



Land Use and Demographic change in Haryana:A Spatio-Temporal Study

Ruchi*

*Assistant Professor, Department of Arts, G.V.M Girls College, Sonipat

Abstract—Land use and land cover generally infers to some type of development with impacts such as loss of agricultural land, open space, and ecologically sensitive habitats. Present paper entitled Land Use and Land Cover Mapping and Change Detection in Haryana Using Multi-Temporal Satellite Data adequately demonstrates the utility of Remote Sensing and GIS to detect and record the Land use and Land cover of the area and its changes through time. The present paper is an attempt to analyse the changes that have taken place in land use pattern in Haryana from 1966-69, 1990-93 and 2010-13. The study is based on secondary data; data has been taken from statistical abstract of Haryana. The study reveals that marginal changes have occurred in all land use categories except proportion of area under forest it has drastically declined from 2.08 percent in 1966-69 to 0.9 percent in 2010-13. Net sown area is increased in 1966-69 to 1990-93 but in 1990-93 to 2010-13 net sown area is same proportion. Area under non-agricultural uses has recorded positive change it has increased from 5.92 percent in 1966-69 to 11.93 percent in 2010-13. The agriculture land covering an area of about 55.27% in 2007 reduced to 43.42% in 2017. The built up area increased from 15.97 % in 2007 to 30.23 in 2017. The barren land area increased from 6.45 % in 2007 to 16.97 in 2017. The Water bodies decreased from 4.65 % in 2007 to 1.05 % in 2017. The vegetation area has also decreased from 17.66 % in 2007 to 8.33 % in 2017. Urban extension and various anthropogenic exercises have brought genuine misfortunes of agricultural land, vegetation and water bodies.

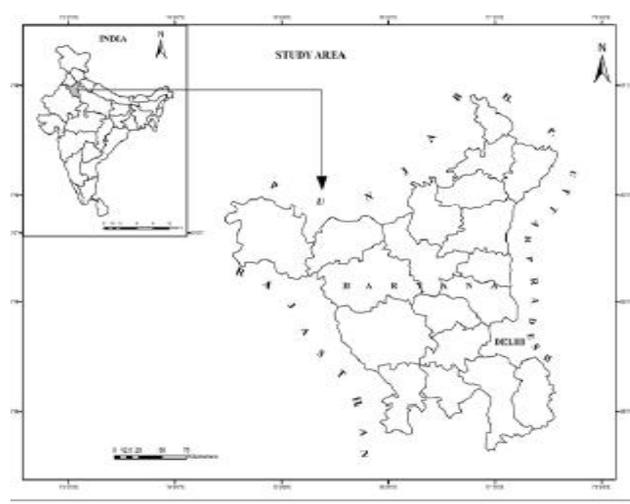
Keywords: *Change detection, GIS, Land use/Land cover, Agricultural, Non- Agricultural*

I. INTRODUCTION

In all resources land is a limited and most important basic natural resource. Land use is a surface utilization of all development and unoccupied land on specific point at a given time and space. Dominant part of land is used for agriculture which is one of the oldest economic activities of man competing demands for its effective and proper use. Land use is a major issue of global environment change. There is subsequent need of system of land utilization. The analysis of land use is an important aspect of geographical studies. At the present, land use is continuously changing as a result of changes in pattern and magnitude of human activities. Haryana is a state where population pressure is more than national average. The state of Haryana has a difficult pattern of land use because of different characteristics of districts. So it becomes a matter of interest for agricultural geographers as to what extent the land use pattern has been lateral and how it has influenced the land use pattern of the state. Therefore, the present study analyzes the change in land use over time and space.

