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# Analysis of Land Use and Land Cover of the Region through Normalized Difference Vegetation Index

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**ABSTRACT:** Based on Normalized Difference Vegetation Index(NDVI), the information obtained by Land use and Land cover(LULC) of a place can be known about various issues related to the geographical environment of that region. Among these geographical issues, the trends of socio-economic development of human life are specially discussed. Again, in the case of using this Normalized Difference Vegetation Index (NDVI) related information, first of all it is necessary to know about Land use and Land cover (LULC). In order to determine the density of green areas within the area, using the visible reflected by the vegetation, an image is proposed and presented by which the region is independently observed on near-infrared sunlight. In addition, Normalized Difference Vegetation Index (NDVI) is the most widely used in Land use and Land cover (LULC) map analysis. So it can be said that by the discussion of this paper first of all Normalized Difference Vegetation Index (NDVI) as well as Land use and Land cover (LULC) map of the area is compared with two years to show the spatial change of land distribution. For this, 2008 NDVI and Land use and land cover map drawing as well as 2019 NDVI and LULC are specially analyzed.

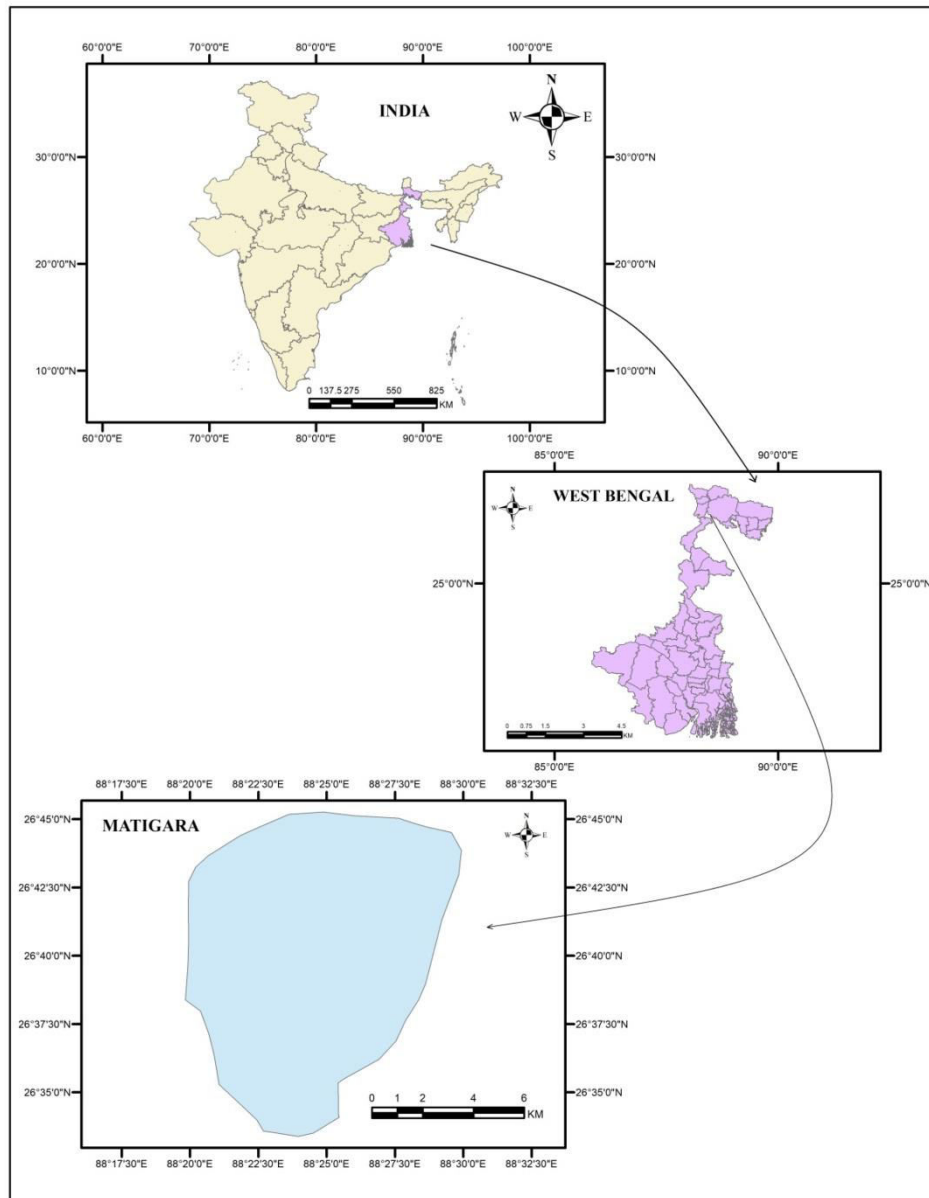
**KEYWORDS :** Overall plant development, Projected needs of the population, land use oriented development, A systematic analysis of resources, overall social development.

