International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 05 Issue: 04 | Apr-2018 www.irjet.net p-ISSN: 2395-0072

Watershed Development by Using GIS and Remote Sensing For Water Budgeting

Mr. Chetan B. Bansode[1], Mr. Vishal B. Bhosale[2], Mr. Akash M. Dongare[3], Mr. Lalit N. Kshirsagar[4], Mr. Aniket A. Malwadkar[5], Prof. Dr. P. D. Sable[6]

[1,2,3,4,5] *Student of AnantraoPawar College of Engineering and Research, Pune-411009.*
[6] *Professor in Environmental Archaeology of Deccan College, Pune-411006.*

Abstract—*The aim of the project is to develop an action plan for watershed management. Watershed management is the process of creating and implementing plans, programs, and projects to sustain and increase watershed functions that affect the plants, animal and human communities inside watershed boundary. The recent technologies like remote sensing and GIS support us to giving a quicker and cost effective analysis of various applications with accuracy for planning. It also gives a better perspective for understanding the problems and therefore helps planners evolve a better solution for sustainable development. From the final output of these themes generate, recharge with of storage of surface, percolation tank and check dams are recommended for the study area, mainly to control sedimentation from the catchments. To increase the ground water recharge and vegetative cover to control soil erosion, various action plans like construction of recharge structures, afforestation etc. has been proposed. This project describes in brief the work carried out for the study area using remote sensing and GIS.*

Morphometric analysis is a quantitative description and analysis of landforms as practiced in geomorphology that applied to a particular kind of landform or to drainage basins. Remote sensing (RS), Geographical Information System (GIS) has proved to be an efficient tool in delineation of drainage pattern and water resources management and its planning, in the present study.

Keywords: Watershed, Watershed Development, Arc-GIS, LISS-III Image, DEM, drainage map, Flow Accumulation Map, Malshiras Region.

1. INTRODUCTION

1.1General:

With the beginning of a new millennium, humankind faces environmental challenges greater in magnitude than ever before because the scale of the problem is shifting from local to regional and even to global levels.

A watershed is a geo-hydrological unit, which drains at a common point. Rain on the mountains starts flowing down into small rivulets. Many of them, as they come down, join to form small streams. The small streams form bigger streams; and finally the bigger streams join to form a nallah to drain out excess water from a village in the form of Watershed is a region (or area) delineated with a well-defined topographic boundary and outlets. It is a region within which Hydrological conditions such that water becomes concentrated within a particular location, for example, a river or a water reservoir, by which the watershed is drained.

A watershed is made up of its physical and hydrological natural resources as human resources.

Therefore, watershed management is the process of guiding and organizing land use and use of other resources in the watershed to provide desired goods and services without adversely affecting soil and water resources. Embedded in this concept is the recognition of this concept is the recognition of the inter-relationships among land use, soil and the linkages between uplands and downstream areas.

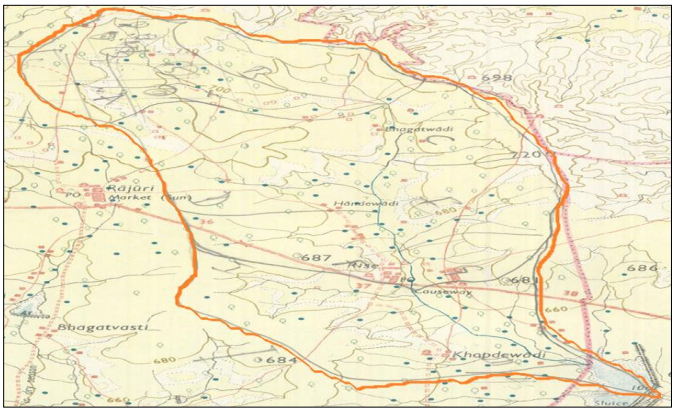
Fig. 1: Watershed Management

1.2 Water Budgeting:

It is considered that the main recharge to the ground water is mainly through the infiltration of precipitation, as it occur and percolates from surface storage to the ground.

Water budgeting equation as follow:

Total precipitation = (Runoff + Evaporation + Stored water on ground + Infiltration + Soil moisture + Recharge)



Map 1: Showing the Study Area For Watershed

1.3 Objectives:

1 To decide dimensions of proposed water and soil conservation structures.

2 To check watershed in rural area to increase availability of water for agriculture and other purpose.

3 To calculate storage capacity of watershed.

4 To analyze and recharging water level of ground water table.

5 Developing accuracy with the help of 3D modeling of GIS and Remote sensing to analyze and develop watersheds and ground water table.

6 To decrease rate of waterborne disease.

7 To analyze efficiency and de-efficiency of water with the help of population census.

2. PROBLEM STATEMENT

India is affected with unevenness of weathering conditions. Every state and regions of nation has different topographical conditions, due to this the rate of rainfall and its intensities are different within every region.