II. STUDY AREA

The present study relates to the state of Haryana. The state Haryana was carved out from the former state of Punjab on 1st November 1966 on the linguistic basis. It is the twentieth state of India and presently has 22 districts. For administrative purpose the state is divided into four revenue divisions namely Ambala, Hisar, Rohtak, and Gurgaon and subdivided into twenty-two districts, sixty-seven tehsils and one hundred sixteen development blocks. The capital of Haryana is Chandigarh which is also the capital of its neighboring state Punjab. It is non-coastal, interior state and located in the northern part of India. Haryana is bounded by Uttar Pradesh in the east, Himachal Pradesh in the north, Punjab in the west and Rajasthan in the south. It is located at an altitude of 200 meters above sea surface and extended between 27° 29' to 30° 55' north latitude and 74° 27' to 77° 36' east longitude with a total geographical area of 44212 sq. kilometers.



III. RESEARCH METHODOLOGY AND DATA COLLECTION

The present study is based on secondary source of land use data. The district wise data that is based on area according to village papers taken from statistical abstract of Haryana, economic and statistical organization Panchkula. An attempt has been made to tabulate process analyze and interpret the data by applying suitable statistical techniques. To see spatial variations, triennium average for 1966-69, 1990-93 and 2010-13 has been taken. The percentage is computed of area according to village paper of nine land use category. District-wise percentage strength of area under different land use categories has been computed and presented in form of tables. Ultimately Pie diagram has been shown by these three time periods to see overall proportional spatial changes in nine land use category. GIS software 9.3 is used for making the maps.

IV. LITERATURE REVIEW

Panday and Ranganathan (2018) analyzed that changing land-use pattern in India with a focus on fallow lands. They were selecting 17 major states for the period 1984-85 to 2011-12. The study reveals that marginal increase in the land for cultivation and the fallow land has expanded in the country. Ahmad et al. (2017) studied that change in land use pattern and factors responsible for variations in current fallow land in Bihar, India. They were used location coefficient method. The study reveals that large concentration of current fallow lands was accounted for Gaya, Patna, Purneea and Manger districts. The non agricultural use of land was identified as the dominant factor for changes in common lands as it affected the current fallows negatively. Mangalagowri and Nagaraj (2016) studied that the changing pattern of land use and its impact on agriculture: A case study of Mysore district. The study concluded that current fallow land is increase and cultivable waste land decrease over the study period. Singh (2015) studied that the dynamics of land use patterns in Punjab. The study reveals that in land use categories big imbalances exist in Punjab. Singh and Kumar (2014) studied that changing in land use pattern of Bhinda was wetland in Haryana. The study reveals that the agricultural land dominates the land use in the catchment area. Grasslands followed by water bodies are other largest categories of the land use in the wetland. Forest area converted in to water bodies and grass land in the wetland area. Malik (2012) studied that changing g land use pattern in Haryana from 1995-98 to 2002-05. The study reveals that marginal changes have occurred in all land use categories except proportion of area under forests which has drastically change from 1995-98 to 2002-05. Proportion of net sown area to total area it has decreased over the time period. However, area under non-agricultural uses it has increased. Singh and Islam (2010) studied that the land use planning in western Uttar Pradesh. The study reveals that the major effect



of land use on land cover since 1750 has been deforestation. In the sector of agriculture many problem with population growth in western Uttar Pradesh like decreasing size of land holding, decreasing the level of underground water and land fertility. Results and Discussion The study of land use plays an important role not only in agriculturally dominated, over populated developing regions but throughout the world because of its relationship with different human phenomena. Its importance also increased during the population pressure and decreasing man and land ratio. Recently, land use is a major issue of global environment change. There is consequent need of system of land utilization. Till 1949-50 the land area in India was classified in to five categories. Further the technical committee on co- ordination of agricultural statistics, in 1948 recommended a nine fold land use classification.