## I. INTRODUCTION

Land is the essential resource of man which is considered as a gift of nature. As nature uses this land, people use it as necessary for their daily needs. This land has a three-dimensional natural landscape. So it can be said that the Land use and Land cover(LULC) components of Normalized Difference Vegetation Index (NDVI) are always applicable. By analyzing the Normalized Difference Vegetation Index( NDVI) data, we can get an idea of how much natural vegetation is present on the topography of the region, as well as forestland and population development. In one word, human life journey is discussed on socio-economic issues. Again, Normalized Difference Vegetation Index( NDVI) can be used specifically in knowing the amount of moisture and dryness of the soil. Again, it is possible to understand and analyze the Normalized Difference Vegetation Index( NDVI) and Land use and Land cover (LULC) maps on the related issues of agricultural elements. In the discussion of this paper, it is possible to know the balance of the inert and biotic elements of nature with the green vegetation of the region by Normalized Difference Vegetation Index(NDVI) and Land use and Land cover(LULC). Besides, the issue of ecological environment is looked at.

## LOCATION MAP OF THE STUDY AREA

SHOWING THE MATIGARA AND ADJOINING AREAS OF WEST BENGAL, IN INDIA

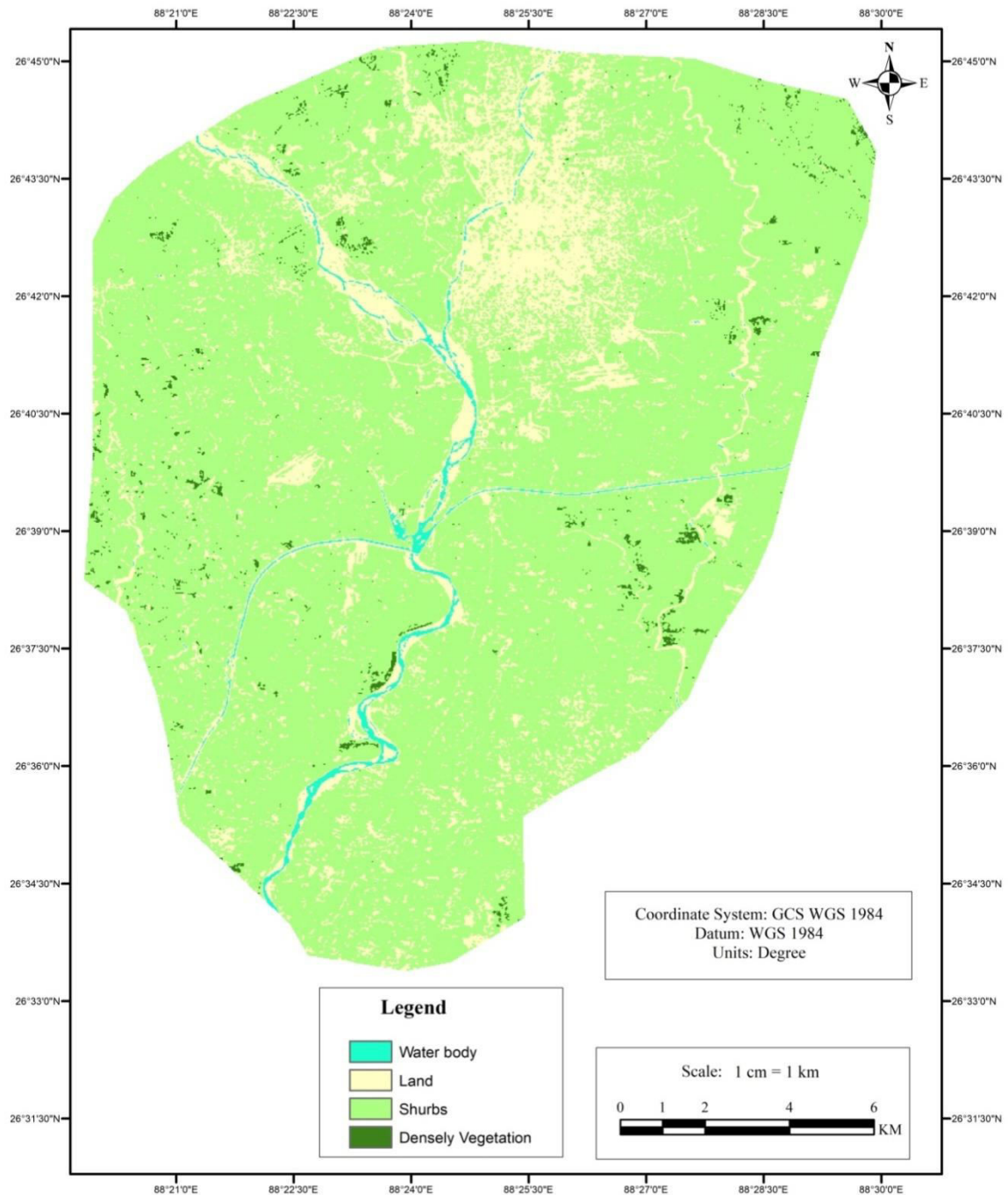


## II. METHODOLOGY AND STUDY AREA

Normalized Difference Vegetation Index( NDVI) and Land use and Land cover (LULC) maps are used to discuss various spatial information. For this, the map of Matigara and adjoining region under Darjeeling district in West Bengal was created. This Normalized Difference Vegetation Index(NDVI) map shows the location of human settlements in addition to the normal vegetation distribution of the region. Various publications and books as well as GIS application help are taken for making the map of this Matigara and adjoining region. For drawing this map, Coordinate System is WGS 1984 and Unit is Degree. Scale value is 1 cm to 1km. Again through these maps various ideas about the variation of landforms as well as information about the development and degradation of resources are analyzed. For this, 2 years of maps are required, the first one is from 2008 and the second one is from 2019.



