

3. Technique used

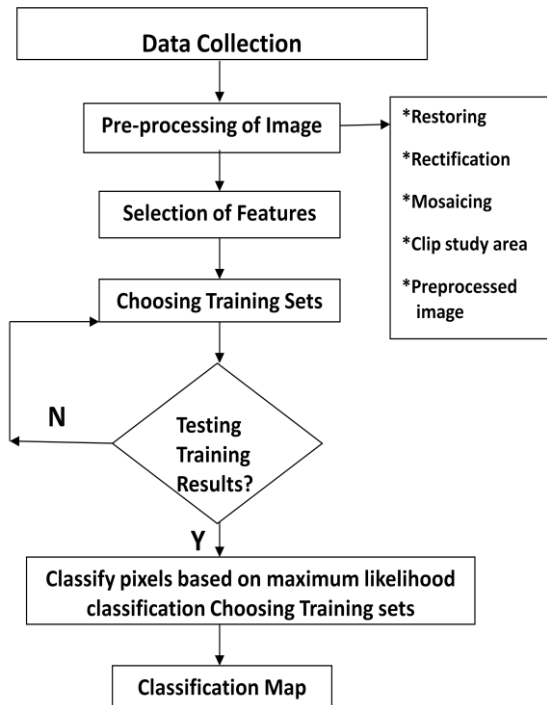


Figure 2: The process of classification

3.1 Data Collection

For analysis and study of Parbhani city, LISS-IV high resolution data were used. For study the multispectral satellite imagery of Dec-2013 is collected from National Remote Sensing Agency (NRSC) Hyderabad, India. Together with this satellite imagery a topographic map and existing land use maps were used to analyze the ground truth.

The LISS-IV sensor is a multispectral high resolution sensor, which operates within three spectral bands (B2, B3, B4). LISS-IV can be operated in either multi-spectral mode (Mx), a swath of 23 Km (selectable out of 70 Km total swath) is covered in three bands, or in mono mode (Mono), the full swath of 70 Km can be covered in any one single band, which is selectable by ground command (nominal is B3 - Red band). The LISS-IV camera can be tilted in the across track direction thereby providing a revisit period of 5 days.

3.2 Preprocessing

In the analysis of imagery, the image pre-processing was carried out. Each preprocessing of an image consists of restoration and rectification of an image. In pre step of study image mosaicing technique is used. It is used to join two satellite images. After joining the images GIS clip tool is used to take appropriate clip of study area. To locate ground features of an image, image enhancement and extraction is used.

3.3 Classification

Maximum likelihood: For analysis, an image classification technique is used. For image classification specific computer

software was used like ENVI. The aim of image classification process is converting image data to thematic data. In classification process, classify pixels iteratively, redefine the criteria for each class, and classifies again. In supervised classification technique, the maximum likely hood algorithm will classify the image based on training sets provided by the user based on field knowledge. Training polygons were chosen from composite image and assign to various land features.

Maximum likelihood classification assumes that the statistics for each class in each band are normally distributed and calculates the probability that a given pixel belongs to a specific class. Unless a probability threshold is selected, all pixels are classified. Each pixel is assigned to the class that has the highest probability (i.e., the maximum likelihood).

A good knowledge of the study area was achieved by a suitable image enhancement and literature studies.

Table 1: Land cover classification scheme

Land Cover Classes	Description	Color
Fallow land	Hills Without vegetation	brown
Built up Area	Residential, industrial, commercial, transportation etc.	Cyan
Water Bodies	River, lake etc.	Blue
Crop land	All farms ,trees	Green
Non crop land	Uncultivated agricultural land	Red

Table 1 shows the different land cover classes of imagery. It also shows the description of classes and different classes is assigning separate color.

3.4 Experimental

The pre classification of image is done in ENVI software. In pre classification step above five classes are created. For classification of an image maximum likelihood algorithm was used. Post classification of an image is as shown in figure 3.

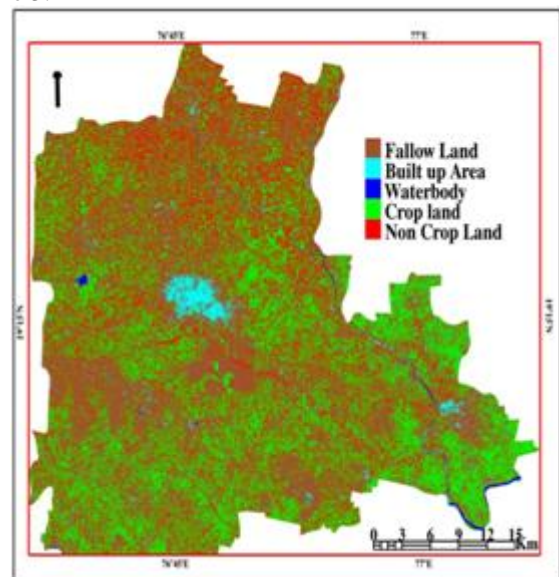


Figure 3: Classified image of Parbhani city

Figure 3 shows the classified image using five different classes. An agriculture is main occupation of the city, so most of the land covered with crop land which is indicated by green color in figure.

Table 2 : Statistic of Land use of Parbhani district

Sr. No.	Categories	Area in km ²	Area in (%)
1.	Fallow land	481.7864	20.80
2.	Built up Area	26.7032	1.15
3.	Water body	6.531	0.261
4.	Crop land	531.6436	22.96
5.	Non crop land	374.4953	16.17

Area in Percentage = Category *100 / (Sum of area of all classes)

Table 2 shows the statistical result of different classes of an imagery. The statistical result also shows that the city is mostly occupied by crop land.

4. Results and Discussions

One of the goal of remote sensing data analysis was to produce a land use map of Parbhani city. This paper indicates that how Remote Sensing and GIS techniques are integrated in order to establish land cover analysis in Parbhani city in the year December 2013. This was done using a maximum likelihood supervised classification algorithm using training areas chosen according to field knowledge and literature study. The classification finally gives the land use land cove image of area. Five land cover classes namely Fallow land, Built up area, Water Bodies, Crop land, Non crop land are identified in the study area. The classified images provide all the information to understand the land use land cover of the study area. Each class is assigning separate color. After classification the post classification was done and map is interpreted. The statistical analysis shows that the land is mostly occupied by crop land.

5. Conclusion

The present study of land use and land cover classification establishes the fact that accurate land use data can be obtained from the satellite imagery more efficiently and economically than by traditional method. By using image processing and Geographic Information System techniques the different land use classes are analyzed and mapped easily. In the field of education the Parbhani is known for the famous Marathwada agricultural university which is very helpful for the peoples residing all around. The classified image shows that the city mostly occupied by crop land.

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