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# SPATIAL DISTRIBUTION PATTERN OF JHUM CULTIVATION AND LAND USE LAND COVER STATUS IN AMRI BLOCK OF KARBI ANGLONG DISTRICT, ASSAM

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## ABSTRACT

Shifting cultivation is also known as jhum cultivation in north-eastern region of India as the main land use system in hilly areas. Increased of human population during last few decades is main cause for intensification of practice of jhum (shifting) cultivation at a large scale in Amri Block of Karbi Anglong District of Assam. In this study area it has been observed that the dynamic change in land use and land cover been mainly caused by traditional practice of jhum (shifting) cultivation. Land use is dynamic phenomenon and it changes with time and space. The aim of this research paper is to investigate the spatial distribution pattern of jhum cultivation in the study area. Another objective of this paper is to study land use land cover status of Amri Block in Karbi Anglong District. Supervised Classification method with maximum likelihood algorithm has been used for land use and land cover classification of the study area using the software Arc GIS 10.2.1. For ground truth verification and error reduction field study is carried out by using the handheld GPS. Land use and land cover of the study area has been divided into seven categories. The total area of jhum (shifting) cultivation is 127.15 sq km which is about 15.65 per cent out of total geographical area of the Amri Block in the Karbi Anglong District in 2017. Due to the excessive practice of jhum (shifting) cultivation in the study area the forest cover gets degraded and that ensure the environmental degradation. Therefore the Proper strategy is required for sustainable jhum practice mitigation the environmental problems.

## INTRODUCTION

Jhum cultivation is a primitive type of farming system. In this system forest cover and natural grasses are cleared by slash and burn method. Jhum cultivation is variously termed as rotational shrub fallow agriculture or slash and burn cultivation. It is an ancient form of agriculture still common in many parts of the humid tropical regions. In South and South-East Asian rainforest regions, large tracts of secondary forests have been created, cultivated, and maintained under shifting cultivation (Shankar Raman, 2001). Shifting cultivation is an age-old farming practice implying that plant nutrients, which are gradually released in the soil, added from the atmosphere or from dust deposition, accumulate in the vegetation and in the soil during the fallow period. After clearing from natural vegetation by slashing and burning the area is cropped for one or two years and then allowed to lapse to natural vegetation. After some years e.g. 3-4 years gap period, the area may be cleared and cropped again (Ramkrishnan, 1992)

Jhum cultivation is mostly practiced in the hilly areas of the North-Eastern Region, Andhra Pradesh, Orissa, and in some pockets of Madhya Pradesh and Bihar. In the north-eastern states 4.92 lakh tribal families practice jhum on 4.53 lakh hectare in one year. The total area used by these families over the total shifting cultivation cycle was 2.69 million hectare (The National Commission on Agriculture, 1976).

Land cover indicates the physical land type such as forest or open water bodies. Land use documents haw people are using the land. Land use land cover changes are main driver of environmental change since it occurs at spatial and temporal dimensions. Remote sensing and GIS techniques are important tool for measuring land use land cover. Land utilization pattern is one of the important elements in the assessment of our natural resources. Amri Block is a mountainous area and many population of this block is dependent on agricultural activities. Jhum cultivation is the most dominant farming practices in the study area. Jhum cultivation is the main cause of deforestation in the study area. The aim of the study is to study spatial distribution pattern of jhum cultivation and land use land cover status in the study area. The total jhum area is 127.15 sq. km and the dense forest covered area 37.92 sq. km. this figure shows that the dense forest area is decreased due to increase of human population and their activities and expansion of jhum (shifting) cultivation areas in Amri block of Karbi Anglong District in Assam.

## OBJECTIVES

Based on the background outlined above, the main objectives for the study are:

(i) To understand spatial distribution pattern of jhum cultivation of the study area

(ii) To investigate the land use and land cover of the study area

## STUDY AREA

Amri Block is located in Karbi Anglong District of Assam. It covers an area of 812.34 square kilometers and supports a population of 36,653 persons (2011). Study region lies approximately between $25^0 48'$ and $26^0 8'$ north latitudes and $92^0 11'$and $92^0 38'$ east longitudes. The altitude of the study area ranges from 55 to 1372m and this area is basically covered by tropical forests dominated by deciduous, semi-evergreen, various bamboos and few mixed vegetation. It is inhabited by different ethnic groups, who have established their permanent settlements in and around the forest from ancient time and are dependent on the forest for their daily needs through direct collection or modification of the land for agricultural practices, called shifting cultivation.

