UGC SPONSORED MINOR RESEARCH PROJECT

SUBJECT: GEOGRAPHY

(2018-2020)

"TO DETECT THE CHANGES IN LAND USE-LAND COVER AND ITS IMPACT ON GEOMORPHIC FEATURES OF THE MULA RIVER BASIN IN MAHARSHTERA (INDIA)".

EXECUTIVE SUMMARY REPORT

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EXECUTIVE SUMMARY OF THE MINOR RESEARCH PROJECT

TITLE OF THE RESEARCH PROJECT: "To Detect The Changes In Land Use-Land Cover and Its Impact on Geomorphic Features of The Mula River Basin in Maharshtera (India)"

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"TO DETECT THE CHANGES IN LAND USE-LAND COVER AND ITS IMPACT ON GEOMORPHIC FEATURES OF THE MULA RIVER BASIN IN MAHARSHTERA (INDIA)"

INTRODUCTION:

The main hypothesis of the project is to detecting the changes in the land use-land cover and its impact on present geomorphic features of Mula River Basin. Because of above hypothesis to fulfill, we selected the satellite data to detect the changes in land use land cover for the year of 2000 and 2014. The image analysis carried out and is directed us that there is changes in both negative as well as positive in their respective sectorial area. And some land use lasses shows there is no change. This project work includes seven

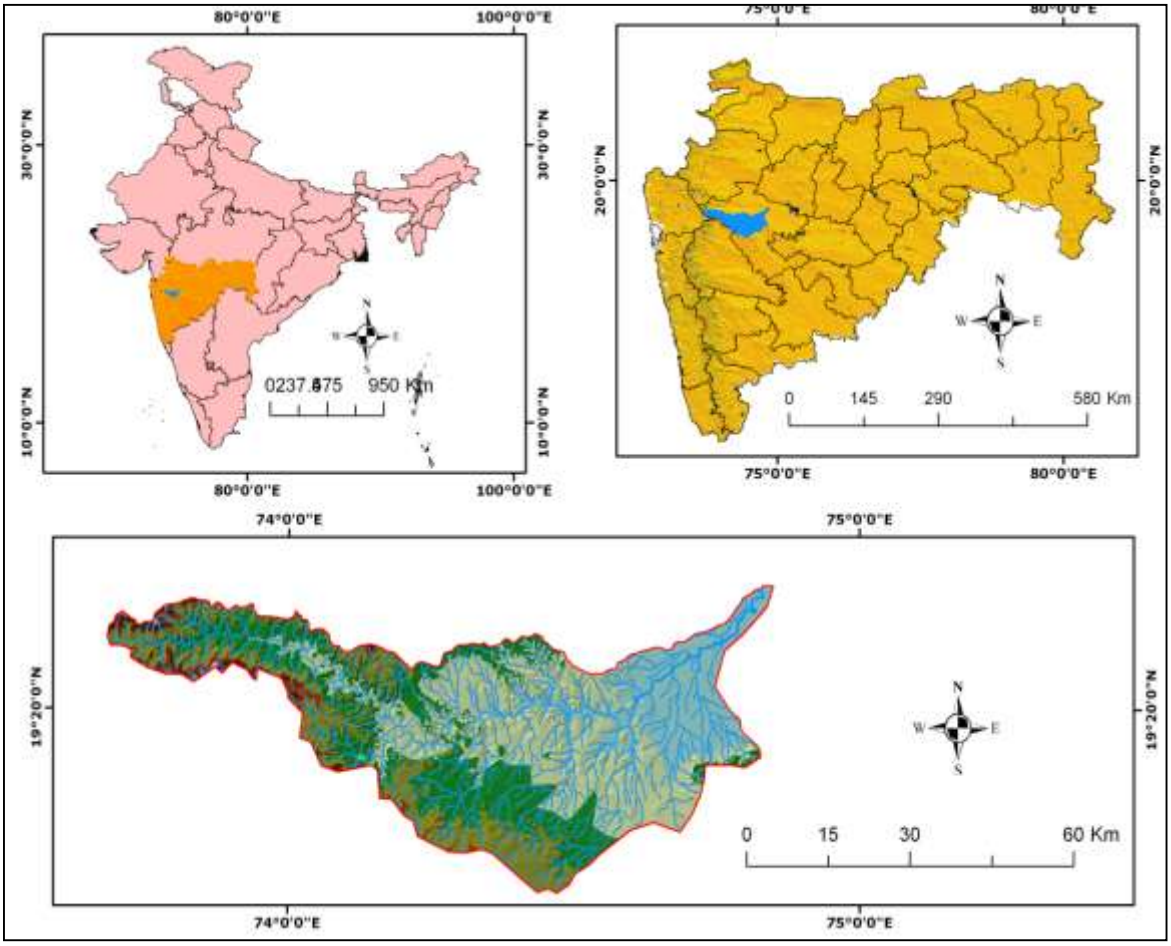
chapter in the first chapter includes, introduction to the topic and study area, objectives of the study, sources of data and methodology and Significance of the study is presented in the chapter.