V. AREA UNDER FOREST

This category of land use includes all areas actually under forests whether state owned or privately owned and classed or administrated as forest under classed or administrated as forest under any legal enactment dealing with the forests. Besides, the forest area along roads, railways and canals is also included in this category. Proportion of area under this landuse category has declined sharply from 2.08 percent in 1966-69 to 0.9 percent in 2010-13. Table 1 shows that in 1966-69, maximum area under forest have recorded in Ambala district 11.78 percent followed by Gurgaon (2.4), Karnal (1.33) and Rohtak (1.32 percent) respectively. During 1990-93, maximum area under forests was found in Ambala district (21.05) percent followed by Yamunanagar (14.04) percent and Gurgaon (5.27 percent) respectively. Rests of the districts of Haryana have area under forests cover less than state average (3.89 percent). Table 3 shows that in 2010-13, very sharp decline is observed in Haryana in area under the forest cover. During in this year maximum area under forest have found in Yamunanagar (8.53) percent followed Panchkula (2.34 percent), Panipat (2.05 percent) and Gurgaon district (2.5 percent) area under forest. As compared to 1966-69 forest area increased till 1990-93 but declining during 2010-13. Table 3 further shows that in 2010-13, forest cover in districts namely Rohtak, Jhajjar, Faridabad and Mewat reached to zero. A very sharp decline is observed in Ambala district in area under the forest cover. Over the time period there are found smaller proportion of area under forests.

VI. AREA UNDER NON- AGRICULTURE USES

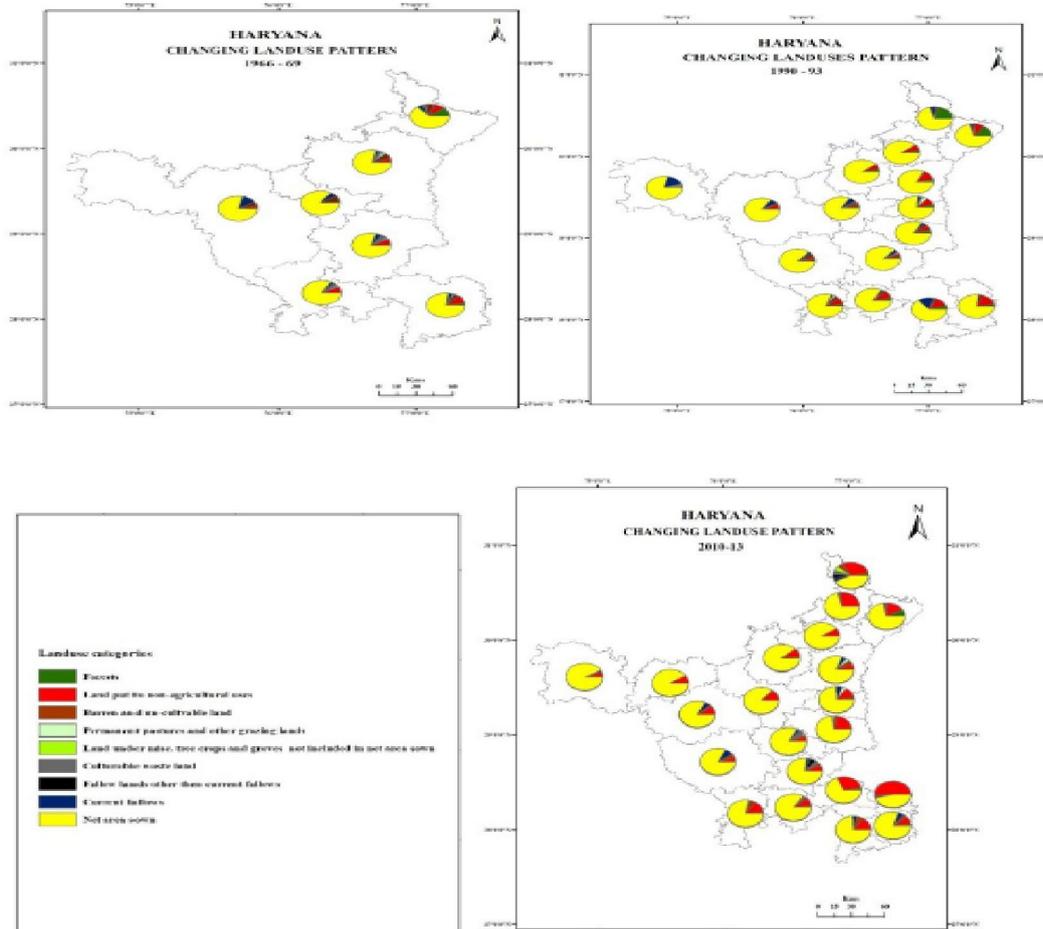
In this category of Landuse included all lands occupied by man settlements, Roads, railway and under water bodies. A significant change has been noted in the proportion of area under this land use category. The proportion of area under this landuse category has increased from 5.92 percent in 1966-69 to 11.93 percent in 2010-13. The increase in this category is an indication of sprawl of urban areas and area under industrial establishments in National Capital Region. Table 1, 2 and 3 shows that, the area under non agriculture uses in Haryana in 1966-69 to 2010-13. In 1966-69, highest proportions of area under non-agricultural uses have recorded in Gurgaon district 11.99 percent followed by Ambala and Gurgaon districts with 9.2 percent and 2.4 percent respectively. Whereas, lowest proportions of area under non-agricultural uses have found in Hisar district 0.57 percent.