In past few years in Maharashtra most of the region are facing drought due to uncertainty of rainfall. To overcome from this issue there is need to implement the effective method to increase the ground water table and natural resources of water.

3. METHODOLOGY

1. Site Selection
2. Pre field Work
3. Field Investigation
4. Laboratory Work
5. Result and Discussion

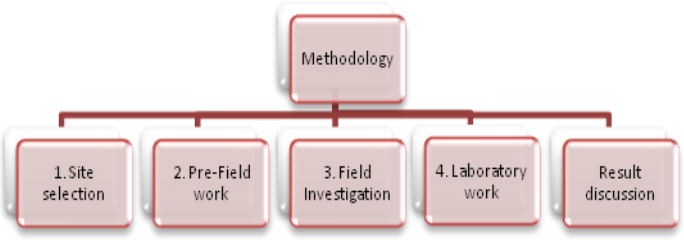


Fig. 2: Flow Chart

4. CONCLUSION

Difference between the amount of rain water and demand of water for various purpose is high, whether there is low or heavy rainfall.

Same issue occurs in other countries also, as we studied in paper presented on sub-Saharan Africa region across Mali.

By proper analysis, management and development of watershed by using advance techniques like GIS and Remote sensing, which gives higher accuracy. We overcome on sever issues like chronic drought and deficiency within population and water resources.

5. FUTURE SCOPE

By developing watershed in proposed selected region, it will improve Socio-Economical condition of local farmers.

Also at the appropriate location water and soil conservation structure suggested, which gives benefit to local farmer.

Ground water level in various micro-watersheds can increase through proper management & by constructing various water and soil conservation structures.

To understand the differential recharge condition in watershed, use of GIS and remote sensing gives higher accuracy in proposed region.

REFERENCES

1. Sharada S. Tanavade, P. A. Hangargekar, “A Case Study of Watershed Development in Sangola-Maharashtra", Department of Civil Engineering, Fabtech College of Engineering andResearch, Sangola- Maharashtra, India, Volume 4 Issue 6, June 2015.

2. Pandurang D. Jankar, Dr.Mrs.Sushma S. Kulkarni, “A Case Study Of Watershed Management For MadgyalVillage”,PG Student, Department of Civil Engineering, Director, Department of Civil Engineering, Rajarambapu Institute of Technology, Rajaramnagar, Islampur, Dist. Sangli, Maharashtra, India, Int. J. Adv. Engg. Res. Studies/II/IV/July-Sept.2013/69-72.

3. KrunaliVora, “Application of remote sensing and GIS in watershed land use development”, ME (WRM) LDCE, May 2011.

4. SumantMallavaram Lawler, Matuskyand Skelly Engineers, "Application of GIS Technology in Watershed-based Management and Decision Making", New York,Vol.1 No 5, July 2003.

5. Mustaq Shaikh andFarjanaBiradar, Ground water survey and development agency, Pune, Maharashtra, "Analysis of watershed characteristics using remote sensing and GIS techniques Vol.4, Issue.4, April 2015.

6. P. D. Aher, J. Adinarayana, "Information system for integrated watershed management using GIS and Remote sensing", Vol. 6, Issue 8, Dec 2014.

7. Murali Krishna Gumma, BirhanuZemadim, BirhanuIrshad, A. Mohammed, RamadjitaTabo and Anthony M., "Prioritization of Watersheds across Mali Using Remote Sensing Data and GIS Techniques for Agricultural Development Planning", Whitbread,18 June 2017(article).

8. Gaurav Savant, Lei Wang, and Dr. Dennis Truax, "Remote Sensing And Geospatial Applications For Watershed Delineation", Civil Engineering, Mississippi State University, vol 4, issue Dec 2010.

9. LeyaSathan, "Remote sensing and GIS for assessing the impact of integrated watershed management", JNTU Hyderabad.

10. PatilShivraj, G Wayal, Abhaykumar S, "Watershed Management in Rural Area –A Case Study(Raigad)", VeermataJijabai Technological Institute, H.R. Mahajani Marg, Matunga, Mumbai MH 400019, India, Volume 1 Issue 1, September 2013.

11. Vinayak N. MangruleandUmesh J. Kahalekar, "Watershed planning and development plan by using remote sensing and GIS of Khultabadtaluka of Aurangabad district", Government college of engineering, Vol.3, Issue.0974-2239, Oct 2013.

12. Kale Amit A[1], WaykuleSagar D[2], Pandit Akshay[3], ShingeShekhar G[4], Prof. Yadav S. J.[5], Prof. Dr. Sable P. D.[6] Assessment of Groundwater Quality of Kanhar Stream: Case Study from Vinpuri in Purandar Tehsil Dist. Pune, Anantrao Pawar College of Engineering and Research, Pune. International Research Journal of Engineering and Technology (IRJET) volume: 04 Issue: 05