

Role of Remote Sensing and GIS in Agriculture

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Learning Outcome

1. The students will understand the basic concepts of remote sensing and GIS techniques.
2. The role of remote sensing and GIS techniques in Agriculture

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What is remote sensing?

“Remote” means away Remote sensing means sensing things from a distance. Of our five senses we use 3 as a remote sensors.

Remote sensing is science of

A. Acquiring

B. Processing

C. Interpreting images and related data that are obtained from ground based, air or space-borne instruments that record the interaction between target and electromagnetic radiation.

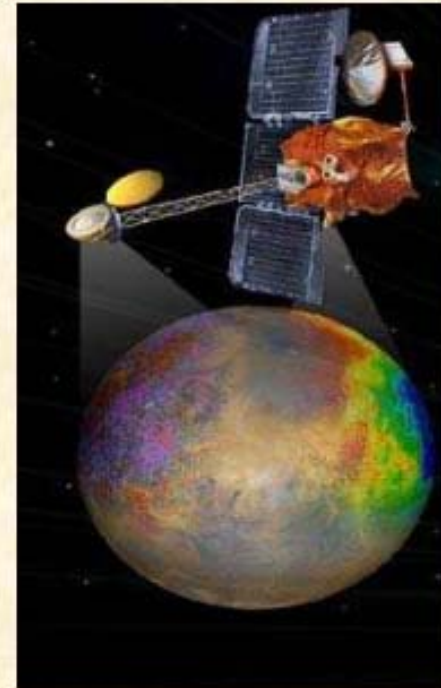
Remote sensing platforms



Ground-based



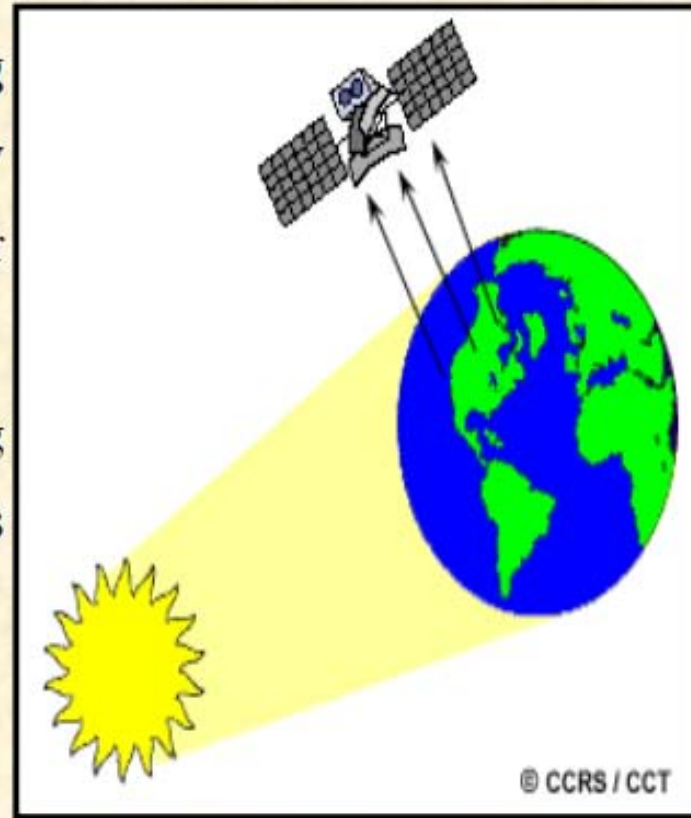
Airplane-based



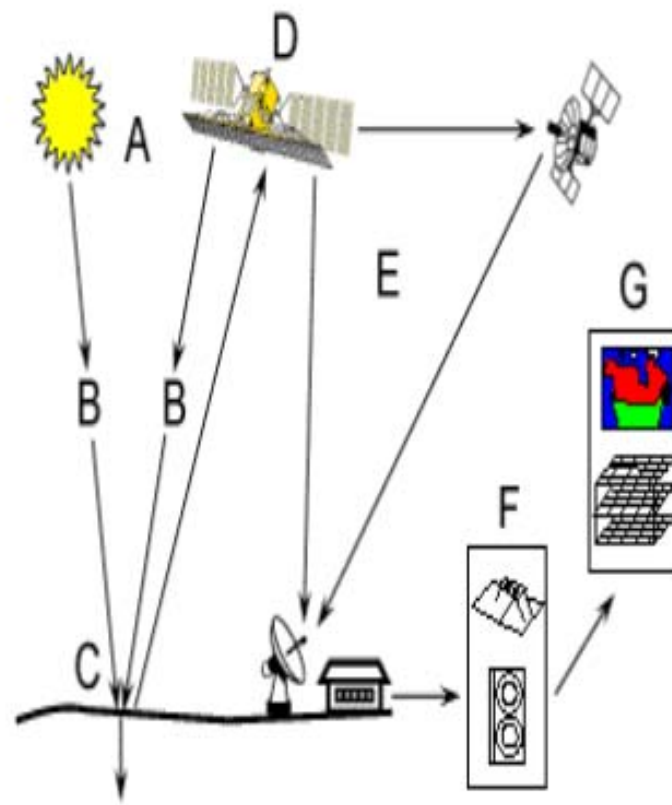
Satellite-based

Types of remote sensing

- ❑ **Passive remote sensing**
systems which measure energy that is naturally available. For example : Sun
- ❑ This can only take place during the time when the sun is illuminating the Earth.



