

# GIM 32013

Geo-Informatics Applications in Natural Resource  
Management

**DEPARTMENT OF GEOGRAPHY**

# **Applications of remote sensing in agriculture**

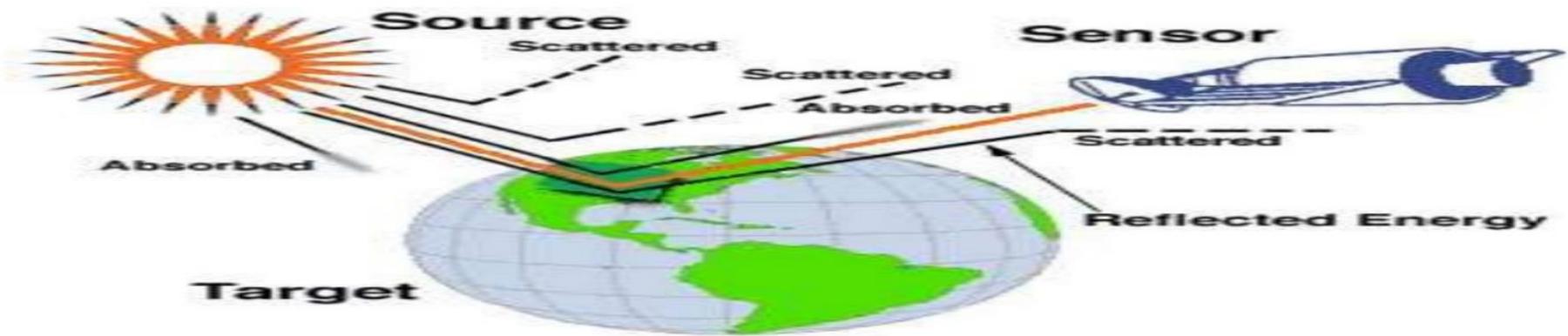
# Geo-Information Technology

- ▶ Global Positioning System (GPS)
- ▶ Remote Sensing (RS)
- ▶ Geographical Information System (GIS)

# What is remote sensing?

- ▶ Remote sensing is the acquisition of information about an object or any phenomenon without making any physical contact with the object.
- ▶ It is a phenomenon that has numerous applications including photography, surveying, geology, forest and many more.

## Remote Sensing



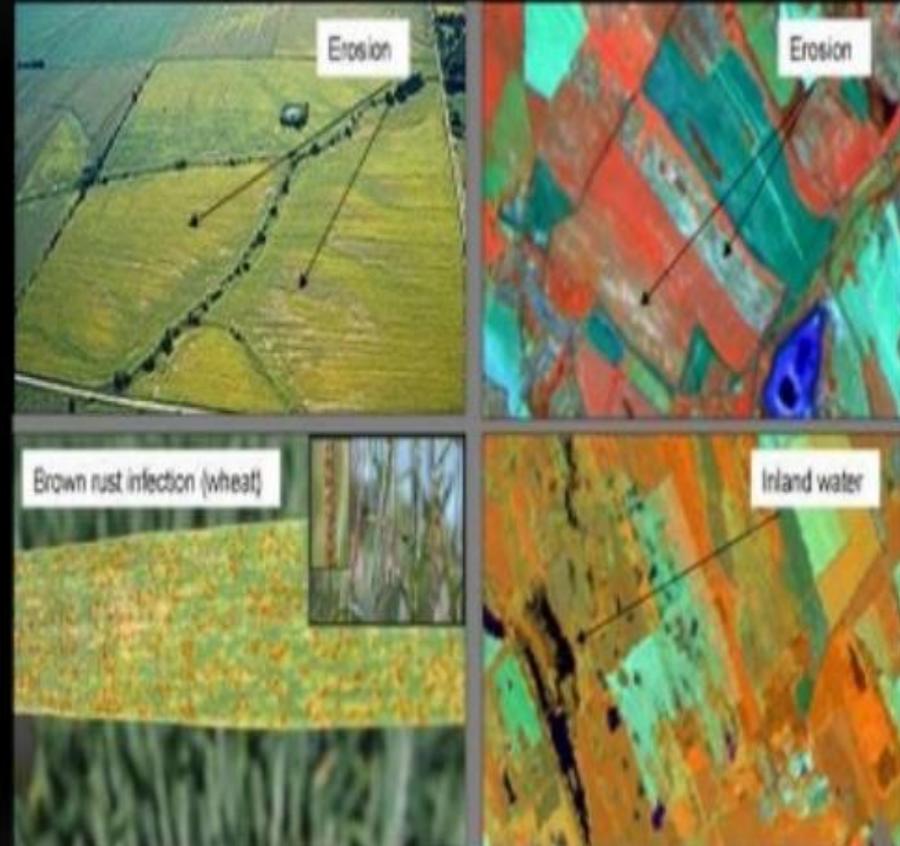
- ▶ In the field of agriculture the remote sensing has found significant use.
- ▶ There are very many applications of remote sensing in the agricultural sector.
- ▶ Agricultural products from crops form a large part of every persons diet.
- ▶ Producing food of sufficient quantity and quality is essential for the well-being of the people anywhere in the world.

