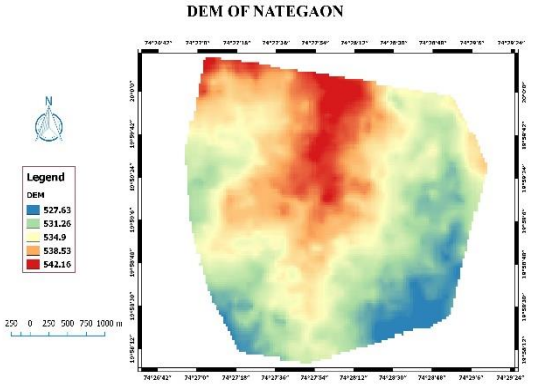


Fig No 3:- DEM Of Nategaon

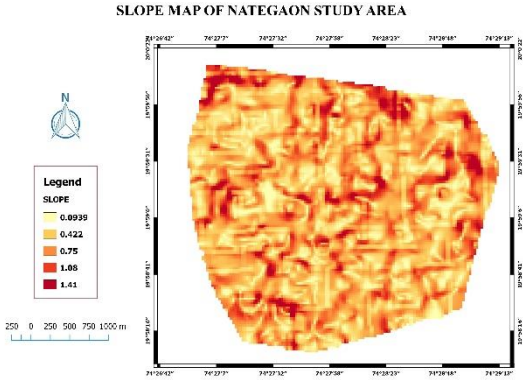


Fig No 4:- SLOPEMAP OF NATEGAON

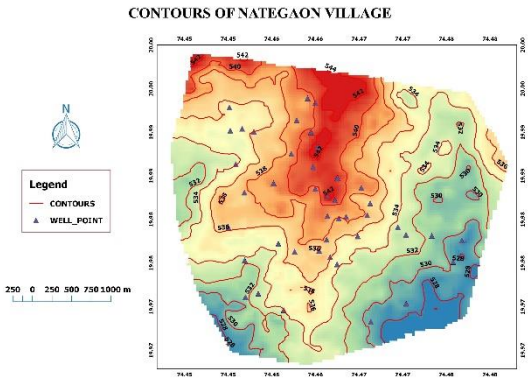


Fig No 5:- CONTOUR OF NATAGAON

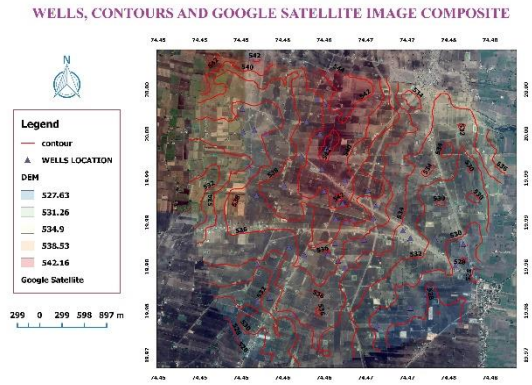


Fig No6:- WELL, CONTOUR AND GOOGLE SATELLITE IMAGE COMPOSITE

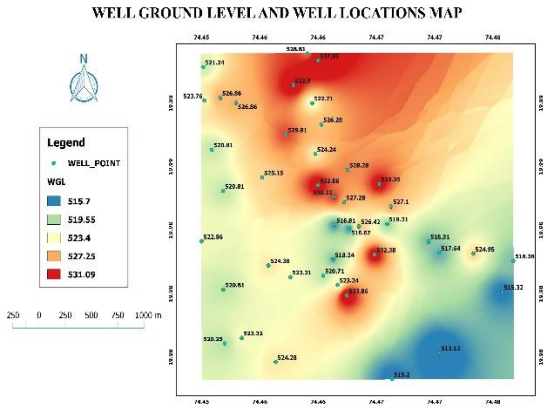


Fig No7:- WELL GROUND LEVEL AND WELL LOCATION MAP

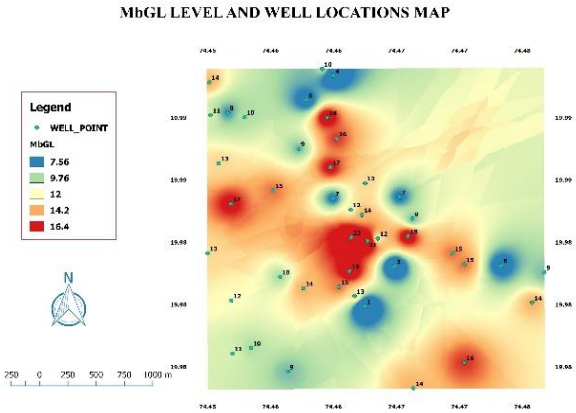


Fig No 8:- MbGL LEVEL AND WELL LOCATION MAP

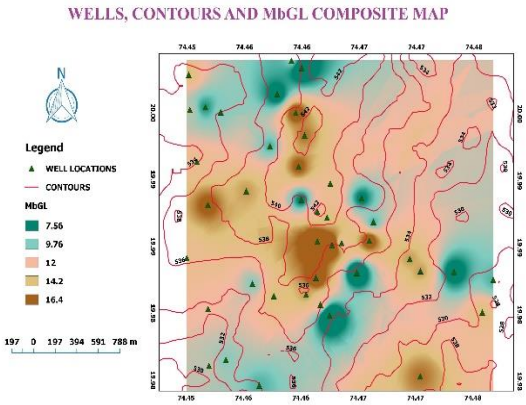


Fig No 9:- WELL, CONTOURS AND MbGL COMPOSITE MAP

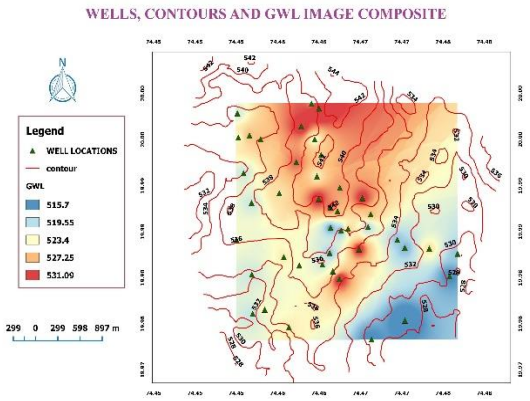


Fig No 10:- WELL, CONTOUR AND GWL IMAGE COMPOSIT

Conclusion

This report introduce monitoring and mapping of ground water table by using GIS.in this study water tables of consecutive three months i.e. November, December, and January were determinedusing GPS instrument.These observations were studied in detail, the changes which have occured in water table level fluctuations are found and using that readings GIS Mapping is done using QGIS software. In which we plot DEM, SLOPE, RELIFE, HILLSHADE,Mbgl level and well location map,well contours, and Mbgl composite map. This gives the idea regarding terrine undulations and variations in ground water table how it changes. This analysis is important for comparative study of well inventory and planning various irrigation activities in the study area.

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