During 1990-93, highest proportion of area under non-agricultural uses were found in Faridabad district 15.87 percent followed by Karnal, Gurgaon, Panipat and Yamunanagar districts with figure (13.52), (12.73), (11.07) and (10.03) respectively. Faridabad district have developed as an industrial city. Ambala, Rohtak, Jind, Bhiwani, Sirsa districts have found below the state average which is 6.8 percent. In 2010-13, highest proportions of area under non-agricultural uses have found in Faridabad district followed by Panchkula and Gurgaon districts with (5.46 percent), (30.41 percent) and 28.33 percent respectively. However, lowest proportions of area under non-agricultural uses have found in Sirsa district. Area under non-agricultural uses highest increased in nearby districts of National Capital Region.

Barren and un-cultivable Land In this category of landuse includes barren and uncultivated lands in mountains and hill slopes, deserts, plateaus, rocky area and extremely degraded lands. These lands cannot be brought under cultivation unless at a very high input cost with possible low returns. The proportion is quite less area under this



landuse category in 1966-69 to 2010-13, in state of Haryana due to mostly plain surface and fertile land. In 1966-69, highest proportions of area under this category have found in Jind district 8.17 percent followed by Karnal and Ambala district with 7.28 and 7.15 percent respectively. These districts are above the state average. Table 1 show that Rohtak, Mahendergarh and Gurgaon districts are below the state average which is 5.06 percent. In 1990-93, maximum proportions of area under this category have found in Bhiwani district 4.71 percent followed by Mahendergarh and Faridabad districts with 4.64 percent and 4.09 percent respectively. Sirsa and Kaithal district have Zero percent area under barren and uncultivable land. During 2010-13, highest proportion of area under this category have found in Mewat district 6.31 percent. Whereas, lowest proportions of area under barren and uncultivable land have found in Panipat district 0.77 percent. In 2010-13, barren and uncultivable land in districts namely Gurgaon, Jind, and Sirsa reached to zero. Barren and uncultivable land area decreased from 5.06 percent to 2.15 percent in 1966-69 to 1990-93, but slightly increased to 2.36 percent in 2010-13. Permanent Pastures and other grazing lands In this landuse category includes all grazing lands whether permanent pastures and meadows or not. The common land in the village and grazing land within the forest area are included under in this category. This land use category found only in trace amount in Haryana. Permanent pastures and other grazing lands occupied 1.15 percent area in 1966-69 which decreased to 0.60 percent point in 1990-93 and almost same in 2010-13, (0.61 percent). Table 1 show that in 1966-69, about 1.15 percent of total geographical area was under in this landuse category in the state. A highest percentage has recorded in the district of Karnal 2.79 percent. No permanent pastures and other grazing lands found in Jind and Hisar districts. In 1990-93, permanent pastures and other grazing lands it has decreased 0.64 percent. The maximum area under in this landuse category have found in Panipat district. However, lowest area under in this category have found in Rohtak district 0.42 percent. During 2010-13, highest area under in this landuse category have found in Panipat 3.85 percent followed by Karnal district 3.66 percent. There are only six districts out of twenty one districts namely Ambala, Karnal, Rohtak, Sonipat, Yamunanagar and Panipat district occupy more than 1 percent. Western Haryana has literally no area under in this landuse category. Area under Miscellaneous Tree Crops In this landuse category includes land under misc. tree crops and groves not included in net sown area. Area under this landuse category is almost negligible in the state over the study period. In 1966-69, (0.1 percent) of total state area was under this landuse category, which it has increased to (0.18 percent) in 2010-13. During 1966-69, highest area under this landuse category have recorded in Ambala district (0.45 percent) followed