CROPPING SYSTEM ANALYSIS

Dr. V. K. Venugopal
Former Professor & Head
Department of Soil Science and Agricultural Chemistry College of Agriculture, Vellayani
Consultant, Digital University Kerala

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Definitions

- Crop Rotation is growing one crop after another on the same piece of land in different (seasons) without impairing the soil fertility.
- A cropping system in agriculture is the specific sequence, arrangement, and management of crops grown on a piece of land over a period of time, considering factors like resources, technology, and environmental conditions to achieve specific goals like maximizing yield or ensuring sustainability
- Multiplicity of cropping system is a main feature of Indian agriculture and is attributed to rainfed agriculture and prevailing socio-economic situations of farming community
- Cropping System Analysis is essential for studying the sustainability of agriculture
- Remote sensing imagery has been used to identify different crop types, estimate crop area and, predict yield at small scales
- Spectral signature for vegetation is highly variable in nature and changes completely with seasonal cycles of many plants

Methodology

- IRS Satellite Resourcesat (IRS-P6) LISS III data is ideal and enables analysis between these seasons
- The Sensor provides 23.5 m spatial resolution data in Green, Red, NIR and SWIR bands with 24 days revisit capability
- Repeat cycle can be used for deriving Kharif, Rabi and summer cropping pattern
- Spectral overlaps make attempts to understand or classify remote sensing imagery difficult

- The IRS-LIII data was the main source of satellite imageries for deriving the spatial maps of agricultural land use, cropping pattern, crop rotation and crop calendar.
- September 30, 2007, October 24, 2007, July 15, 2007, January 4, 2008, March 16, 2008 and May 27, 2008 were used.
- PCI Geomatica v 9.3 image processing software was used for geo-referencing, multi-date data stacking and overlaying state and district boundary.
- Optimum data sets were used to classify forest/permanent vegetation, wastelands and permanent water bodies
- A multi-phased unsupervised ISODATA classification was used for seasonal cropping pattern mapping.

Cropping system analysis - A case study In Kurukshetra District

Major crop rotations are

- Rice-Wheat-other Crops,
- Rice- Wheat-Fallow,
- Fallow-Wheat-Fallow
- Sugarcane based
- Kurukshetra has major area of double crop and less area under more than two crops

