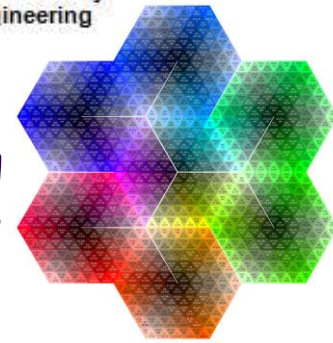


Remote Sensing

Lecture 4: Land Use / Land Cover (LULC) Maps



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Lecture Contents:

- What are LULC maps?
- Why do we need LULC Maps?
- LULC Classification Criteria
- Applications of LULC maps



Land Use / Land Cover

➤ Land Cover

is the observed (bio)physical cover on the earth's surface (vegetation and man-made features) include grass, asphalt, trees, bare ground, water, etc.

➤ Land use

is characterized by the arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it.

➤ Establishes a direct link between land cover and the actions of people in their environment.



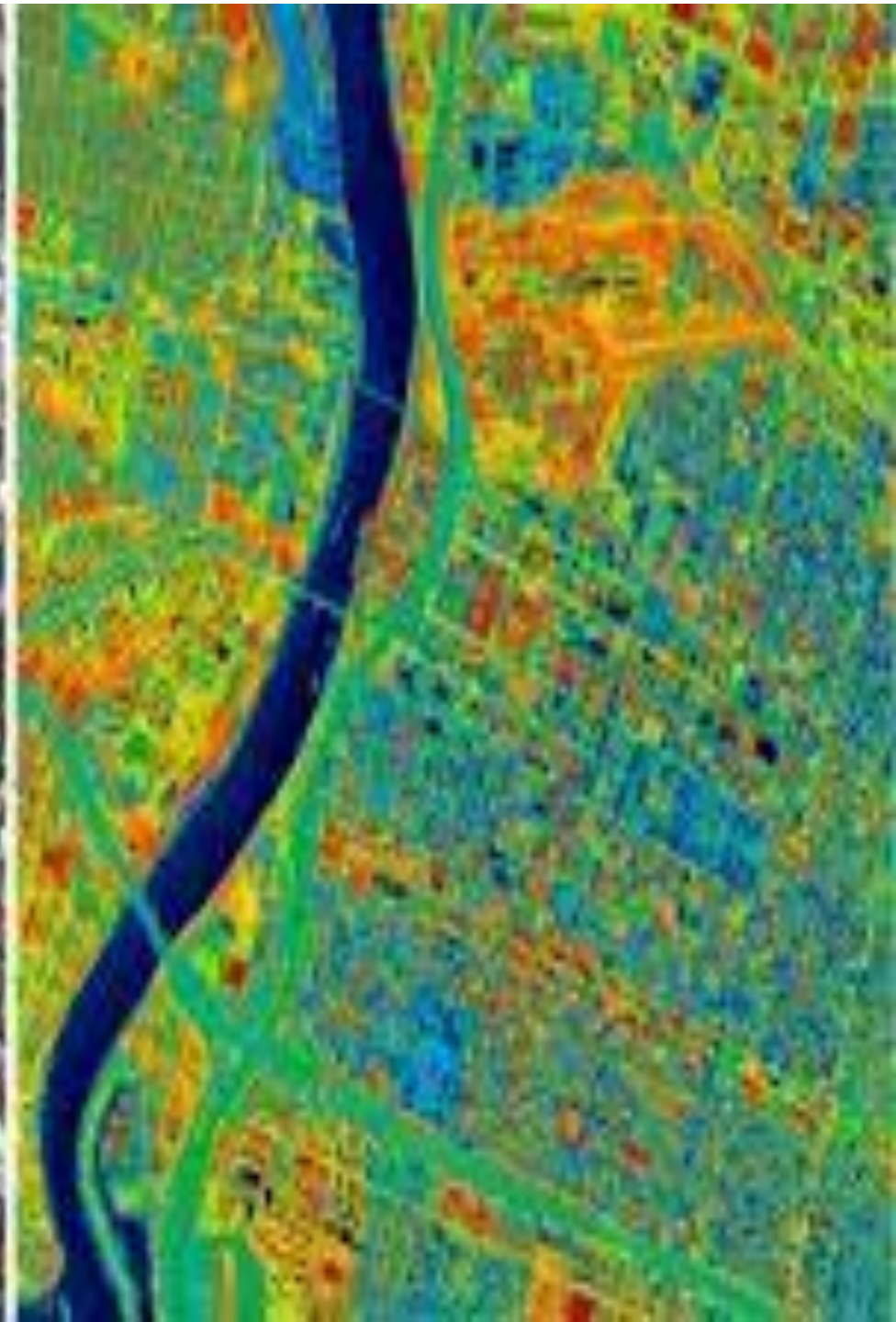
Land Use / Land Cover

- "grassland" is a cover term, while "rangeland" or "tennis court" refer to the use of a grass cover
- "recreation area" is a land use term that may be applicable to different land cover types: for instance sandy surfaces, like a beach; a built-up area like a pleasure park; woodlands etc.