by Karnal district (0.33 percent). In 1990-93, highest proportions of area under this landuse category have found in Sonipat district (0.93 percent). On the contrary in 2010-13, highest area under this landuse category have found in Panchkula district (5.85 percent). In north eastern regions rising of tree crops and groves is being practiced now to grow mango, keno and others fruits. Cultivable Waste Land The waste land survey and reclamation committee has defined "cultivable waste land" as that land available for cultivation but not used for cultivation for one reason or the other. This land was used for cultivation in the past but is not being used at present. Table 1, 2 and 3 shows that proportion of cultivable waste land was merely 1.76 percent in 1966-69 it has increased to 0.87 percent in 1990-93 and 0.61 percent in 2010-13 it has decreased. Cultivable waste land has squeezed over the period of time in the state. In 1990-93, maximum area under this landuse category was recorded in Rohtak district (4.69 percent). While lowest area under in this land use category were found in Hisar district with 0.1 percent. Comparatively high proportions of cultivated waste land were found in Sirsa district 4.1 percent. On the other hand lowest proportions of cultivated waste land were found in Yamunanagar district 0.29 percent. In 2010-13, highest proportions in this land use category have found in Rohtak district 5.39 percent followed by Jhajjar and Panchkula district with 4.36 and 4.09 percent respectively. Cultivable waste land has increased significantly Rohtak and Jhajjar districts in over the study period.



VII FALLOW LAND AND CURRENT FALLOW LAND

Fallow land is two types one is fallow land and second is current fallow land. Current fallow means the land left unsown during the current agricultural year. Fallow land include all lands which were cultivated earlier and are temporarily unsown for a period of not less than one year, and not more than five years. Fallow lands other than current fallows in total area. This land use category is also almost absent in the state. Table 1, 2 and 3 shows that the proportions of area under current fallow in total area it has decreased over the time period 1966 to 2013. In 1966-69, highest proportions of area under current fallow land were found in Hisar district 12.47 percent. On the contrary lowest proportions in this land use category were found in Karnal district. The remaining district had proportions of current fallow land less than state average 6.55 percent. Table 2 show that 1990-93, highest proportion of area under current fallow land was found in western district Sirsa 16.04 percent followed by Gurgaon district 14.55 percent. Whereas, in 1990-93, current fallow land did not exist in Kurukshetra and Kaithal districts. Table 3 show that in 2010-13, highest proportion of area under current fallow land have found in Panipat district 5.45 percent followed by Hisar and Palwal districts with 5.45 percent, 5.64 percent respectively. The current fallow land does not exist in Yamunanagar, Kaithal, Gurgaon, Sonipat and Kurukshetra districts in northern and northeastern part of the state during 2010-13. **Net Sown Area** Net sown area is a very important indicator. It is an indicator of the proportion of land devoted to crop production. The proportion of net sown area occupied 77.36 percent of the total area in 1966-69 it has increased 80.42 percent in 2010-13. In 1990 to 2013 not much fluctuations net sown area occupied almost same proportion 80.42 percent of area in 2010-13. Table 1 shows that in 1966-69 highest proportion net sown area



were found in Jind district 83.04 percent. However, lowest proportions of Net sown area were found in Ambala district 63.54 percent. In 1990-93 highest proportion NSA were found in Kaithal district 89.27 percent. However, lowest proportions of net sown area were found in Gurgaon district 64.18 percent. Table 3 shows that in 2010-13, highest proportions of NSA have found in Palwal district 92.51 percent. While lowest proportion of Net Sown Area have found in Sirsa district 45.37 percent. Overall there are not significant variations in terms of area under Net Sown Area.

