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## LAND USE LAND COVER CHANGES IN INDIA

**\*MEETU SHARMA**

*\*Lecturer Geography GDC Billawar*

**\*\*DIVYA SHARMA**

*\*\*Lecturer Geography GDC Billawar*

### **ABSTRACT**

*Information on land use/land cover in the form of maps and statistical data is very vital for spatial planning, management and utilization of land. Land-Use and Land-Cover (LULC) scenario in India has undergone a radical change since the onset of economic revolution in early 1990s. These changes involve a series of complex interaction between biophysical and socioeconomic variables. LULC follows a set of scientific themes which includes detection and monitoring, carbon and biogeochemical cycle, ecosystems and biodiversity, water and energy cycle, predictive land use modeling and climate variability and change.*

**KEYWORDS:** Land use, classification, India, land INTROD

### **INTRODUCTION**

India lies to the north of the equator between 8 degree 4 minutes and 37 degree 6 minutes north latitude and 68 degrees 7 minutes and 97 degrees 25 minutes east longitude. It is the seventh-largest country in the world, with a total land area of 3,287,590 km<sup>2</sup> (1,269,219 square miles). The geography of India is extremely diverse, with

landscape ranging from snow-capped mountain ranges to deserts, plains, hills and plateaus. India comprises most of the Indian subcontinent situated on the Indian Plate, the northerly portion of the Indo-Australian Plate. Having a coastline of over 7,000 km (4,300 miles), most of India lies on a peninsula in southern Asia that protrudes into the Indian Ocean. India is bounded in the southwest by the Arabian Sea and in the southeast by the Bay of Bengal.

## LAND USE/ LAND COVER CHANGE

LULC has two separate terminologies that are often used interchangeably. Land cover refers to the biophysical characteristics of earth's surface, including the distribution of vegetation, water, soil, and other physical features of the land. While land use refers to the way in which land has been used by humans and their habitat, usually with an emphasis on the functional role of land for economic activities.

## LITERATURE REVIEW

1. Rawat JS, Kumar M. Monitoring land use/cover change using remote sensing and GIS techniques: A case study of Hawalbagh block, district Almora, Uttarakhand, India. *The Egyptian Journal of Remote Sensing and Space Science*. 2015;18(1):77–84. <https://doi.org/10.1016/j.ejrs.2015.02.002>.

2. Barah.B.C. (2010), A Rapporteurs in *Indian Journal of Agricultural economics*, in his work entitled 'problems And prospects for mountain agriculture' states that, it is the topographical diversities, distinctive socio-economic Features and climatic variability which makes the hilly and mountains areas different from plain areas. These Features states that a unique treatment is given to hilly and mountains areas, the infrastructure facilities, transport And communication should play an important role and these facilities should be enhanced.

3. Kumar Rohitashw and Raj Hardener Gautam in (2014) , in his work entitled 'Climate change and its impact on Agricultural productivity in India ' states that , climate change has a very serious issues on almost all the natural Resources especially water which sustain the life on this planet. Changes in biosphere, biodiversity and other Natural resources has a serious and adverse effect on the human health and quality of life. The changes in Temperature, seasonal variation effect the human health.

## OBJECTIVES

1. To analyse land use land cover changes in India for the period 2005-06 to 2011-12.
2. To find better ways to use land for sustainable development.

## METHODOLOGY

The data used is secondary taken from Economic survey of India. Descriptive statistics has been used to analyse the LULCC.

The land-use categories defined in SEEA-CF and Indian 9-fold classification have Deviations in respect of concept, definition and treatment. Hence a one-to-one Correspondence cannot be established between the datasets. However, Indian 9-fold Classification could be arranged in the SEEA land use categories

### Land Cover Statistics

In India, land cover statistics are maintained by National Remote Sensing Centre (NRSC), Department of Space (DOS) through a component on National Land Use/ Land Cover (LULC) mapping of the Natural Resources Census (NRC) Project of National Natural Resources Repository (NRR) Program. The data for land use/land cover Classification of 1:50,000 scale for 2005-06 and 2011-12 has been released by NRSC.

### Land Use Statistics

The land use statistics in India were developed as a source of information for Planning of agricultural production. Out of a geographical area of 328.73 million hectares, Statistics are available for 305 million hectares, with coverage of more than 93%. As much As 58 percent of India's farmland is held by marginal farmers with holdings below one hectare, against less than 8.2 percent in large holdings of 10 hectares and above\*.

The Reporting area is classified into the following nine categories:

1. Forests: Includes land classed as forest under any legal enactment dealing with Forests or administered as forests, whether state-owned or private and whether Wooded or maintained as potential forest land. The area of crops raised in the forest And grazing lands or areas open for grazing within the forests are included under The forest area.
2. Net area sown: Represents the total area sown with crops and orchards. Area sown More than once in the same year is counted only once.
3. Area under non-agricultural uses: Includes land occupied by buildings, roads and Railways or under water, e.g. rivers and canals as also other land put to uses other Than agriculture.

