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He / She presented a paper entitled

Applications of GIS & Remote Sensing for Selection of watershed sites - A case study of Ranjani village in Nagar Tahesil.

Dr Kalyan Gangarde

Dr Ramkishan Bhise

Dr Krutika Khandare

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CamScanner

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Application of GIS and Remote Sensing for Selection of Watershed Study of Ranjani Village in Nagar Tahesil

Lagad Santosh Jabaji
Asst. Professor in Geography
Dada Patil Mahavidyalaya, Karjat Mob. No.9850814041

Introduction: Water is a precious natural resource and at the same time a complex factor to manage. There is no doubt that India has done well in the sector of water resource development in the form of major, medium and minor irrigation projects, in the last fifty years which has in turn played an important role in the progress of the country. Water resource development is a continuous process which has to be resorted on account of ever increasing demand. The major irrigation projects cater to millions of hectares of land, whereas at the other extreme local level projects such as small pond/tanks involving small structures may also be used to fulfill the requirements of a small community at the village level. The integrated watershed management (IWM) approach has been globally accepted as the best for natural resource management (Gosain et al. 2004).

For watershed harvesting structure site selection there has used the criteria of model and ideal villages' i.e. contour trenches, loose boulder structure, farm pond, check dam and percolation tank.

Aim and Objective

To identify potential watershed sites in Ranjani villages in Nagar tahesil.

Study Area

Ranjani village is in Nagar Tahesil. It is situated in the east part of Nagar tahesil and lies between north latitude 19°08'45" to 19°10'32" and east longitude 74°52'01" to 74°55'28". It has total population of 1181as per 2011 census. Among them 613 are male population and 568 female populations.

Methodology and techniques

Geographical Information System (GIS) techniques are also used for understanding ground truth. However, brief idea of the methodology adopted in the study is given in the following points.

Spatial data -

Data related to the space means real world is known as spatial data. This data is collected in the form of primary and secondary.

Village Survey

Regular visits are carried out to the study area for field observation. During the field survey of the study area present status of watershed development is checkout.

GPS (Global Possessing System) Survey –

GPS survey is done for all selected village watersheds to obtain the information of latitude, longitude and elevation of related watersheds. Also GPS is used for preparation of rainwater harvesting structures of proposed village watersheds in the study area.

Secondary data

For the generation of toposheets, tahesil cadastral maps are used. The Nagar is covered India toposheets numbers 47 I/ 12 then Ranjani village is in scale.Cadastral tahesils map of c Nagar, Parner, Shrigonda, Karjat an as base maps.

All mentioned toposheets namely IRS 1C/1B (NRSC, Hydrat details such as contour of 20 Mt. tahesils and village boundaries are 9.3x software. Various maps are contour, drainage, stream ordering Shuttle Radar Topographic Mission of 30 Mt. spatial resolutions are us elevation models of the south Ahm proposed village watershed of the st 9.3x, ERADAS IMAGINE 9.2 softw For preparation of proposed structures various thematic maps i.e. stream ordering, slope, aspect and ra structures are prepared in ArcGI IMAGINE 9.2 and Global Mappe Finally with the help of above them analysis interpretation is done.

Result and Discussion

Existing Watershed Structures in the

Earlier in semi arid region various watershed management structures are constructed under dif Central and State Government (Tel These includes

1. Drought Prone Area Programme (D
2. Comprehensive Watershed Develo (CWDP)
3. Integrated Watershed Developr (IWDP)
4. Mahatma Gandhi National Ru Guarantee Act (MGNREGA)
5. National Watershed Development P Areas (NWDPRA)
6. Indo-German Watershed Developn (IGWDP)
7. NGOs Working in the Selected Pr Villages

It is observed that N Organizations are working sincerel management to reduce water scarcit Resolution dated 15th March 2012 all watershed management work at micro through private NGOs under MGN From 2014 Government of Mahara

implemented the scheme of water conservation called Jalshiwar Abhiyan.

Sites Selection Criteria for Watershed Management Structure

The study area faces serious problem of water scarcity. To overcome this problem various soil and water conservation structures check dam, loose boulder structure, continuous contour trench, farm pond and percolation tank are proposed for ideal watershed. These structures are suggested by Technical Watershed Guideline, Soil Conservation and Agriculture Department Government of Maharashtra (2006) and Central Water Commission Ministry of Water Resources, Government of India (2012-13). With the help of these guide lines the researcher proposes suitable sites for rainwater harvesting structures for village watershed.

1. Continuous Contour Trench (CCT) - Continuous Contour Trench (CCT) is dug along a contour line. CCTs are constructed in the ridge area, basically which is located on upper portion of ridge area of watershed. This watershed structure control soil erosion, decreasing water velocity and improve soil layer. For construction of CCTs 5.71 to 14.04 degree slop is suitable site .If slop is more than 14.04 degree then the site is not suitable for construction of CCTs because high degree is the basic cause of high soil erosion. Digging of CCTs on such site is harmful. If slop is less than 5.71 degrees instead of CCTs then construction of LBS (Loose Boulder Structure) is suitable for preventing of soil erosion and decreasing runoff water from upper ridges.