Process of Remote Sensing



(A) Energy source or illumination

(B) Radiation and the atmosphere

(C) Interaction with the target

(D) Recording of energy by the sensor

(E) Transmission, reception, and processing

(F) Interpretation and analysis

(G) Application

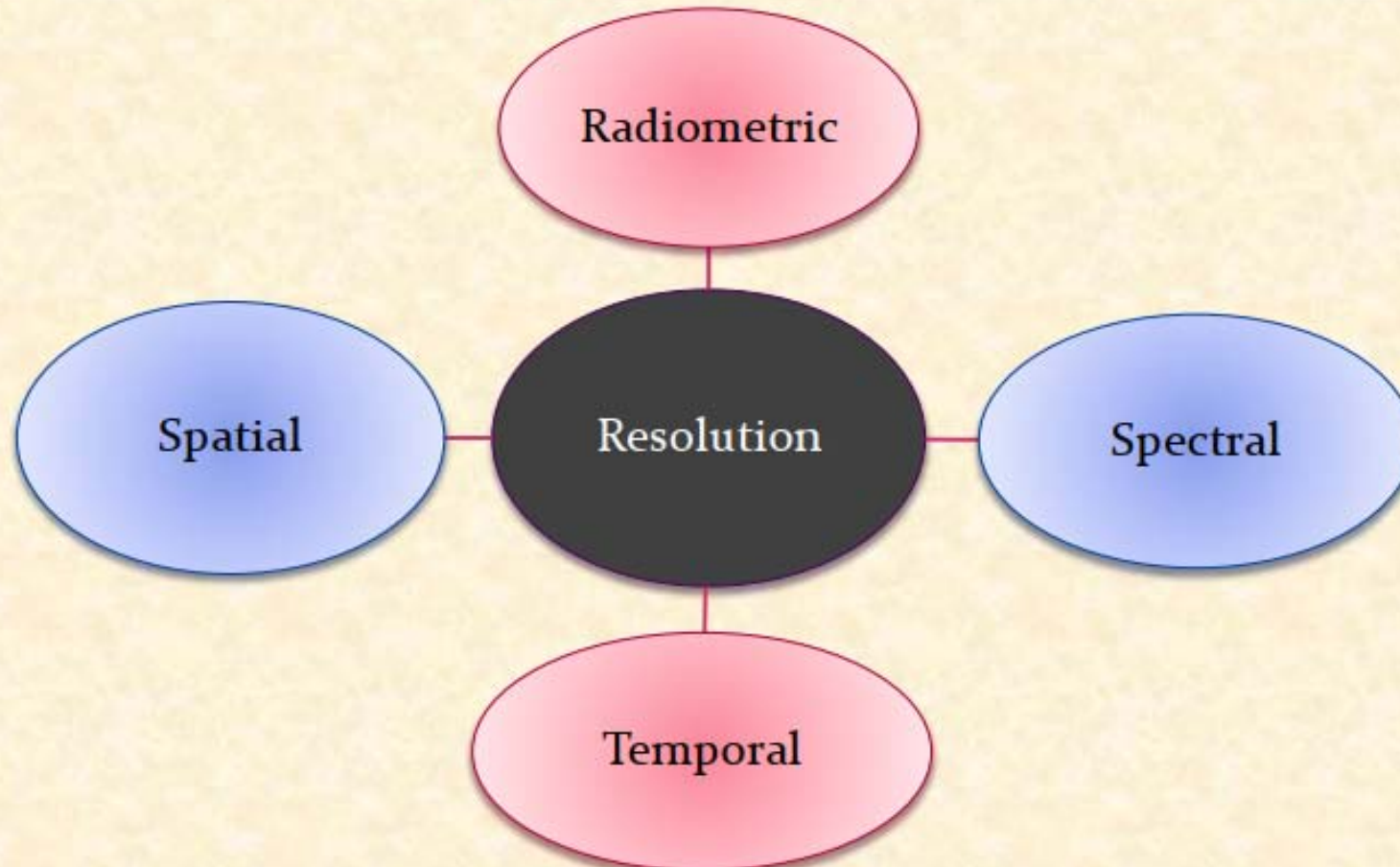
Radiation - Target Interactions

There are three (3) forms of interaction that can take place when energy strikes, or is incident (I) upon the surface.

1. Absorption (A)
2. Transmission (T)
3. Reflection (R)
 - Specular reflection
 - Diffuse reflection



Four types of resolution



Spectral signature for vegetation

- ❑ A general characteristic of vegetation is its green colour caused by the pigment chlorophyll.
- ❑ Chlorophyll reflects green energy more than red and blue energy, which gives plants green colour.

School of Agriculture

Course Code : AGRI300 Course Name: Geoinformatics and Nano Technology For Precision Farming

- ❑ The major difference in leaf reflectance between species, are dependent upon leaf thickness.



Thick leaf



Thin leaf

Soil moisture content

- A wet soil generally appears darker.
- Increasing soil moisture content lowers reflectance.



Dry soil



Wet soil

Remote sensing applications in agriculture

- ❑ Agricultural products from crops form a large part of every person's diet. Producing food of sufficient quantity and quality is essential for the well-being of the people anywhere in the world.
- ❑ Plants require water and nutrients in order to grow and are sensitive to extreme weather phenomena, diseases and pests.
- ❑ Remote sensing can provide data that help identify and monitor crops.
- ❑ When these data are organized in a Geographical Information System along with other types of data, they become an important tool that helps in making decisions about crops and agricultural strategies.