VII. CONCLUSION

The study concluded that land use pattern is changed over the period from 1966-69, 1990-93 and 2010-13. Sharp decline in the proportion of forest cover has been recorded in Haryana over the period. The proportion of area under put to non-agricultural uses has been increased due to urbanization and industrialization. Barren and un-cultivated land, land uses for grazing and as permanent pasture and cultivable land have all decreased over the study period 1966 to 2013. Land under miscellaneous tree crops and grove is almost non-existent in the state. Fallow land other than current fallow is almost non-existent in the state. Such land found in Jhajjar, Panchkula and Fatehabad district. Net sown area is increased in 1966-69 to 1990-93 but in 1990-93 to 2010-13 net sown area is same proportion 79 percent and 80.42 percent. Net sown area is decreased in Faridabad, Panipat and Sonipat districts because these districts are nearby National Capital Region.

References:

- [1] Ahmad, N., Sinha, D.K., K.M.Singh (2018). Changes in Land Use Pattern and Factors Responsible for Variations in Current Fallow Land in Bihar, India, Agricultural Research Communication Centre, Vol-52, No.3, PP 236-242.
- [2] Malik, J. (2012). Changing Landuse Pattern in Haryana, International Journal of Computing and Corporate Research, Vol-2, No.2
- [3] Mangalagowri, B., H. Nagaraj (2017). Changing Pattern of Land Use and its Impact on
- [4] Agriculture: A Case Study of Mysore District, Scholarly Research Journal for Interdisciplinary Studies, Vol-4, No. 37, PP 8580-8556.
- [5] Panday, G., T. Ranganathan (2018). Changing Landuse Pattern in India: has there been an Expansion of Fallow Lands?, Agricultural Economic Research Review, Vol-31, No.1, PP 113-122.
- [6] Singh, J.(2015). Dynamics of Land Use Pattern in Punjab, International Journal of Social Science & Interdisciplinary Research, Vol-4, No.6
- [7] Singh, S., R. Kumar (2014). Changing in Land Use Pattern of Bhindawas Wet Land in Haryana, International Journal of Informative & Futuristic Research, Vol-2, No.2, PP 346-349
- [8] Singh, R., Z. Islam (2010). Land Use Planning in Western Uttar Pradesh: Issues and Challenges, Recent Research in Science and Technology, Vol-2, No.9, PP 11-17.
- [9] Staastistical Abstract, Government of Haryana 1966 to 1969, 1990-93 and 2010-13 Economic and Statistical Advisor, Planning Department.
- [10] Alphan, H., 2003. Land use changes and urbanization in Adana, Turkey, Land degradation and Development, 14, pp 575-586.
- [11] N.C.Anil, G.JaiSankar, M. JagannadhaRao, I.V.R.K.V.Prasad and U.Sailaja, Studies on Land Use/Land Cover and change detection from parts of South West Godavari District, A.P – Using Remote Sensing and GIS Techniques. J. Ind. Geophys. Union, October 2011, Vol.15, No.4, pp.187-194.
- [12] Gautam, N.C., & Narayanan, L.R.A., 1983. Landsat MSS data for land use/land cover inventory and mapping: A case study of Andhra Pradesh, J.IndianSoc, Remote Sensing, 11(3), pp 15-28.
- [13] Sarma, V.V.L.N., Murali Krishna, G., HemaMalini, B., &NageswaraRao, K., 2001. Landuse/Landcover Change Detection through Remote Sensing and its Climatic Implications in the Godavari Delta Region, Journal of the Indian Society of Remote Sensing.Vol. 29, No. 1&2.