4. Barren and unculturable land: Includes all barren and unculturable land like Mountains, deserts, etc. Land which cannot be brought under cultivation except at An exorbitant cost, are classified as unculturable whether such land is in isolated Blocks or within cultivated holdings.
5. Permanent pastures and other grazing lands: Includes all grazing lands whether They are permanent pastures and meadows or not. Village common grazing land is Included under this head.
6. Land under miscellaneous tree crops, etc. : Includes cultivable land which is not Included in 'Net area sown' but is put to some agricultural uses. Lands under Casurina trees, thatching grasses, bamboo bushes and other groves for fuel, etc. Which are not included under 'Orchards' are classified under this category.
7. Culturable waste land: Includes land available for cultivation, but not cultivated During the current year and the last five years or more in succession for one reason Or other. Such lands may be either fallow or covered with shrubs, which are not put To any use. They may be assessed or unassessed and may lie in isolated blocks or Within cultivated holdings. Land once cultivated but not cultivated for five years in Succession are also included in this category at the end of the five years.
8. Current fallow: This represents cropped area which are kept fallow during the Current year. If a seeding area is not cropped against the same year, it may be Treated as current fallow.
9. Fallow Land other than Current Fallow: Includes all lands, which were taken up For cultivation but are temporarily out of cultivation for a period of not less than One year and not more than five years.

\*- Agricultural census of India 2011

The major findings of LULC Change matrix at all India level is given below:

- i. Farmland: Around 28.97 thousand sq.kms (0.88area of farmland shifted into Fallow land from 2005-06 to 2011-12 under the Agriculture Land. Similarly, around 65.10 thousand sq. Kms (1.98%) area of fallow land and 9.98 thousand sq. Kms of Barren/wastelands/unculturable converted into farmland under agriculture land in The same period.
- ii. Fallow: Around 65.10 thousand sq.kms (1.98%) area of fallow land converted to Farmland from 2005-06 to 2011-12 under the Agriculture Land. Similarly, around 28.97 thousand sq. Kms of farmland converted to fallow land under agriculture land In the same period.

- iii. Barren/ Unculturable /Wastelands: 9.98 thousand sq. Kms (0.30%) area of this class of Land shifted to farmland under agriculture from 2005-06 to 2011-12 and 17.88 Thousand sq. Kms of snow and glacier converted into barren / unculturable/ Wastelands in the same period.
- iv. Built-up: 5.39 thousand sq. Kms area (0.16%) of land of agriculture and Barren/unculturable/wastelands converted into built-up from 2005-06 to 2011-12.
- v. Forest: 4.53 thousand sq. Kms (0.14%) area of land of forest shifted to farmland under Agriculture and barren/unculturable/wastelands from 2005-06 to 2011-12 and 7.43 Thousand sq. Kms of farmland under agriculture and snow and glacier converted Into forest in the same period.
- vi. Snow and Glacier: 21.99 thousand sq. Kms (0.67%) area of land under snow and Glacier converted to barren/unculturable/wastelands and forest from 2005-06 to 2011-12.
- vii. Wet Lands / Water Bodies: 4.26 thousand sq. Kms (0.13%) area of land of wet lands /Water bodies shifted to farmland, barren/unculturable/wasteland and grass/grazing From 2005-06 to 2011-12 and 6.24 thousand sq. Kms of agriculture and Barren/unculturable/wastelands converted into wet lands /water bodies in the same Period.

## SUGGESTIONS

1. Minimal damage to the environment should be done. It is a well-understood fact that human beings are at the centre of the developmental process, however, to direct the developmental process establishing and maintaining the already established harmony between nature and needs of human beings is imperative.
2. There should be a holistic development, the developmental policies should not be centres in some specific areas. This is necessary for the equitable development of the nation as a whole. Sustainable development should be the goal of the government while framing policies. This should be to ensure that the resources of the country are equitably shared between the present and future generations. Smart utilization of resources should be the aim of these schemes, especially when it comes to land resources.
3. Optimum resources should be channelised for the development for development of wasteland, uncultivable lands, recycled and degraded land. For a comprehensive development, there has to be adequate harmonization of authorities at all the three levels, that is- national, state and local level. Also, the evolution of a sound scheme which directs the entire policy is imperative.

4. The specific purpose of each terrain of the land is necessary so that the natural purpose of that piece of land is not altered and hence most effective use of such land is enabled.

5. Specific attention should be given to conservation of agricultural lands, taking into consideration the growing demands of food consumption of the ever-increasing population of India.

## CONCLUSION

Land cover and land use statistics and accounts provides the crucial information to The policy makers for better utilization of land in a sustainable manner to fulfill the Demands of growing population without increasing the degraded land. The compilation of Land accounts will help in addressing many of the SDGs like SDG 2. ‘Zero Hunger’, SDG 11, ‘Sustainable cities and Communities’ and SDG 15, ‘Life on land’. Three of the targets In SDG 2.4, 11.3 – 15.1 and 15.3 – explicitly refer to quality and utilization of land in a Sustainable manner. The information on the quality of country’s land and its utilization Provides valuable information required to initiate the requisite corrective measures and Also forms the input for forest, coastal & marine policies. Spatial land use and land cover change is a reflection of the impact of biotic drivers as well as abiotic drivers on the prevalent land use and land cover of the region. The force of the drivers as well as the changes in driver composition leads to changes in the prevalent land use and land cover of a region. Both the terrain and climatic factors also play a major role in influencing the intensity as well as the rate of land use and land cover change.

## REFERENCES

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4. Economic Survey of India, land use land cover data (2005-06 & 2011-12)