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*Original Article*

# Land Use and Land Cover Analysis Using GIS: A Case Study of International Center of Excellence in Engineering and Management(ICEEM), Waluj-Aurangabad (Maharashtra) Master Planning

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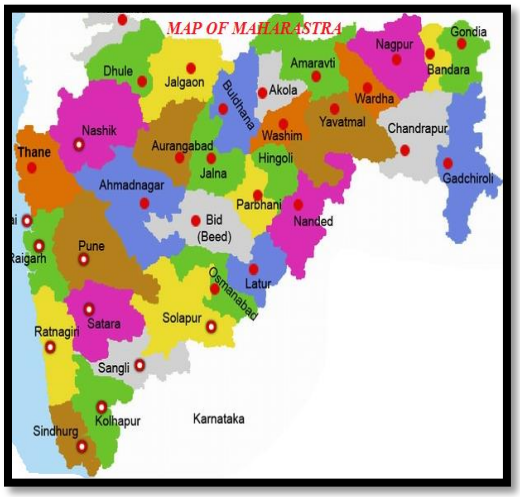
***Abstract:*** *Geographical location and object description are crucial tasks in this research. Environmental researchers have been analysing data and noting records of location and descriptions of observations using a variety of instruments and methodologies. Field mapping has recently become considerably easier thanks to mobile mapping on handheld devices. In order to cultivate, constrict, manage, and monitor environmental changes that have a direct impact on society, land use and land cover change have become essential processes. The development of mapping as a concept has substantially improved the accuracy of assessments of tree spread and health.The improvement of all woods' health should be a top focus. The use of spatial technology, such as Geographical Information Systems (QGIS), is a new tool for making construction and maintenance decisions.*

***Keywords:*** *Field Mapping, Mobile QGIS Online Reprocessing Geo Location Data*

## I. INTRODUCTION

Environmental changes that are of concern today due to environmental devastation and harm to human health are caused by both natural and human activity in both urban and rural settings [1]. Environmental researchers employ a variety of tools and techniques to analyse and record information about plants, locations, soil textures, acceptable sites, etc. Among these technologies are portable mapping tools and software. GIS mapping technology, for example, has caught our attention recently. For proper planning, management, and exploitation of natural resources, it is crucial to research land use and cover [2]. With the help of the GPS (Global Positioning System) and QGIS replaced in every person's smartphone, the geographic location and description of plants and things, together with their range of application, is made possible.

## II. STUDY AREA

The "International Centre of Excellence in Engineering and Management(ICEEM)" educational campus in Waluj Aurangabad, Maharashtra, India, is the focus of this study. Waluj is home to ICEEM, which is situated between latitude 19.8155189 and longitude 75.1404528. This rural location is flanked by a significant industrial area and a dense population. There are 11 acres in all that make up the campus. The term "land use" relates to the function that a piece of land performs, such as a water body, a playground, building, or a safety tank. Our study field encompasses all of the aforementioned characteristics. Land use is a result of how a society's cultural heritage interacts with its environment.

**Location of Study Area:**


**Figure 1: Geographical Identification of the Study Area**

## III. DATA AND METHODOLOGY

We mainly employed two types of data for our investigation. Topographic maps and mobile QGIS are these. used QGIS, a geographic information system that is open source, for analysis [6]. We did our research based on the aforementioned points and the methodologies used in each of the points we gathered. For the purpose of classifying land use and cover, Google Earth Engine data at high resolution (4 m) was gathered from several locations on the ICEEM site during June and July 2021. This image was used to categorise and identify various plant species, departments, map out routes, pinpoint various sites, etc.