# Area Application

- ▶ Agriculture
- ▶ Forestry
- ▶ Geology
- ▶ Hydrology
- ▶ Sea ice
- ▶ Land cover & Land Use
- ▶ Mapping
- ▶ Oceans & Coastal Monitoring
- ▶ Environmental studies
- ▶ Urban Development
- ▶ Climatology
- ▶ Disaster Management
- ▶ Natural resource Management
- ▶ Education
- ▶ Tele Communication

# APPLICATION OF RS IN AGRICULTURE

- Identification, area estimation and monitoring
- Crop nutrient deficiency detection
- Soil mapping
- Crop condition assessment
- Agricultural draught assessment
- Reflectance modelling
- Crop yield modelling and production forecasting



## 1. Crop production forecasting

Remote sensing is used to forecast the expected crop production and yield over a given area and determine how much of the crop will be harvested under specific conditions.

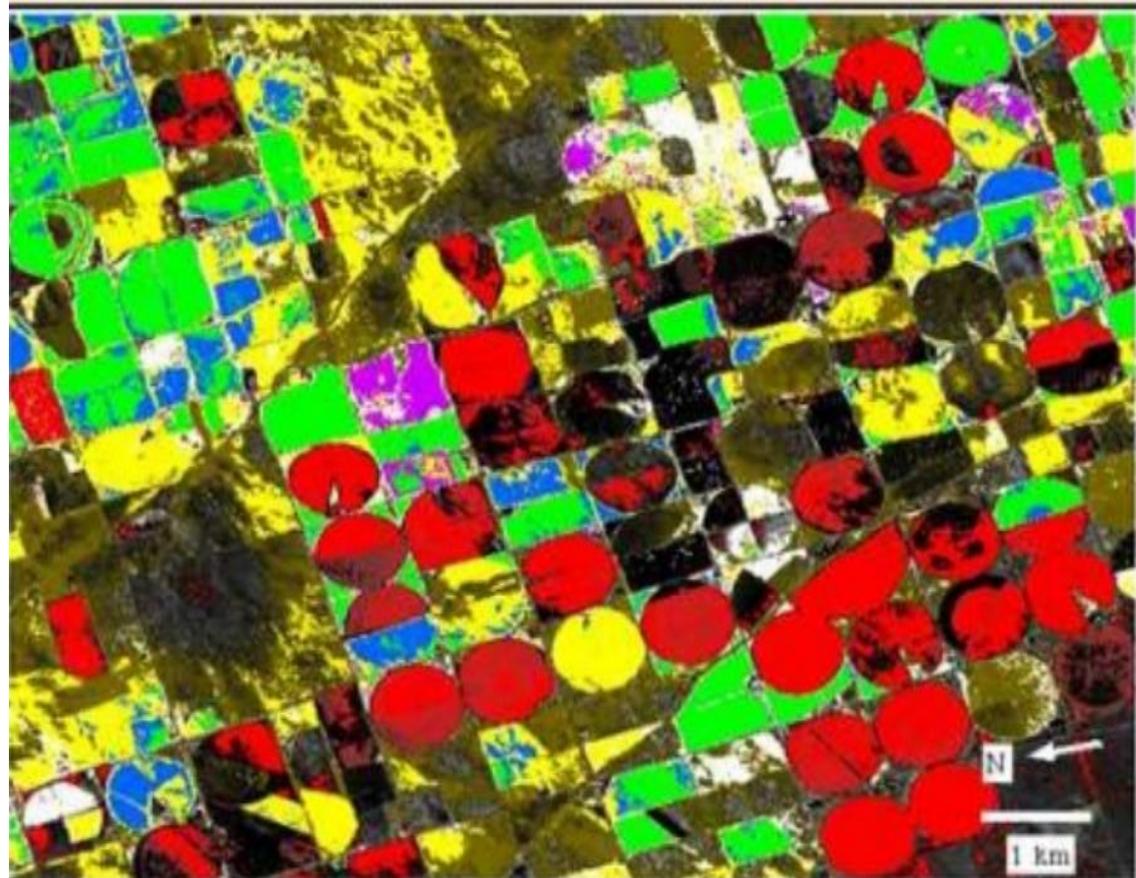
## 2. Assessment of crop damage and crop progress