# **NORMALIZED DIFFERENCE VEGETATION INDEX MATIGARA AND ADJOINING AREAS YEAR OF 2008 OF WEST BENGAL , IN INDIA**

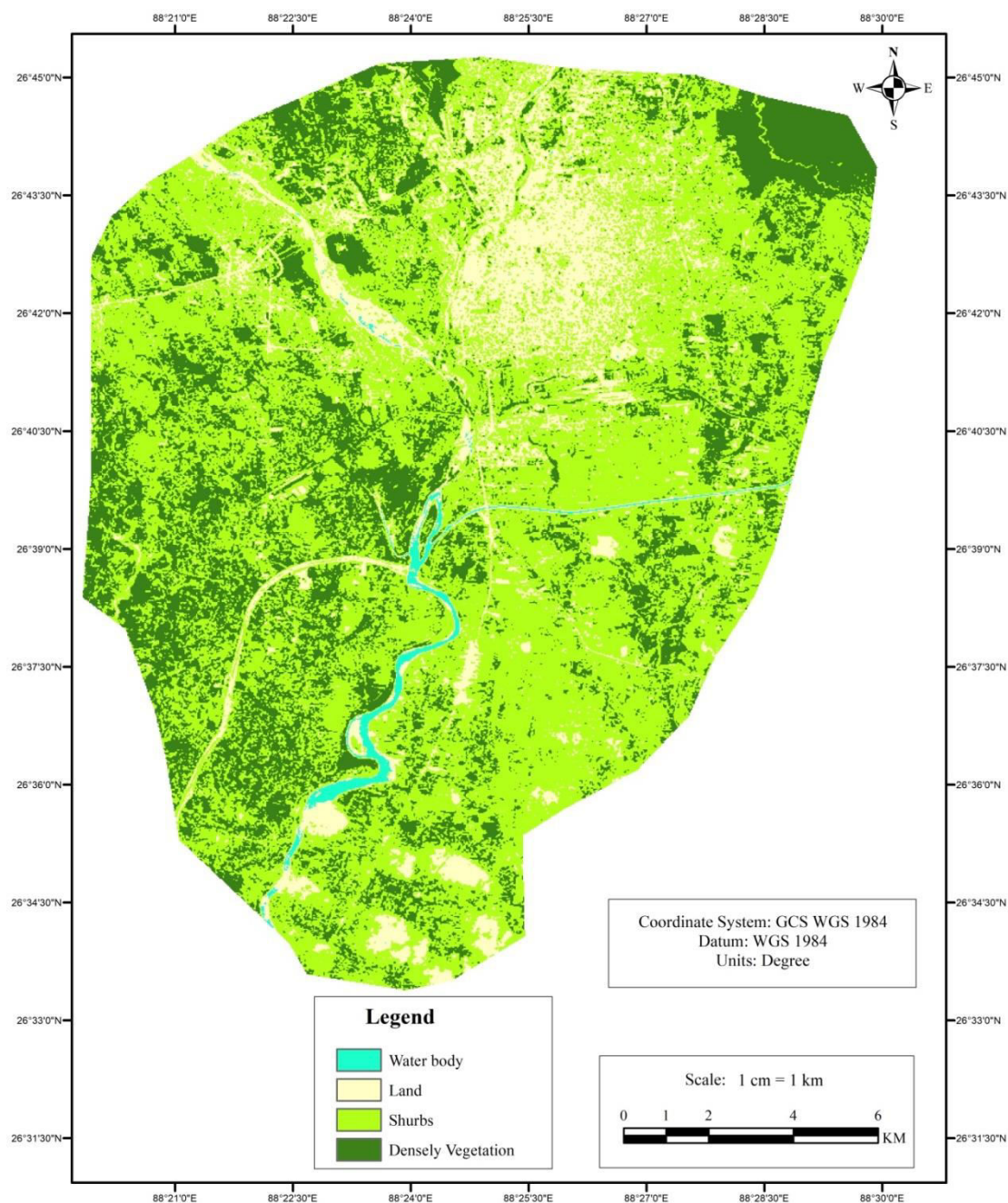


## **NDVI map in 2008 and analysis :**

2008 mapping of Matigara and adjoining area by various components related to Normalized Difference Vegetation Index (NDVI) and Land use and Land cover (LULC). That is why the region is identified by four colors. In which blue color is river and water body, light yellow is landform, light green is shurbs and densely vegetation is represented by dark green. The amount of Shurbs in 2008 is the highest in the region. Again there is a main river on the map and its branches come from different directions and join the main river. This main river flows from the north-west to the south-west and the land cover consists mostly of Shurbs. Again, the land cover of the region in 2008 shows very little

Densely vegetation. Again, the land cover of the region in 2008 shows very little Densely vegetation. By this Normalized Difference Vegetation Index (NDVI) map, the Shurbs component meets the land use needs of a large part of the population in 2008. The lowest land use component is Densely vegetation which can be observed sporadically. Again, the Land element is most in demand on the north side of the map and most of it is used for settlement construction.