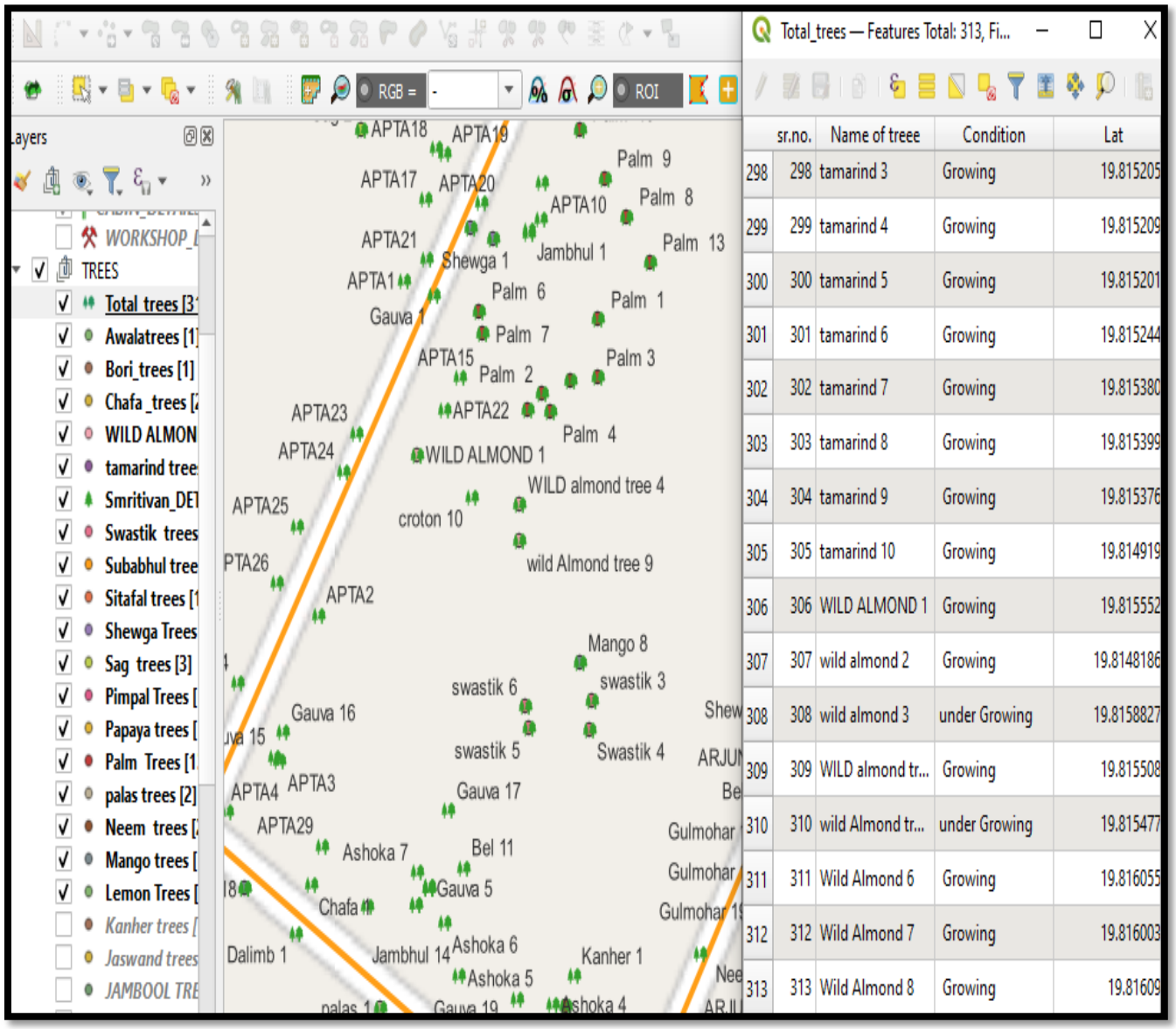



**Figure 2: Trees Mapping in ICEEM with Geo database**

## IV. MAPPING LOCATION OF PLANTS, DEPARTMENTS

Finding and analysing locations with Q-GIS is helpful for enhancing our management system. For this investigation, each point's location on the digitised map was geocoded using free source GIS software called QGIS[6]. to assess the geographical densities and species grouping of plants.