In the event of crop damage or crop progress, remote sensing technology can be used to penetrate the farmland and determine exactly how much of a given crop has been damaged and the progress of the remaining crop in the farm.

### 3. Crop identification

Remote sensing has also played an important role in crop identification. Especially in cases where the crop under observation is mysterious or shows some mysterious characteristics.

The data from the crop is collected and taken to the labs where various aspects of the crop including the crop culture are studied.



San Luis Valley, CO – Vegetation Distribution Map

AVIRIS Sept. 3, 1993 Data

U. S. Geological Survey

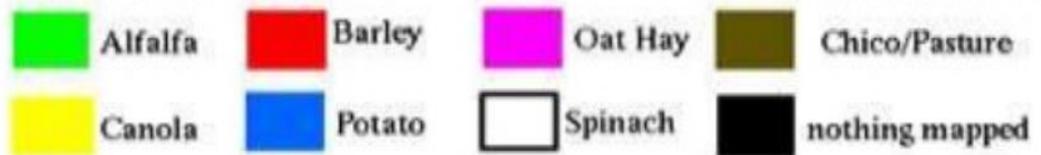


Image classification showing the various crop types.

Source: U.S. Geological Survey

#### 4. Identification of planting and harvesting dates

Because of the predictive nature of the remote sensing technology, farmers can now use remote sensing to observe a variety of factors including the weather patterns and the soil types to predict the planting and harvesting seasons of each crop.

# 5. Monitoring of crop status

- ▶ The normal growth process of a plant can be disrupted when it goes through a stress period.
- ▶ When in stress, the plant is not functioning properly because of one or more causes.
- ▶ When a plant is stressed, it usually expresses certain visible symptoms, but also some that are not visible to the human eye.



Chlorosis



Development of a fungus



Water Stress



Insect attack

## ▶ 6. crop yield modeling and estimation

- ▶ Remote sensing also allows farmers and experts to predict the expected crop yield from a given farmland by estimating the quality of the crop and the extent of the farmland.
- ▶ This is the used to determine the overall expected yield of the crop.

### **Crop yield estimation**

May 2005

August 2005



## 7. Identification of pests and disease infestation

Remote sensing technology also play a significant role in the identification of pests in farmland and gives data on the right pest control mechanism to be used to get rid of the pests and diseases on the farm.