### NORMALIZED DIFFERENCE VEGETATION INDEX MATIGARA AND ADJOINING AREAS YEAR OF 2019 OF WEST BENGAL, IN INDIA



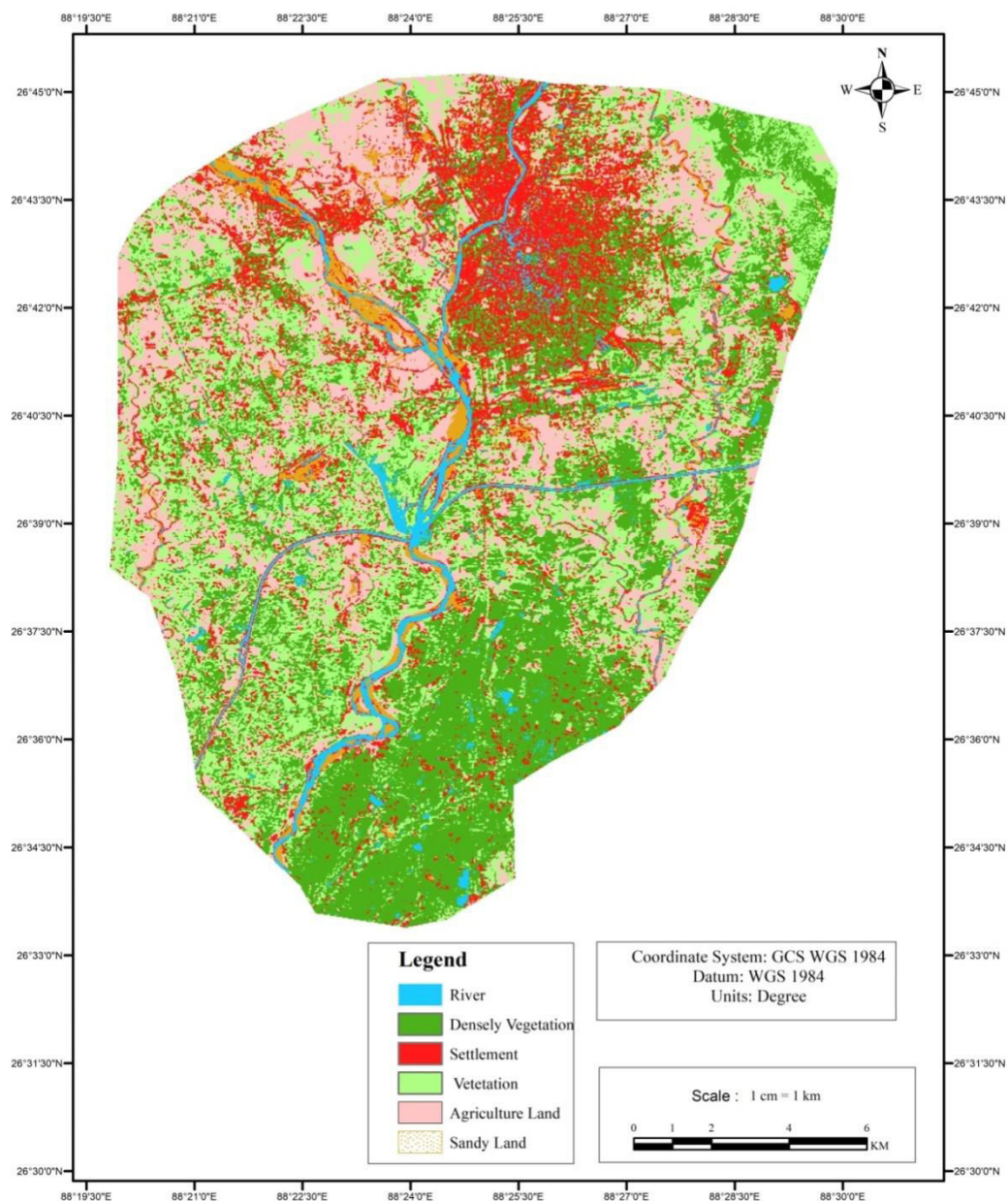
#### NDVI map in 2019 and analysis :