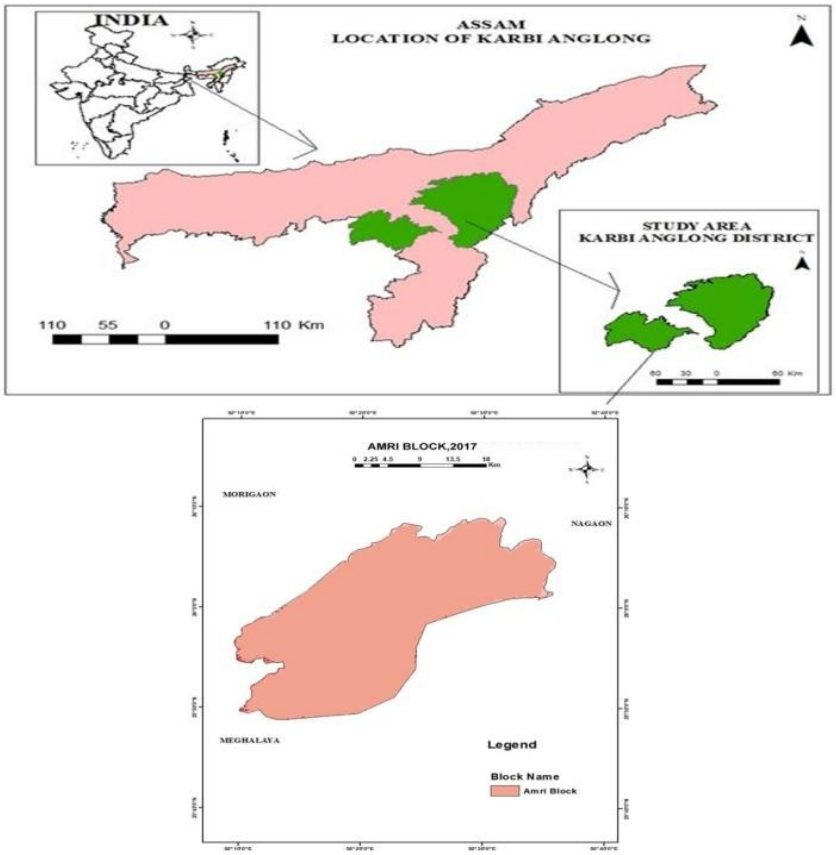


**Figure 1:** Location of Amri Block in Karbi Anglong District

## METHODOLOGY

The topographical sheet collected from survey of India at the scale of 1:250,000 along with remote sensing data of Land sat 5 (TM) and Land sat 8 (OLI) in digital format (Path 135, 136 and Row 44) are consulted for demarcating of study area and also prepared land use land cover map of the study area. Supervised Classification method with maximum likelihood algorithm has been used foe land use and land cover classification in Arc GIS 10.2.1 and this method is well recognized for the land use and land cover classification throughout the world. For ground truth verification and error

reduction field study is carried out using the GPS. The total land use and land cover of the study area has been divided into seven categories.