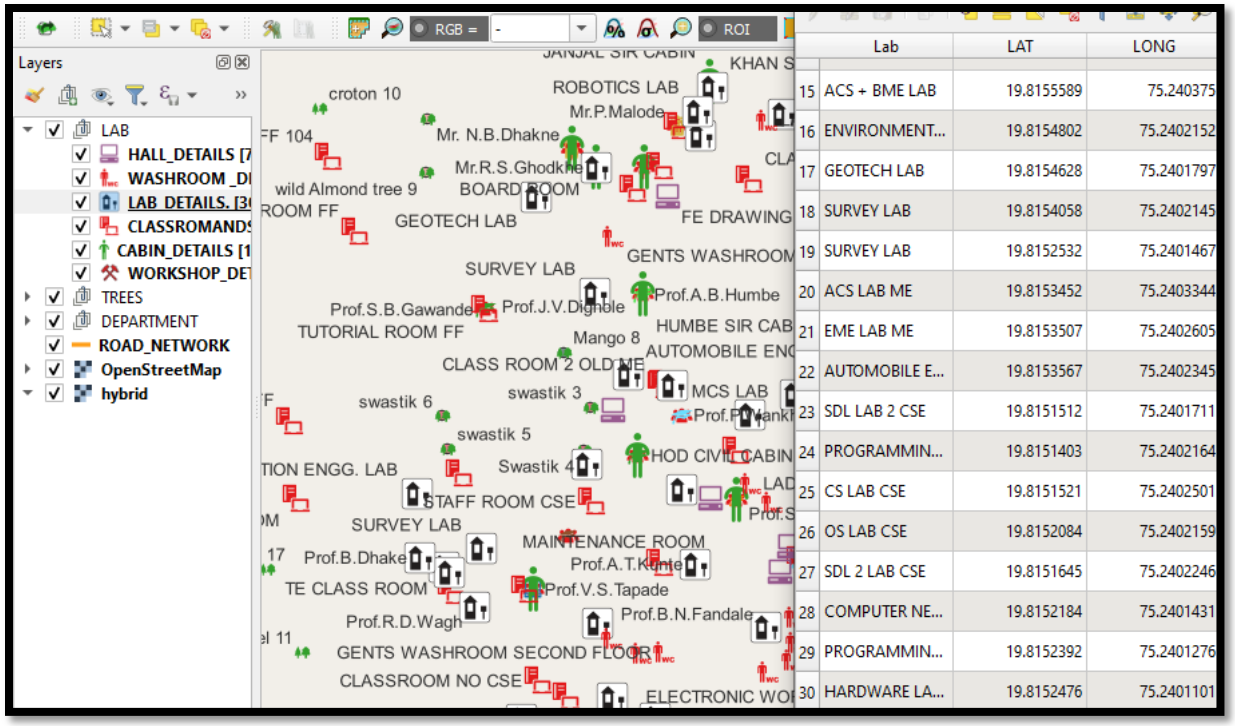



**Figure 3: Placemark Mapping in ICEEM**

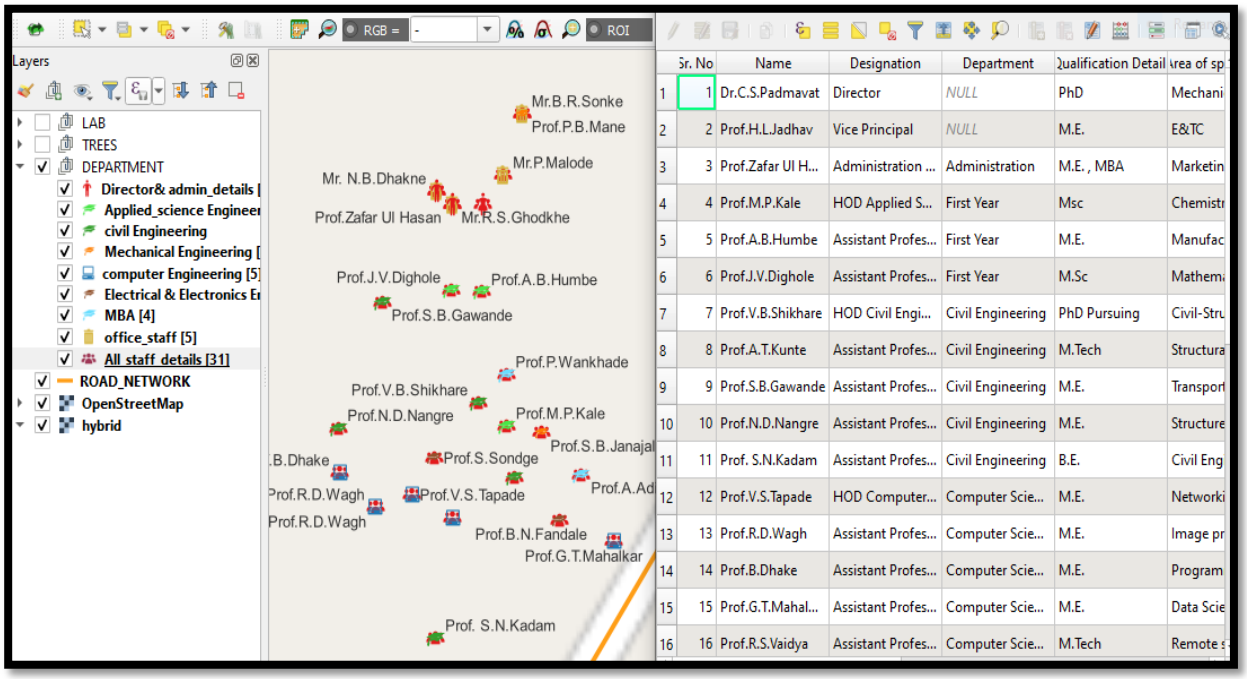



**Figure 4: Departments Mapping in ICEEM**

## V. METHOD OF LOCATING POINTS IN QGIS

We will first gather all GIS points for buildings, roads, and plants before geocoding each point's position using its corresponding coordinates. Each area can be separated based on its classification after geocoding. related Google Maps can be used to access the ICEEM educational campus's digital map. It will be exported as a new layer and integrated into QGIS. The X and Y coordinates of each site will be used to geocode each point's position.For additional analysis, each ponit location was also