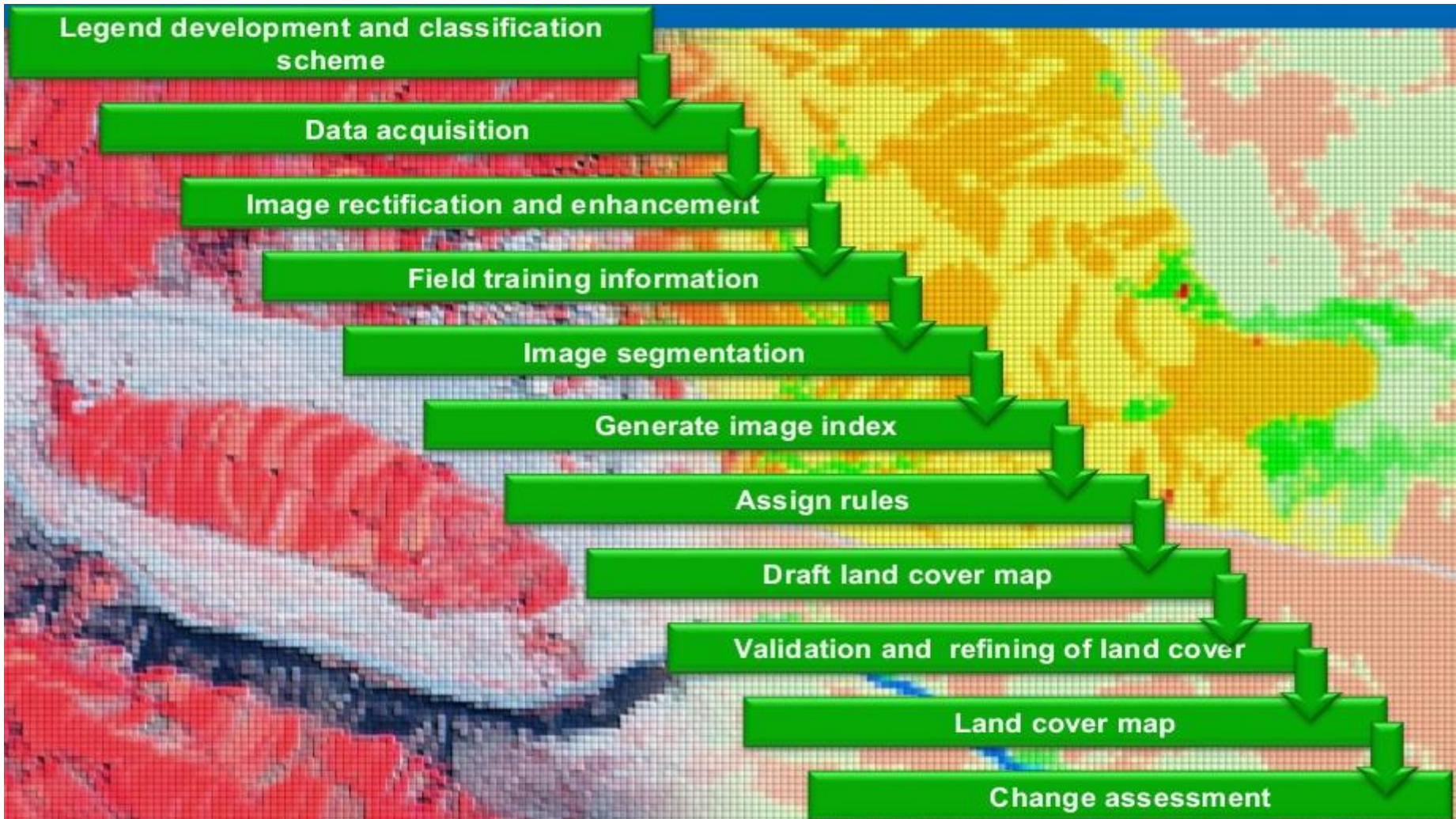


Land Use / Land Cover mapping using Remote Sensing

- Conventional data in the form of maps, statistical figures are inadequate and lack up-dation on changing land use pattern
- Remote Sensing provides up-to-date, accurate, reliable, timely and cost-effective data
- Remote Sensing provides land use/ land cover data of large and inaccessible areas on continuous basis
- The objective of any classification scheme is to simplify the real world in order to facilitate communication and decision making.



Steps of Land cover mapping





Need of LULC mapping

- LULC maps play a significant and prime role in planning, management and monitoring programs at local, regional and national levels.
- Provides a better understanding of land utilization aspects.
- Plays an important role in the formation of policies and program required for development planning.
- For ensuring sustainable development, it is necessary to monitor the ongoing process on land use/land cover pattern over a period of time.
- In order to achieve sustainable urban development and to check the haphazard development of towns and cities.