## RESULT AND DISCUSSION

### *Land use and land cover of amri block in 2017*

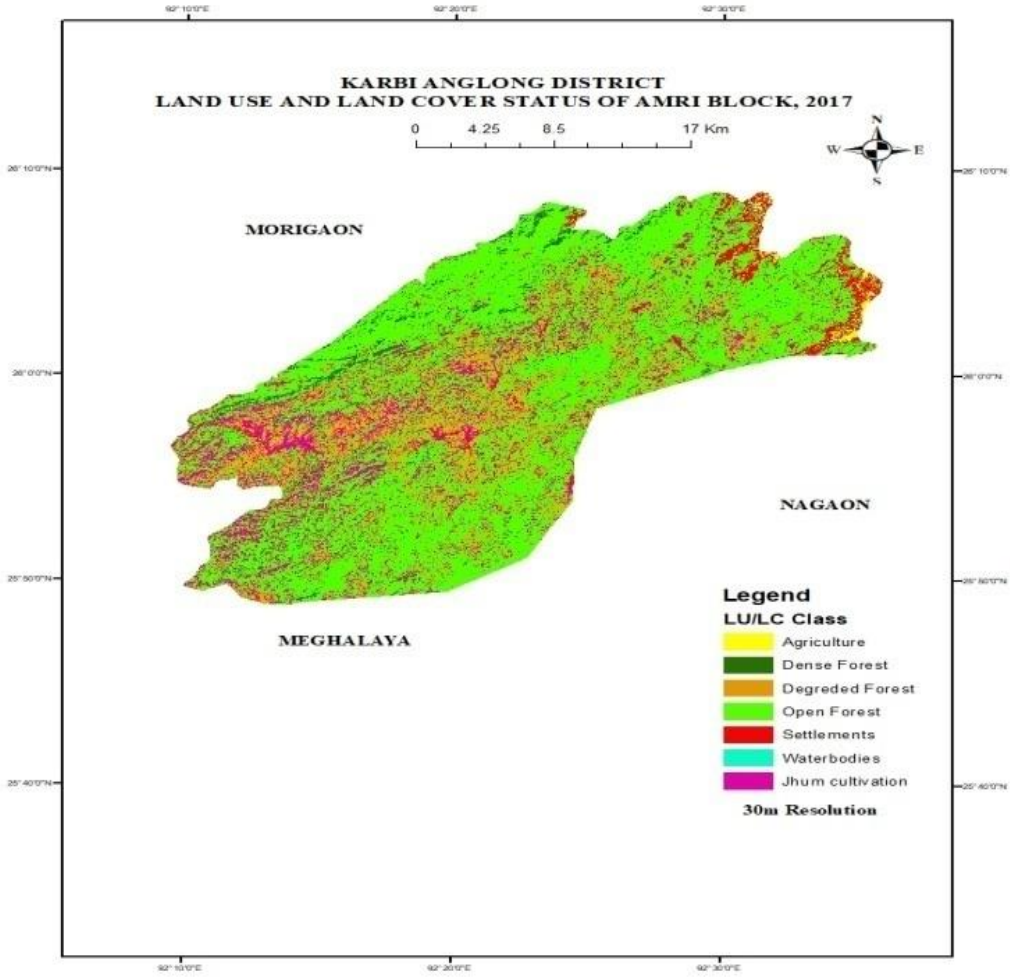


**Figure 2:** Land use and land cover of Amri Block, 2017

Amri Block covers an area of 812.34 sq km. Analysis of satellite image of 2017 reveals that there are lots of significant changes in land use land cover types in Karbi Anglong District (Table 1). Due to increased population pressure on forest covered area and practice of jhum cultivation for livelihood in rural hilly areas of Amri Block in Karbi Anglong District. Dense forest occupies only 37.92 sq km (4.67 per cent) and Open forest covers an area of 507.05 sq km (62.42 per cent). 12.77 per cent area is covered by degraded forest (103.72 sq km) and 3.72 per cent area covered by settlements (30.23 sq. Km area). Agricultural land cover an area of 0.71 per cent (5.79 sq km area) while water body cover 0.48 sq km area (0.06 per cent). Jhum cultivation covers an area of 127.15 sq km (15.65 per cent). Due to increase in human population the number of area covered by settlement, jhum cultivation and

degraded forest increase. Area under Dense forest decreases because of human pressure on the forest land. As a result of population pressure jhum cultivation area also increases. Dense forest area converted into other categories of land.

**Table 1:** Status of land use and land cover in amri block in 2017

| LU/LC class in 2017 | Area in sq. km | Percentage of Area |
|---|---|---|
| Dense Forest | 37.92 | 4.67 |
| Open Forest | 507.05 | 62.42 |
| Degraded Forest | 103.72 | 12.77 |
| Settlement | 30.23 | 3.72 |
| Agriculture | 5.79 | 0.71 |
| Water bodies | 0.48 | 0.06 |
| Jhum Cultivation | 127.15 | 15.65 |
| Total Geographical Area of Amri Block | 812.34 | 100 |

***Spatial distribution pattern of jhum cultivation in amri block, 2017***

Spatial distribution mapping of shifting cultivation in Amri block has been prepared by using Arc GIS. From the spatial distribution map it is observed that jhum cultivation area is located near open forest. Generally jhum field is located in hilly area where hill slope is near $20^0$ to $40^0$ slope which is easily accessible by the jhum cultivators. In Amri Block 127.15 square kilometer area is covered by jhum cultivation.