The second chapter is related to detection of changes in land use-land cover of the study area in which includes selection of classification scheme, Types of land use land cover classes Accusation of IIRSLISS III image to classified for the year of 2000 to 2014. And at the end of chapter different land use- land cover classis are identified using ERDAS IMAGINE 9.3 software. The third chapter is focused on the manmade activities as well as identification of geomorphic feature that are affected by land use land cover system. Land use land cover and its impact on geomorphic feature is the major area of this chapter. Forth chapter is related to DEMs analysis of the study areas both affected and unaffected by the present human activities and land use land cover system. The fifth chapter includes Results and discussion of the previous chapters and also attempts to and sectors to indemnify where maximum changes are occur in the study area. In the six chapter includes all Summary and conclusion and in last part of the project includes references sited for the research work.

THE STUDY AREA

The area selected for the study is located in Western part of Maharashtra. Which comes under the rain shadow area water scarcity Zone, The Mula River Basin is a major tributary of Godavari River. The area lies between 19^0 02'8" to 19^0 31' 28" North Latitude and 73^0 40' 56" to 74^0 50' 39" East Longitude. Elevation in varies between 464 And1473 m from MSL. The location map of the study area is depicted in following Figure

LOCATION MAP OF THE MULA RIVER BASIN



OBJECTIVES OF THE STUDY

The study begins with the assumption that there is a strong co-relation between the activities of human being of land use Land cover and its impact on geomorphic features of the study area. The area which has been chosen for the investigation is also evidently undergoing a sudden change in the land use land cover. Therefore the main objective of the present study is to evaluate whether this change in the land use is causing land degradation in this region or not. This is elaborated as follows:

1. To detect the changes in the land use - land cover from 2000 to 2014 of the study area.

2. To appraise the recent causes of the land use land cover changes in the study area,
3. Highlight the human activities operating over the study area.
4. To find out the impact of recent changes in the land use Land cover on the geomorphic features of the study area.

METHODOLOGY

The work is divided into three main components and methodology is given following.

1. The first part is the detection of the recent changes in land use - land cover from 2000 to 2014 of the study area using remote sensing data.
2. The second component involves identification of the sectors that have undergone maximum changes in the area within the years under review and highlight causes of the land use land cover changes in the area.
3. The third part deals with understanding the influence of the changing land use pattern and its impact on the geomorphic features of the area. This will be achieved by carrying out DEMs analysis of the areas.
4. Finally the synthesis of the results of the three components mentioned above will culminate into the final scenario on the land degradation in the area.

RESULTS:

- **Scanty vegetation**

Slightly changes are accrued in this class that is from 148.00 to 164.00 km2 from the year of 2000 to 2014 that is near about 14.53 percent area is increased.

- **Deep water**

Water table and deep water having the close relationship between among them In the study area it is find out that area under deep water is increases from the year of 2000 to 2014 that is near about 3.19.percent.

- **Shallow water**

Under this class we find out that there is 2.64 percent area is increased, that is because of shallow water is occupied mostly in Mala dam and Kolhapur type tank which is present in the study area.

- **Cropped land area**

We find out that there is positive changes occurred in the class of cropped land area that is near about 15.53 percent area is increased. The nature and intensity of cropped land area is closely related to the irrigation facilities. Maximum changes are accrued in this class that is from 120.29to 175.28 km2 from the year of 2000 to 2014. This is remarkable increase in last fifteen years. That is only because of increase the irrigation facilities that in the study area that is Mula Dam and its two cannel.

- **Cow grass land**

There is positive changes occurred in the class of Cow Grass land that is near about 4.85 percent.

- **Mixed built up land**

This class also responding the positive changes that is near about 3.20 percent area increases in under this category.

- **Dense vegetation**

In this class we observed that there is negative changes occurred in last fifteen years that is near about 5.39 percent.

- **Temporal fallow land and Permanent fallow land**

These class are also negatively changes are occurred that 4.03 percent and 1.09 percent respectively decrease of land.

- **Bare exposed rock**

This class also decreases from 2000 to 2014 that near about 17.41 percent to 13.52 percent which is depicted in the fig no 2.3, 2.4 respectively

- **Broken land:**

There is negative changes occurred in the broken land area. 7.64 percent area is decreases out of the total area.

- **Barren land**

There is a negative changes occurred in the barren land classes that is near about 3.43 percent area is decreases.