Normalized Difference Vegetation Index (NDVI) year of 2019 discussion with how much land cover does land use. By this it is known that the current human society is extracting wealth. So it can be said that in the map of 2008, the amount of Densely vegetation that is observed is very low, now the amount of Densely vegetation in the 2019 map can



be observed more. Through this it is known that the amount of densely vegetation of the land cover belonging to nature has increased. One of the reasons for this can be attributed to the public awareness, i.e. the development of the region as well as the balance of natural elements. Again in the 2008 Normalized Difference Vegetation Index (NDVI) map where the Shurbs component was high, here it can be observed that its amount is decreasing. The main reason for this is the expansion of settlements along with the change of rural to urban areas on vacant land forms. This dark green vegetation is most observed in the area between north-east and west region.

### UNSUPERVISED IMAGE CLASSIFICATION MATIGARA AND ADJOINING AREAS YEAR OF 2008 OF WEST BENGAL, IN INDIA

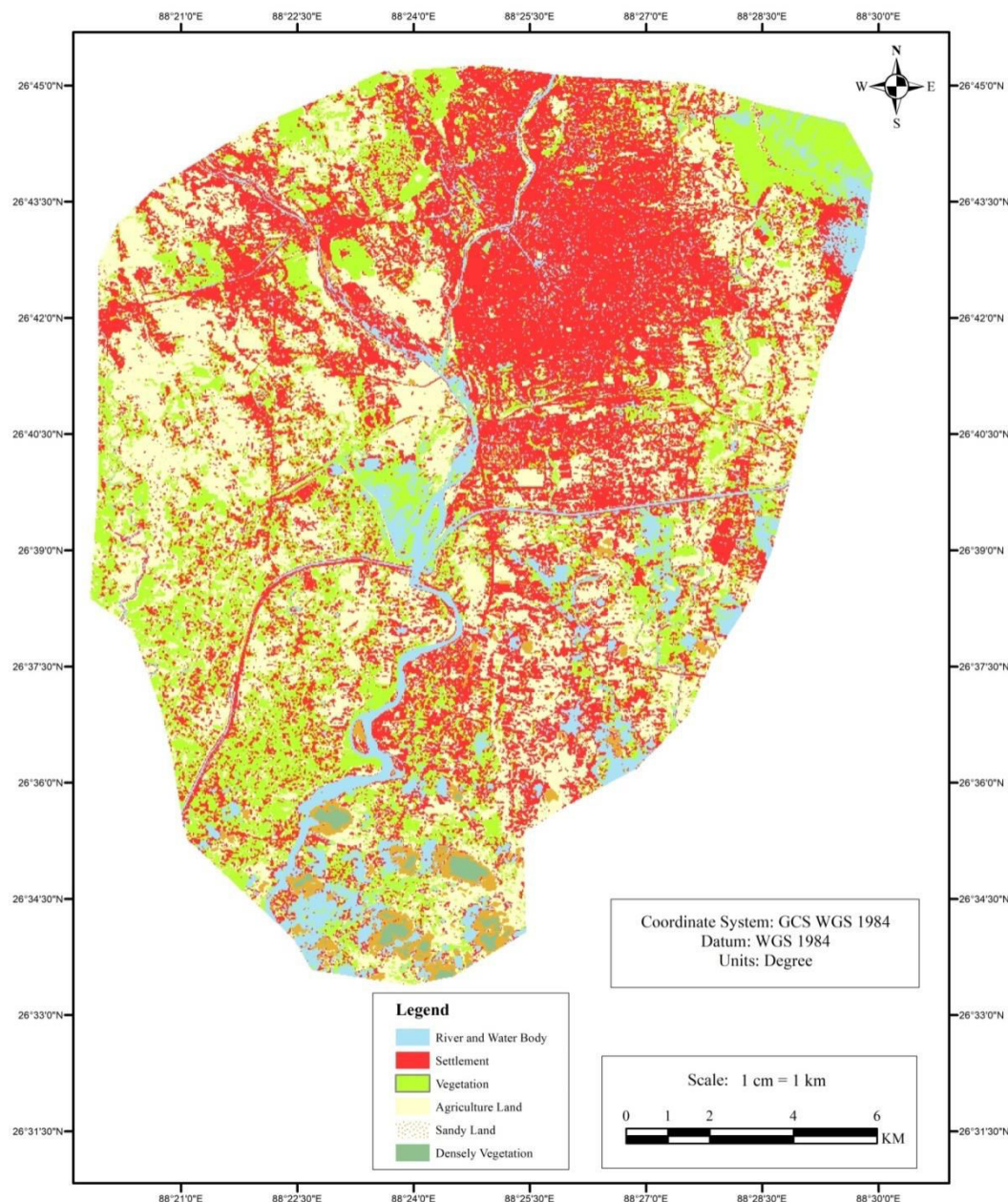


#### LULC map in 2008 and analysis :

Normalized Difference Vegetation Index(NDVI) 2008 and 2019 maps show densely vegetation, land use and land resource distribution. In this case Land use and Land cover (LULC) 2008 map shows the spread of settlement today compared to past days. So Land use and Land cover (LULC) 2008 maps are identified by 6 colors. In which dark green on the map is known as densely vegetation and red as settlement. The coordinate value of this map is GCS, WGS 1984.

The amount of natural vegetation in this Land use and Land cover (LULC) map is again seen in the southern part. Again the settlement can be seen in the north and north-west.

# UNSUPERVISED IMAGE CLASSIFICATION MATIGARA AND ADJOINING AREAS YEAR OF 2019 OF WEST BENGAL, IN INDIA



## LULC map in 2019 and analysis :

By Normalized Difference Vegetation Index (NDVI), the regional and land-use patterns of natural environment resources depend on Land use and Land cover (LULC). For this, we can get the correct idea through the 2019 map along with understanding the map of the previous year. For this Land use and Land cover (LULC) accurate analysis of crop production system is available through variation of soil composition on urban and rural population as well as climate. Moreover, there is an idea of how much forest land there is in the soil. In this case, looking at the LULC (2019) map, it can be understood that the maximum land demand is available for settlement. This settlement can be seen more in the north and northeast side by the red color of the map. Densely vegetation is reduced for the demand of land and it changes to Agricultural Land and settlements. This can be attributed mainly to the excessive increase in



