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Remote Sensing and Geographical Information System in Agrometeorology

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INTRODUCTION

Agriculture is the backbone of India's economy. Today in this era of technological supremacy, agriculture is now adopting several modern technologies such as robotic technology, remote sensing, and Geographical Information System (GIS) for the advancement of agriculture. It is easy to obtain information about areas where humans are unable to verify the status on a daily basis and to assist in data collection using remote sensing. Whereas, GIS helps in the preparation of a map that displays an accurate depiction of data obtained through remote sensing. From disease estimation to water stress factors, from ground water quality index to acreage estimation the application of remote sensing and GIS in agriculture has benefited agriculture in a various way. The applications of those software or techniques are very new to the agriculture domain, there is still much more exploration to be done in this part. In different parts of the world, new software and remote sensing are being developed. Today's farmers see the benefits of applying these approaches to the agricultural field, which help in increasing productivity and benefiting future generations, as technology is hype in the traditional system of farming.

REMOTE SENSING:

Remote sensing is the science, technology and art of acquiring information about an object without coming into direct physical contact with it.

It consists of the following components:

1. A source of Energy
2. Interactions of energy with the atmosphere
3. Interactions of energy with earth surface
4. A sensor with platform

GEOGRAPHICAL INFORMATION SYSTEM (GIS):

"A GIS is a computer-based system that includes the following four sets of capabilities to handle geo-referenced data:

1. Input
2. Data management (storage and retrieval)
3. Manipulation and analysis
4. Output

RELATIONSHIP BETWEEN REMOTE SENSING AND GIS:

Provide data input Different software input

Remote sensing----------GIS----------Ultimate output

THE ROLE OF REMOTE SENSING:

Remote sensing provides spatial coverage by measuring reflected and emitted electromagnetic radiation from the earth's surface and surrounding atmosphere, across a wide range of wavebands. Without entering into a detailed description about the tools and techniques used in remote sensing.

Remote sensing provides a continuous stream of data that has grown extremely reliable and nearly unreplaceable. A modern and effective agrometeorological weather service that uses advanced data collection methods such as remote sensing must have equipped with sophisticated devices, but above all must have efficient and trained staff.

GEOGRAPHICAL INFORMATION SYSTEM (GIS) APPLICATIONS IN AGROMETEOROLOGY:

Geographical Information System (GIS) technology is an expansion of cartographic science, which takes advantage of computer science to improve the efficiency and analytical power of traditional approaches. In, GIS combines data from several disciplines and sources, such as traditional and digital maps, databases, and remote sensing, can be combined in models that simulate the behaviour of complex systems. In agrometeorology, these technologies are known as land information systems (LIS) for their agronomic and natural components. In particular, LIS need a series of information on environmental variables such as meteorological parameters, vegetation, soil, and water.

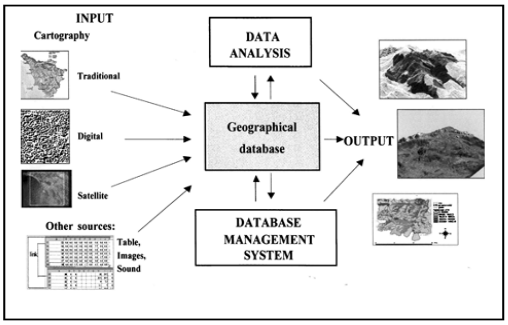

Fig. 1 General Structure of a GIS

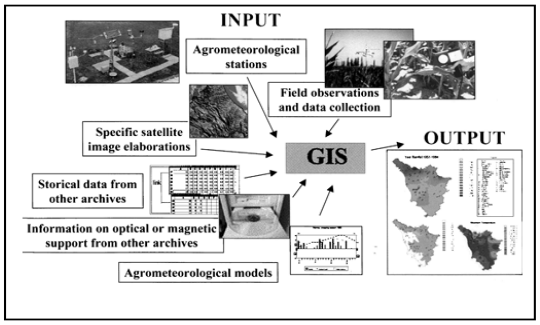

Fig. 2 Schematic representation of a LIS in Agrometeorology

Data collected directly in the field is the most crucial in agro meteorological applications since it represents the ground reality. Meteorological stations, field data collection (agronomic practises, eco-physiological measurements, soil, insect assaults, illnesses, etc.) and direct territorial observations are fundamental to all the possible agro meteorological GIS applications.

All these factors produce the reality of the territory and the condition of the elements that composed of. After the preliminary considerations, only the availability of real-time field data may allow simulations and evaluation of the current and future scenarios. When there is a lack in information, the models can assist the users in complete the information and understand the real situation. For instance, it is possible to estimate the soil water deficit of a given area in two ways:

- Direct measurements (a very expensive process) or using the estimated values of a model.

CONSLUCION

The existence of new tools is based to reinforce the use of agrometeorology and to increase its applications both in developed and developing countries, is based on the strengthening of this use of GIS and remote sensing in the national services, research and training.

Numerous organizations have recognized the benefits of using GIS to display, manage, and statistically evaluate spatial data and the relationship among multiple data sets. GIS can use to map and analyze any data set that has a spatial component i.e., economic, landmark, population, transportation, agrometeorological data etc.

To reach this objective there are several initiativesthat should be undertaken:

- a larger participation to the international pro-grammes
- a greater visibility of the agrometeorology at both national and international level
- better integration with meteorology and climatology.
- All these activities are based on the development of new competencies as in the case of GIS utilization.

The promotion of new specialized software should make the applications of the various devices easier, bearing in mind the possible combination of several types of inputs such as data coming from standard networks, radar and satellites, meteorological and climatological models, digital cartography and crop models based on the scientific acquisition.

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