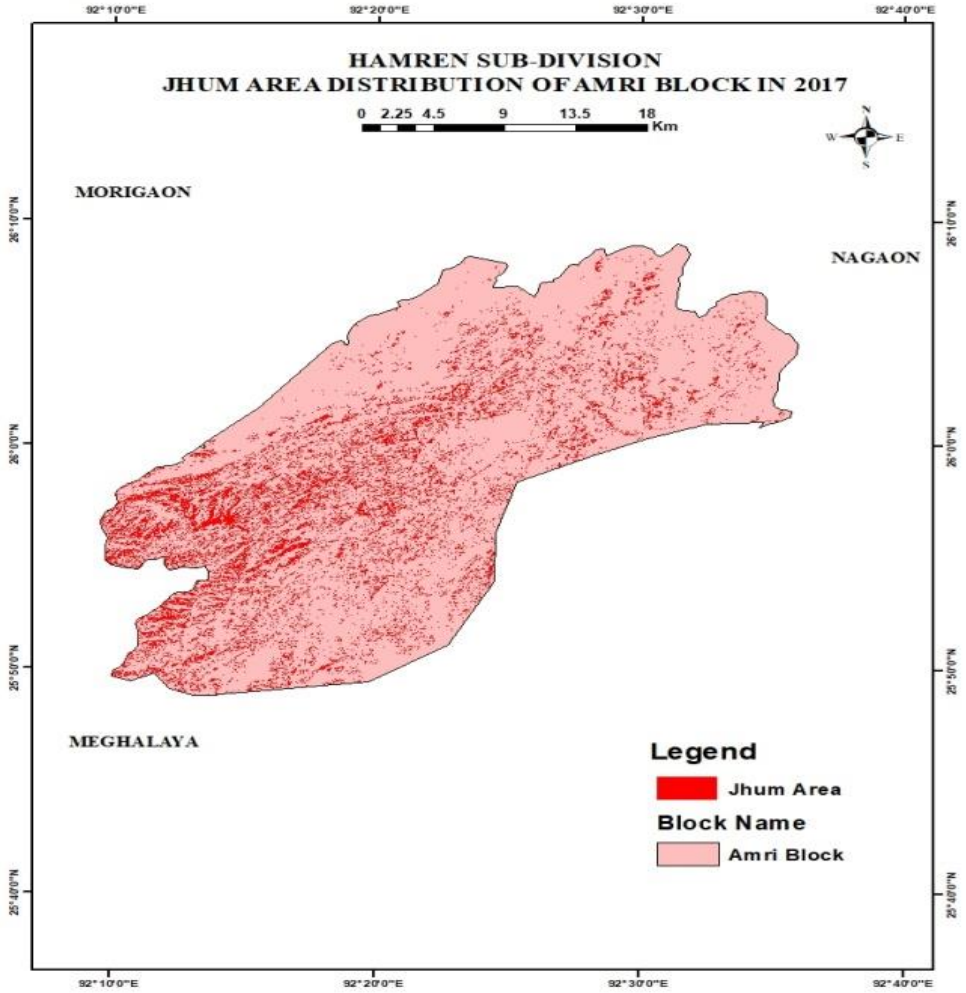


**Figure3:** Jhum area distribution in Amri Block

## CONCLUSION

The modern technique of remote sensing and Geographic information system plays an important role in assessment of jhum cultivation, distribution of jhum fields and land use and land cover mapping of Amri Block in Karbi Anglong District. The study has completed on the effectiveness of remote sensing and GIS in the identification and distribution of shifting cultivation area and its impacts on landscape. The present study reveals a disturb land use and land cover status in Amri Block with the changing land use land cover elements. These kinds of changes are mainly related to human interferences for their daily needs and required economy. The forest dwellers are enormously extracting natural resources and practising shifting cultivation resulting in threat to the biodiversity and forest ecosystem. The total area of jhum (shifting) cultivation is 127.15 sq km which is about 15.65 per cent out of total geographical area of the Amri Block in the Karbi Anglong District in 2017. Due to the excessive practice of jhum (shifting) cultivation in the study area the forest cover gets degraded and that ensure the environmental degradation. Therefore the Proper strategy is required for sustainable jhum practice mitigation the environmental problems.

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