2. Loose Boulder Structure (LBS) - The structure can be constructed in upper reaches of watershed to reduce gully erosion. It can be constructed in areas where boulders are available in radius of 1 km of structure. Area above the structure is up to 5 hectors for small structures and 5 to 10 hectors for big structures. Vertical distance between two structures should be above 1 meter. Heights of small structures of 5 hectors watershed area upto 0.75 meter and of 5 - 10 hector watershed area up to 1 meter. It should be constructed above farm pond, check dams and percolation tanks. According to necessity galvanized iron grid should be use to protect loose boulder structures.

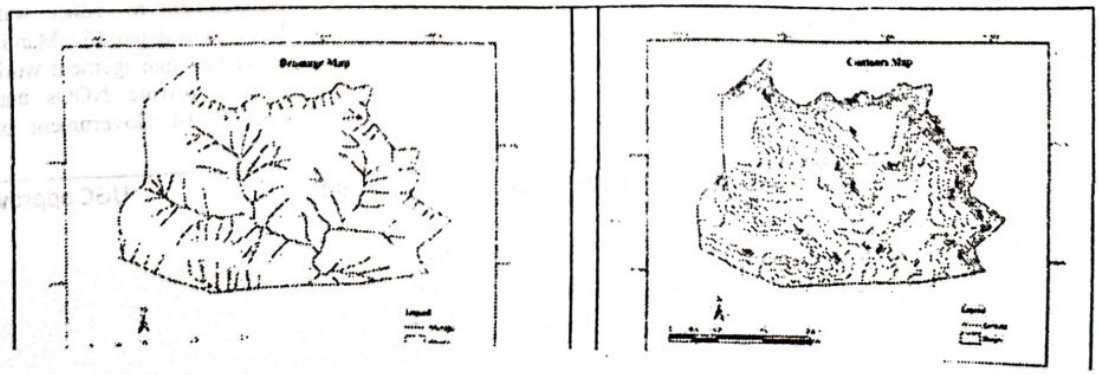
3. Farm Bund - Farm bunds are proposed in the plateau reaches of micro watershed on agricultural land or non agricultural land to minimize soil erosion and improve soil moisture profile. Bunds can support to increase groundwater level. Farm bunds are proposed on contour lines. In some cases it becomes inconvenient to farmers, so bunds are suggested on field boundary. Distance between bunds must be 30 to 80 meter, depending upon slope of the area. Bunds are proposed in the area where slope is less than 5.71 degrees. In comparison to contour trenches farm bunds effective means of checking runoff and soil erosion.

4. Farm Ponds - The farm pond should be prepared in the areas of less percolation. Black cotton soil area is ideal for pond structure because it has minimum seepage loss. Pond can be constructed on first order tributaries; it can be constructed on junction of site. Pond can be constructed on flat terrain. Large natural depression should be preferred for pond site. The drainage area above the pond should be large enough to fill the pond. Ponds are proposed on the area having up to 1.72 degrees slope and care should be taken where other structures are not proposed. Topography affects on the dimensions of farm pond, i.e. length. width and depth is 20 X 20 X 3 m or 40 X 20 X 2.5 meter etc. It has storage capacity of ~ 1000 TCM. Ponds are not proposed where canal irrigation system is existing and in area where Stalinization occurs. Farm ponds should be on upper portion of cultivated land.

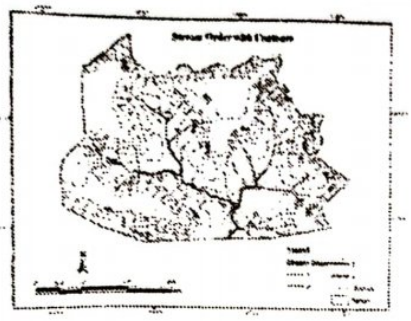
5. Checks Dam - Earthen or cement check dams can be constructed across bigger first order or second order streams. It should be constructed in areas of gentle slopes (less than 1.72 degrees). Depth of nala should be more than 1 meter. The soil downstream of the bund should not be prone to water logging. Vertical distance between two check dams should be more than 1 meter. It can be constructed in area which having mix material.

6. Site selection criteria for Percolation Tank - The tank can be located across streams by creating low elevation. Terrain with high fractured and weathered rock for speedy recharge. Submergence area should be uncultivated. Rainfall pattern based on long-term evaluation is to be studied so that the tank gets filled up fully during monsoon, preferably more than once. Soil in the catchment area should be of light sandy type to avoid silting of the tank bed. The location of the tank should preferably be downstream of runoff zone or in the upper part of the transition zone, with a gradient of 1.72 to 2.86 degrees. Tanks can be constructed in middle or lower reaches of watershed.