### **Combating disease and pests**



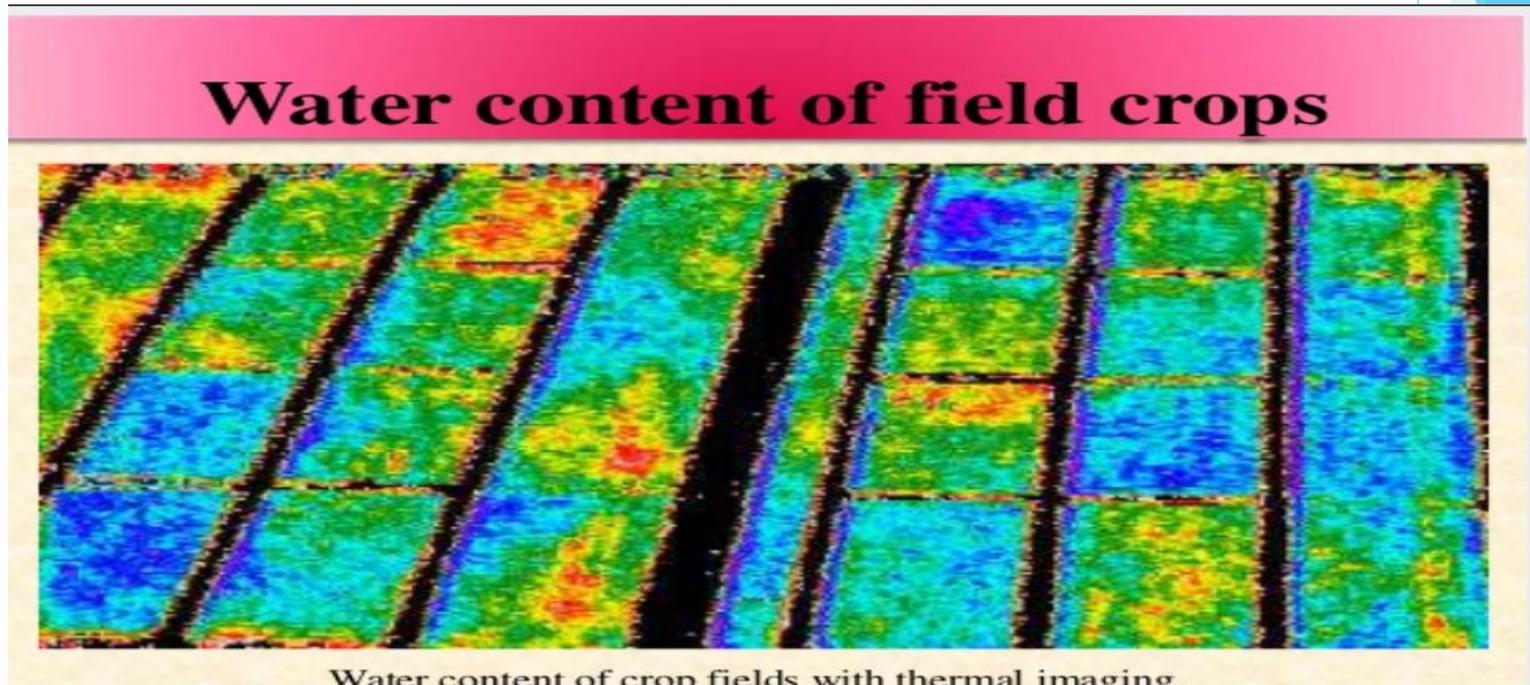
Identifying the most probable areas where insects might attack.

# 8. Soil moisture estimation

- ▶ Soil moisture can be difficult to measure without the help of remote sensing technology.
- ▶ Rs gives the soil moisture data and helps in determining the quantity of moisture in the soil and hence the type of crop that can be grown in the soil.

## 9.Determination of water content of field crops

Apart from determining the soil moisture content, remote sensing also plays an important role in the estimation of the water content in the field crops.



# 10.Land mapping

- ▶ Remote sensing helps in mapping land for use for various purposes such as crop growing and landscaping.
- ▶ The mapping technology used helps in precision agriculture where specific land soils are used for specific purposes.

# Conclusion

- ▶ Remote sensing is the acquisition of information about an object or any phenomenon without making any physical contact with the object.
- ▶ Remote sensing play an important role in agriculture.
- ▶ Agricultural products from crops a large part of every persons diet.
- ▶ In the field of agriculture remote sensing is used for various purposes.  
such as: crop identification  
detection, diagnosis and control of plant diseases.