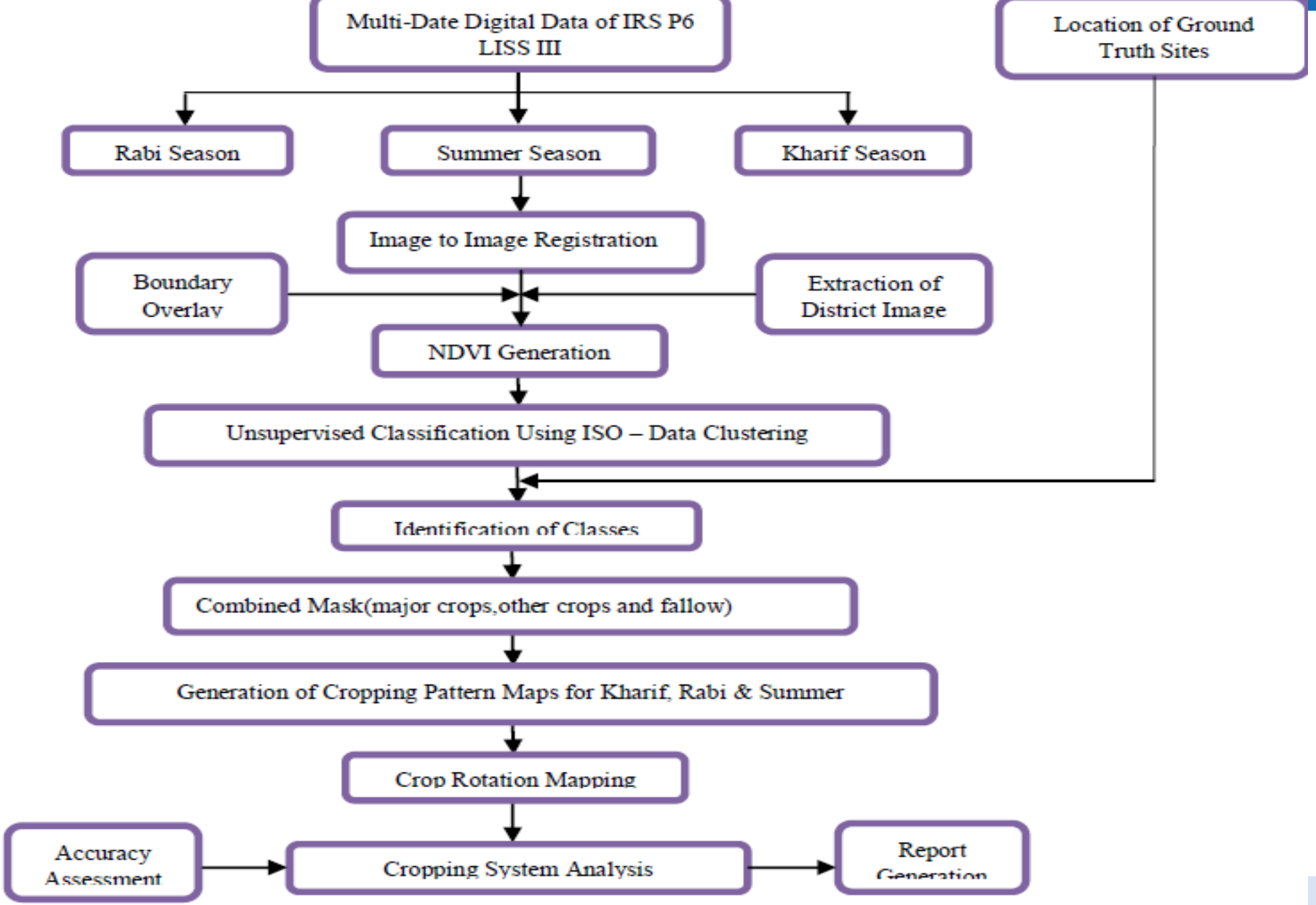

Fig.2: Methodology for Cropping System Analysis

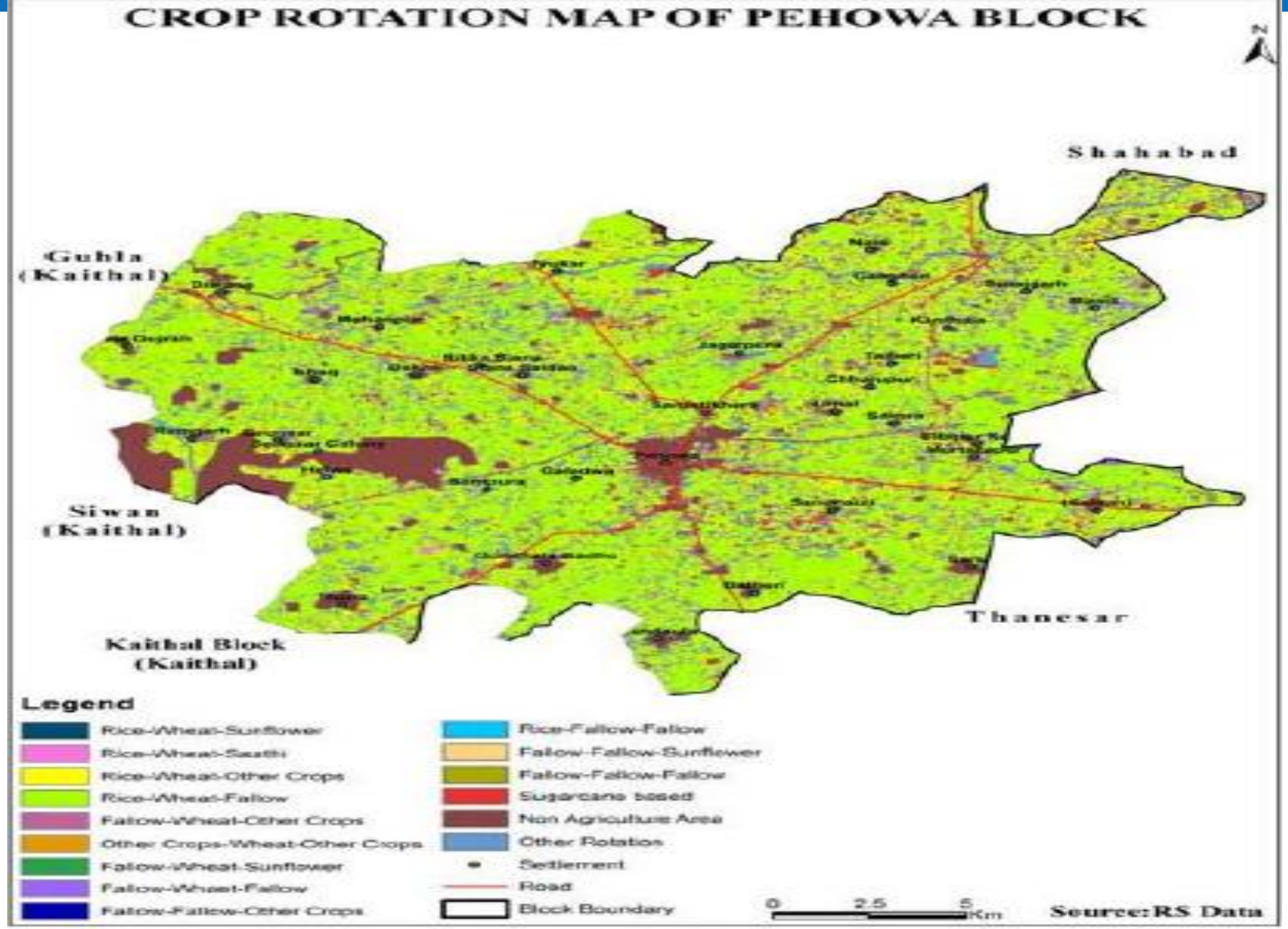

Figure-3. Crop rotations map of pehowa block.

Table-2. Crop rotations statistics of Pehowa block.

S. No.	Rotations	Area (000'h)
1.	Rice-wheat-sunflower	0.30
2.	Rice-wheat-saathi	0.02
3.	Rice-wheat-other crops	6.02
4.	Rice-wheat-fallow	25.82
5.	Fallow-wheat-other crops	0.87
6.	Other crops-wheat-other crops	1.51
7.	Fallow-wheat-sunflower	0.06
8.	Fallow-wheat-fallow	2.32
9.	Fallow-fallow-other crops	0.21
10.	Rice-fallow-fallow	0.27
11.	Fallow-fallow-sunflower	0.02
12.	Fallow-fallow-fallow	0.36
13.	Sugarcane based	1.13
14.	Other rotation	6.36

Conclusions

- This method identifies main crops of Kharif, Rabi and Summer Seasons shown in the study area
- It allows spatial relationships between main crops, and other crops at a specific location to be mapped during the study period.
- For example, in the study area of Kurukshetra district the spatial relationship between Rice, Wheat and Sunflower which are seasonal crop in Kharif, Rabi and summer shows the specific location of typical distribution areas.
- It allows spatial relationships between crops in the study area and implicit probabilities of changes in cropping system


Thank You