LULC Classification Criteria

1. The minimum level of interpretation accuracy in the identification of land use and land cover categories from remote sensor data should be at least 85 percent.
2. The accuracy of interpretation for the several categories should be about equal.
3. Repeatable or repetitive results should be obtainable from one interpreter to another and from one time of sensing to another.
4. The classification system should be applicable over extensive areas.



LULC Classification Criteria

5. The categorization should permit vegetation and other types of land cover to be used as surrogates for activity.
6. The classification system should be suitable for use with remote sensor data obtained at different times of the year.
7. Effective use of subcategories that can be obtained from ground surveys or from the use of larger scale or enhanced remote sensor data should be possible.



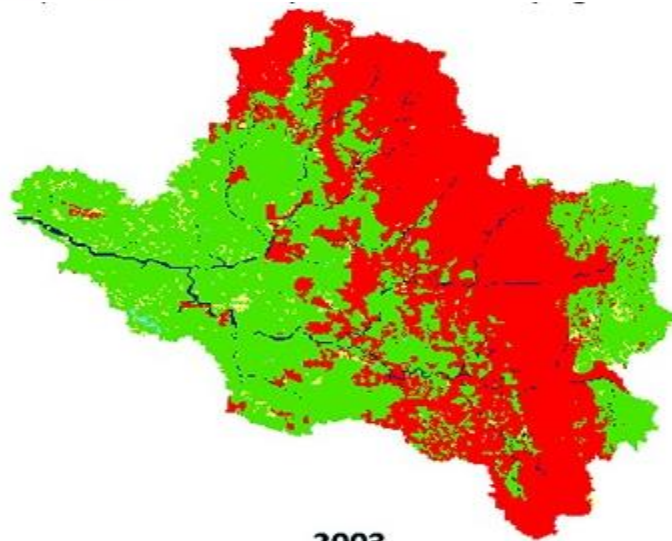
LULC Classification Criteria

8. Aggregation of categories must be possible.
9. Comparison with future land use data should be possible.
10. Multiple uses of land should be recognized when possible.

