

## 1 Times Series Analysis

## 2 Classification Methods Use in Other Countries

LULC data are records that documents to what extent a region is covered by wetlands, forests, agriculture, impervious surfaces, and other land and water forms. These water forms include open water or wetlands. Land use shows how people use landscape either for conservation, development, agriculture or mixed uses [6, 7]. Changes In land can be identified by analysing satellite imagery. However, land use cannot be identified from satellite imagery. Satellite imagery give us information that helps in understanding the present landscape. Furthermore, to see changes through time, different years are needed. With this information, we can assess decades of data as well as insight into the possible effects of these changes that has occured and make better decisions before they can cause great harm. According to [10], five different types of LULC pattern were classified barren lands such as Galamsey Site, agricultural lands, urban lands, quarries, and free water bodies, to detect the 25years LULC change in the western Nile delta of Egypt. Supervised maximum likelihood classification (MLC) method together with landsat images were used in Erdas Imagine software. The finding shows a significant change in barren land changing into agricultural land continuously from 1984 to 2009.

[10] also used the Maximum likelihood classification(MLC), for Change detection and spatial matrix analysis to find changes in Avellino Italy for the period (1954 to 2004). The result was a LULC classification, with urban land use rapidly increasing and affecting the cultivated land, while woodland and grassland cover decrease was at a lower rate.

Moreover, in [13] studied the land use, land cover change in Duzce plain Turkey. They use Supervised classification and the Corine land cover nomenclature methods. The result shows classes of urban fabric, forest, heterogeneous agricultural land, inland wasteland and (Industrial, commercial, and transport) units with an accuracy assessment between 92.41 % and 97.3 % for 2010 and 1987 respectively. Also, a significant change in LULC was noticed with 11.2% increase in agricultural area and 335% decrease of forest land.

Furthermore, in [17] study the LULC change of watershed in Pakistan

from 1992 to 2012 using the supervised classification of maximum likelihood algorithm in Erdas Imagine. The finding shows agriculture, bare soil/rocks, settlements, vegetation and water. Also, the water body and vegetation are decreasing in favour of settlements, agriculture and bare soil rapidly from 38.2

Also, in [18] study, both unsupervised and supervised methods ISODATA and MLA respectively were used for classification. Change detection and Markov change analysis methods were also used to measure the changes generated in Mansoura and Talkha of Egypt from 1985 to 2010. The finding shows classes this is to say agriculture, barren land, built-up area and water body. Also, a significant change was noticed in agricultural land and built-up area to tune of 33% decrease and 30% increase respectively, while barren land and water bodies changes were minimal.

Similarly, in [19] studied the LULC classification of Sawantwadi taluka, in India. The hybrid, parametric (MLA and ISODATA), and nonparametric (DT) methods were used. The finding shows the classified LULC of the forest, water, built-up, agriculture, plantation, fallow land, open and dense shrubland, stone quarry, and grassland with an accuracy assessment of 93% and kappa of 0.92.

Also, in [20] they measured the land use, land cover change in Seramban. In the study, Natural Breaks (Jenks) and Normalized Difference Vegetation Index (NDVI) methods were used for classification and difference from 1990 to 2000. The result shows four classes of LULC viz barren land, built-up area, vegetation and water body. A 13% decrease in vegetation cover was noticed while other land use land cover increase by 3.7% accordingly with an accuracy assessment of 87% and 88% respectively.