Propose Poetical Sites in Ranjani

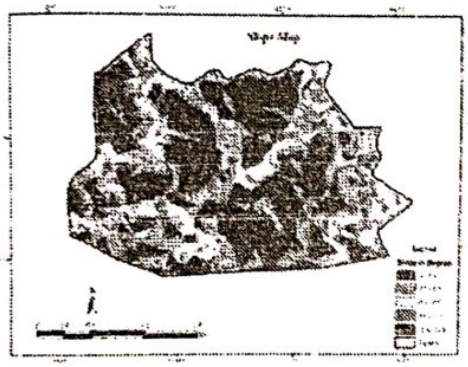


A: Drainage map

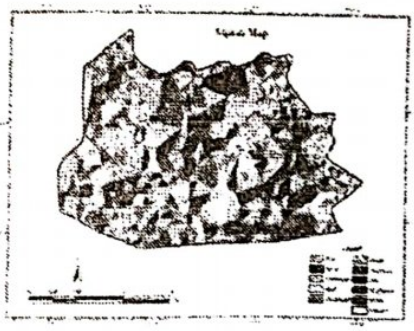


C : Stream order with contour map

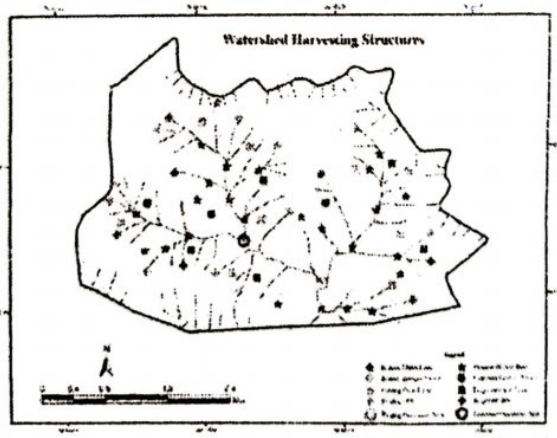
D: Digital Elevation Model



E: Slope map



F: Aspect map



G: Watershed Harvesting structures

Various maps of village Ranjani watershed.

Ranjani is village in Nagar tahesil. This has ideal Physiography for rainwater harvesting as it is situated at lowland area and is protected by surrounding circular hills. Slope of this area is about 0 to 22 degrees (Map no. 4.5) and direction of slope is toward south. Two tributaries in this region flow toward south. Drainage pattern of these tributaries is dendritic. In Ranjani village 30 existing rainwater harvesting sites are found. They include 09 cement dams, 11 [illegible]

bolder structures, 09 farm ponds and 01 percolation tank. These rainwater harvesting structures are insufficient to fulfill the need of water. According to physiographic and hydrological setting, village has ideal location for rainwater harvesting. Therefore, four main types of structures and 32 different ideal rainwater harvesting sites are proposed. Out of these 16 earthen or cement check dams are suggested in the middle portion of first and second order streams. 07 loose boulders are suggested in the upper reaches of first order river to reduce gully erosion on first order streams 08 farm ponds are suggested in the middle reaches according to natural sites and 01 percolation tank is proposed to accumulate water at lower reaches. Proposed structures are helpful to reduce soil erosion, increasing underground water level and increasing availability of ground water in the village. Proposed watershed development of the village will be helpful for changing the existing agriculture system and it will bring new economic and social transformation of Ranjani village.

Conclusion

Before Jalayuktha Shivar 2014 villages has always problem of water scarecity. After intensively implementation of Jalayukta Shivar Abhiyan Government has constructed rainwater harvesting sites. There are not sufficient to fulfill the need of water villages Ranjani. So with the help of GIS techniques and field visits we suggested rainwater harvesting sites for sustainable development.

These Proposed structures are beneficial to reduce soil erosion, increase underground water level and availability of ground water in the village. It will also helpful for changing the existing agriculture land use and bringing economic and social transformation of above villages.

References

- **Gulzar R.K., Jat B.C.** (2008), Geography of Water Resource, Rawat Pubication, New Delhi. P.p.1-6
- **Nagarajan N.** (2012), Watershed Management- A Multidimensional Approach, Unpublished Doctoral Dissertation, Annamali University, Annamalainagar, India. P.p.1-17.
- **Kular D. R.** (2012). India-A Comprehensive Geography, Kalyani Publication, New Delhi. P. 554
- **Pray C.E.and Nagarajan L.** (2009), Improving Crops for Arid Land – Pearl Millet and Soulghum in India, International Food Policy, Washinton D.C. Publishing House Pvt. Ltd., New Delhi. P.p. 83-88
- **Telore N. V.,** (2015), A Geomorphic Analysis of the Yerla Basin for Watershed Management *Using Remote Sensing and GIS*, the thesis presented to the Savitribai Phule Pune University, Pune. P.p.129-166.
- **WOTR** (2010). Watershed Development, Watershed Organization Trust, Ahmednagar.

Web References

- Ahmednagar A official website of Ahmednagar District.
- www.ahmednagar.ac.in.
- www.ahmednagar.nic.in
- www.census2011.co.in
- www.census2011.co.in
- www.weatherreport.com/india/ahmadnagar

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