Following are some of the LULC types and their respective classes

Urban or Built-up Land	<ul style="list-style-type: none"> ▪ Residential ▪ Commercial and Services ▪ Industrial ▪ Communications and Utilities ▪ Mixed Urban or Built-up Land ▪ Other Urban or Built-up Land
Agricultural Land	<ul style="list-style-type: none"> ▪ Cropland and Pasture ▪ Orchards, Groves, Vineyards, Nurseries, and Ornamental Horticultural Areas ▪ Confined Feeding Operations
Rangeland	<ul style="list-style-type: none"> ▪ Herbaceous Rangeland ▪ Shrub and Brush Rangeland ▪ Mixed Rangeland
Forest Land	<ul style="list-style-type: none"> ▪ Deciduous Forest Land ▪ Evergreen Forest Land ▪ Mixed Forest Land
Water	<ul style="list-style-type: none"> ▪ Rivers ▪ Streams and Canals ▪ Lakes ▪ Reservoirs ▪ Bays and Estuaries
Wetland	<ul style="list-style-type: none"> ▪ Forested Wetland ▪ No forested Wetland
Barren Land	<ul style="list-style-type: none"> ▪ Dry Salt Flats ▪ Beaches ▪ Sandy Areas Other than Beaches ▪ Bare Exposed Rock ▪ Strip Mines, Quarries, and Gravel Pits ▪ Transitional Areas ▪ Mixed Barren Land
Perennial Snow or Ice	<ul style="list-style-type: none"> ▪ Perennial Snowfields ▪ Glaciers

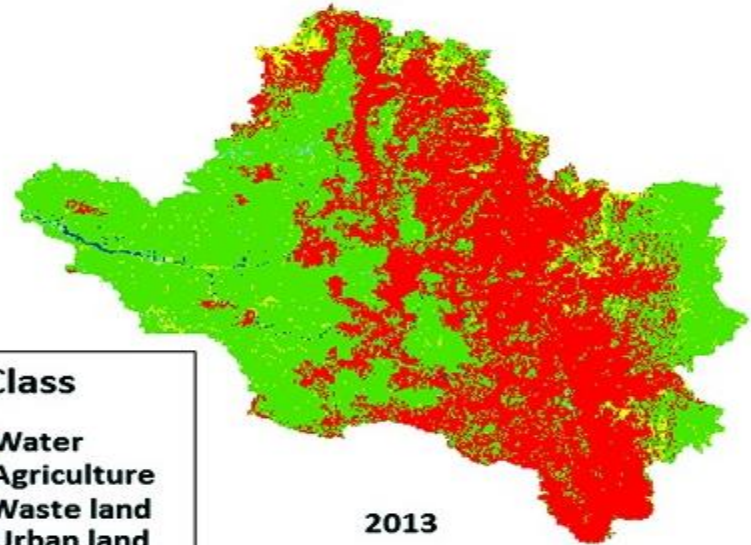
LULC examples



2003

LULC Class

- Water
- Agriculture
- Waste land
- Urban land
- Forest land



2013



Agricultural Land



Wetland



Barren Land



Applications of LULC maps

- Natural resource management
- Wildlife habitat protection
- Baseline mapping for GIS input
- Urban expansion / encroachment
- Routing and logistics planning for seismic / exploration/resource extraction activities
- Damage delineation (tornadoes, flooding, volcanic, seismic, fire)
- Legal boundaries for tax and property evaluation
- Target detection - identification of landing strips, roads, clearings, bridges, land/water interface



Summary

- Land Use / Land Cover (LULC) generally refers to the categorization or classification of human activities and natural elements on the landscape within a specific time frame based on established scientific and statistical methods of analysis of appropriate source materials.
- It has various methods of classifications.



Summary

- LULC maps has their wide applications like Natural resource management, Baseline mapping for GIS input, Legal boundaries for tax and property evaluation and many more.
- LULC mapping is not possible without the help of other geospatial datasets.



Supplementary files:

- https://www.youtube.com/watch?v=xskBV_fV_88&t=1053s
- <https://www.satpalda.com/blogs/significance-of-land-use-land-cover-lulc-maps>

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Thanks

Dr.Eng. Hassan Mohamed