IMPACT OF LAND USE LAND COVER ON GEOMORPHIC FEATURES:

1. In the study area the Land use land cover pattern is affected the top of hill and Plateau steps
2. Impact on cliff, escarpment, erosional surface planation surface dykes, waterfalls and potholes, rapids meander of the Mula River basin as considering the above geomorphic features there is very steep in slope like more than 75 degree within this slope land use-land cover never impacted in the study area.
3. The gravity force is very high the water velocity near the V and U shaped valley are becoming high because of this water is moving in high speed so land use land cover is induced by V and U shaped valley.
4. Land use land cover system has been impacting on colluvium. It is going to decreases due to the human interference in the class of colluvium and it converted in to cropped land.
5. Impact on alluvium, River Terraces and Flood Plain area these classes is highly impacted by land use - land cover because of these are only fertile land which is getting under cropped land. From the satellite image it's indicated that that these type of soils are well developed and have good land for water holding capacity is also high.
6. Impact on Foot Hill Are the major impact of land use land cover on foot hill area is getting converted partially in cropped land area and some part on fallow land because where water is available that land goes under the cropped land classes and other hand where water is not available for the foot hill area this land is appear as a fallow land classes.
7. The intermediate valley is a low area between two hills or mountains typically with a river flowing through it. It is more affected by land use – land cover because it is fertile land all

along the Mula River and where source of water is available there land use land cover system is inducing the intermediate valley

RESULT FROM FIELD WORK TO FIND OUT GEOMORPHIC PROCESSES

- Geomorphic processes are getting active during the rainy season and most of the top hill and Plateau steps soil is getting eroding and move to downward direction and big gulley were appear because of loosening the soil by land use land cover practices.
- In U shaped and V shaped Valley there is three geomorphic processes are actively work that is lateral erosion, vertical erosion and headword erosion
- Geomorphic processes on colluvium is actively work especially erosion and weathering also some time transportation by water these are the geomorphic processes are actively work on colluvium
- Geomorphic processes are very active in alluvium, River Terraces and Flood Plain area that is because of river water erosion and transportation abrasion this type of geomorphic processes area actively worked in above area.
- Foot hill area this geomorphic feature is also goes on induced due to the land use land cover pattern and here erosion mass wearing and weathering this type of geomorphic processes is actively worked. E.g. Mandva village
- The slope of the Mesa and Butte is very steep so Erosion and weathering as well as Denudation processes operating over this class. E.g. Ratangarh
- In the intermediate valley all fluvial process are actively work because of that River in first segment headword, lateral and vertical erosion is carried out. And in second segment river is transporting the eroded material and in third Segment River is depositing the course of eroded material in their mouth or confluence.

RESULT FROM DEM ANALYSIS

- According to generated results, the Mula River Basin slightly influenced by Tectonic activities.
- Smf values computed for 50 fronts show that the most slightly active mountain fronts associated with faults of the area.

- Valley Floor Width to Height Ratio (Vf) ranges between 09 and 131 in the area deep and narrow valleys show low Vf values <1.0 this valleys can be classified as "V" shaped valleys and Vf values greater than 1, 0 can be classified as "U" shaped valleys.
- These areas subject to major lateral erosion is dominated Asymmetry factor significantly less than 50 suggesting tectonic tilt.
- In Mula River Basin there are different geomorphic units are present such are River channel, Floodplain area, different type of gully and rills, dams, Pediments, different types of hill slopes are geologically controlled,

CONCLUSION

On the basis of Image analysis of land use land cover and its impact on geomorphic features, field work and DEM analysis, It can be concluded that there is a detecting the changes in last use land cover for last fifteen years in which we seen that there is six classes and three sector in which positive changes are occurred especially Mixed built up land, Cropped land, Scanty vegetation, cow grass land, shallow water and deep water classes from that classes we can easily understand that there is one trend in the study area that is any how condition the area under agriculture should be increases because of when area under agriculture is increased that means the income of farmer will be increased and exactly this is happened in the study area. People are simultaneously doing pet husbandry occupation for the batter income because of that there is a three major sector in which there is changes are occur positively that is cropped land and cow grass land. And another two sector is observed that there is mix built up land is increased in their area because of increasing the population, its happened when the area is going to way of developing like industrialization, urbanization and villages are converted in to town for example in Rahuri tehsil like Devalali, Mahatma Fule Krushi Vidyapith area. Because of that mixed built up land increased, in the study area there are some easily broken land is available people are starting it on agriculture where source of water is available but some of the portion and sector are remain barren which is not used so there should be provide irrigation facility so people are bringing those area under cropped area.

Farmer should remember that maximum area they can utilized as cropped land but water should be used less because this is an area where water is less available because of rain shadow area. And they should remember that they are sustain the geomorphic feature. Because in the

study area some of the geomorphic feature is actively processed and affected by land use land cover system.

SUGGESTION

1. In the present study optimum use of land has been suggested.
2. Suitable Land use land cover pattern should implementing in the study area
3. Crop rotation should be maintain by farmer
4. Stop doing the agriculture practices on highly erodible land.
5. Less water should be used by farmer in the study area for the cash crop like sugarcane
6. Farmer should be follow the best land use planning.
7. There should be water conservation more work should be done under any government scheme.

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