population. This results in the degradation of natural resources for food and shelter of the population. Again, the difference between Normalized Difference Vegetation Index (NDVI) and Land use and Land cover (LULC) from 2008 to 2019 can be seen due to the change of rural population to urban areas. These Land use and Land cover (LULC) maps are correctly identified by unsupervised image classification.

### III. RESULTS AND DISCUSSION

Through this Normalized Difference Vegetation Index (NDVI) and Land use and Land cover (LULC), in addition to knowing the direct and indirect distribution of the natural vegetation of an area, along with it, how much of the natural elements and resources are located in the area and with it, the idea of improving the quality of human life is obtained. For this 2008 Normalized Difference Vegetation Index (NDVI) and Land use and Land cover (LULC) maps were drawn. As a result, constant changes in Normalized Difference Vegetation Index (NDVI) and LULC components are known in 2019. In this case, Normalized Difference Vegetation Index (NDVI) is low in Densely vegetation in 2008, but after that in 2019, due to the growth of vegetation in urban areas, the amount has increased more than before. Again, as in Land use and Land cover (LULC) 2008, as the population is less, land use is less to meet the settlement demand. But in Land use and Land cover (LULC) 2019, as population increases, land use for settlement needs more as well as food to meet the demand, the amount of forest area decreases.

### IV. CONCLUSION

The overall development of natural plants and land is possible by creating a balance between the socio-economic conditions of the people living in any region of the world and the social needs from that region at the national level. It can be said again that resources are wasted through people's foresight, technology, lack of awareness, illiteracy and egoism. How effective these Land use and Land cover (LULC) and Normalized Difference Vegetation Index (NDVI) quality improvement trends are from the past and present can be known only through thematic analysis and specific planning measures.

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