tagged with specific information such as Name, landmark, quantity, type, etc.[6]. The areas will be indicated using the Heat map Plugin. Currently, there are numerous QGIS solutions available, including open access data bases that enable performing spatial analysis and field surveys, free programming languages and software for very particular purposes or multipurpose mapping applications for mobile devices. [7]

Having the capacity to gather different geometries (points, polygons), many attributes, and compatibility with the most often used data formats (KML, CSV). We list the most popular apps that are currently accessible. as well as proprietary and open source applications, therefore they would require us to hunt for simple online mapping solutions.

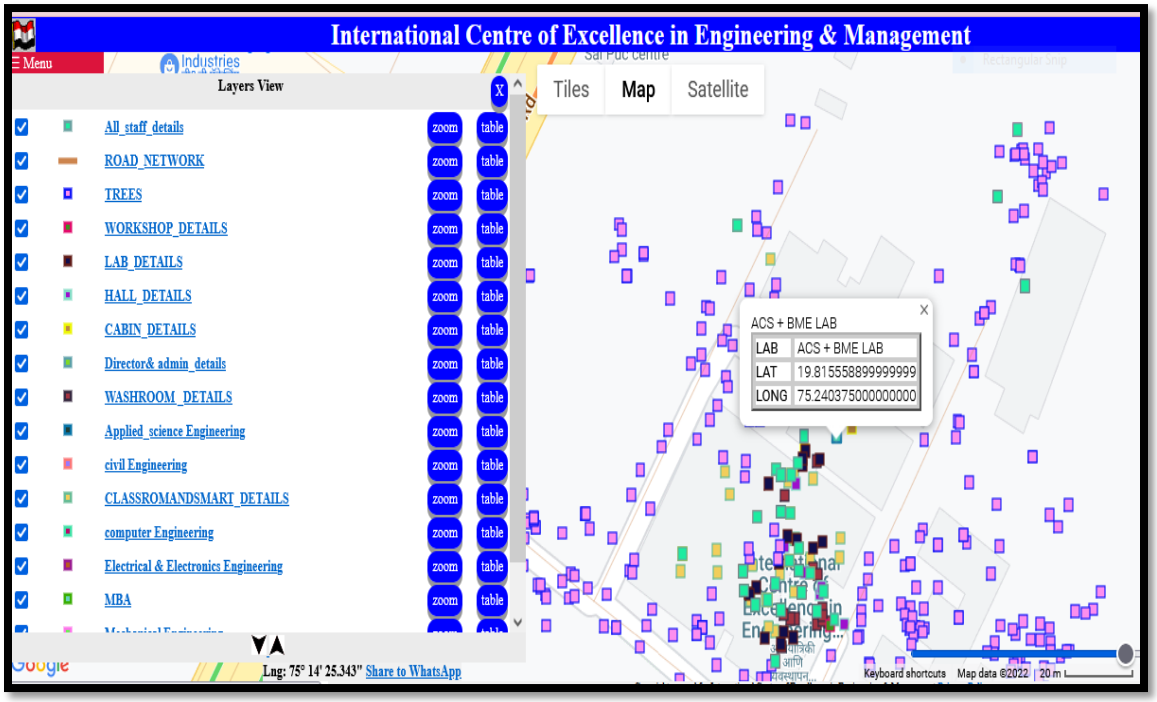



**Figure 5: Web Application of ICEEM**

## VI. BUILT-UP LAND

The ICEEM's built-up land is made up of sections with numerous buildings, including hostels, workshops, canteens, and different departments. From this information, we can plan for future construction without affecting the environment. The total amount of built-up land is 12500 sq.m, while the rest area is vegetation.

## VII. CONCLUSION

We learned from this study that Q-GIS makes mapping the locations of trees and departments simple. Moreover, a point map of their positions is produced by this study. Point maps are more advantageous since they can generate spatial data that is simpler to comprehend because they group data from the same region. A point map with colours representing the frequency of occurrence density level is produced in this study by grouping the data depending on the distance of occurrence.
The Q-GIS software's capacity to be a very potent tool for determining the position of points.

**Acknowledgement:**

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