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USING SATELLITE TO IMPROVING AN INDIAN AGRICULTURE ECONOMY

Dr. K. S. MOHANASUNDARAM,
Assistant Professor
Dept of Computer Science,
P.K. R. Arts College for Women,
Gobichettipalayam – 638 476,
Tamilnadu (India).

Mr.V.J.FREADY BLESSON
Assistant Professor
Dept of Computer Science,
Senthamarai College of arts and science,
Madurai-18, Tamilnadu(India)

Dr.R.JAYAKARTHIK
Associate Professor
Department of Computer Science
SAVEETHA COLLEGE OF LIBERAL ARTS & SCIENCES
SIMATS
Saveetha Nagar,
Thandalam, Chennai - 602 105

Abstract:

Agriculture is an important part of India's economy and at present it is among the top two farm producers in the world. This sector provides approximately 50 percent of the total number of jobs available in India and contributes [1] around 18.1 percent to the GDP. Agriculture is theonly source of living for almost two-thirds of the employed class in India. As being stated by the economic data of financial year 2019-20, agriculture has acquired 6.2 per cent India’s GDP. The agriculture sector of India has occupied almost 43percent of India's geographical area. Here i propose how we can use satellite source to improve our Indian agriculture Economy.

Keywords: GDP. AgricultureSector.

1. Introduction

Agriculture plays a vital role in the Indian economy. [2] Over 70per cent of the ruralhouseholds depend on agriculture.to using the satellite we can avoid unwanted expenses of money and time, work. Now days our India changes into digital world to improving technology in many fields. Here I suggested if we use of satellite in Agriculturеit can impureour Indian economy in this Agriculture field. A satellite is an object with mass which revolves around the another object which is heavier than that. For instance Moon is a Natural Satellite to Earth

because it revolves or moves around the Earth. [5] The Satellites which are man-made are known as Artificial Satellite. For example: sputnik 1, Rohini

2. **Objectives of the Study**.

1. **What is meant by satellite**
2. **Types of satellite**
3. **Remote Sensing of Agriculture**
4. **Earth observation satellites (EOS)**
5. **Conclusion**

1. What is meant by satellite:

A satellite is an object with mass which revolves around another object which is heavier than that. For instance Moon is a Natural Satellite to Earth because it revolves or moves around the Earth [4]. The Satellites which are man-made are known as Artificial Satellite. Two Stations on Earth want to communicate through radio broadcast but are too far away to use conventional means. The two stations can use a satellite as a relay station for their communication. One**Earth Station** sends a transmission to the satellite. This is called a**Uplink**. The satellite **Transponder** converts the signal and sends it down to the second earth station. This is called a **Downlink**.

i. Basics: Advantages of Satellites

The advantages of satellite communication over terrestrial communication are:

- The coverage area of a satellite greatly exceeds that of a terrestrial system.
- Transmission cost of a satellite is independent of the distance from the center of the coverage area.
- Satellite to Satellite communication is very precise.
- Higher Bandwidths are available for use.

ii. How Satellites are used in Service Types

- Fixed Service Satellites (FSS)
  - ✓ Example: Point to Point Communication

- Broadcast Service Satellites (BSS)
  - ✓ Example: Satellite Television/Radio
  - ✓ Also called Direct Broadcast Service (DBS).
- Mobile Service Satellites (MSS)
  - ✓ Example: Satellite Phones

2. Types of satellite:

- Satellite Orbits

2.11 Geostationary Earth Orbit [GEO]
2.12 Low Earth Orbit[LEO]
2.13 Medium Earth Orbit [MEO]
2.14 Molniya Orbit
2.15 HAPs

2.11 Geostationary Earth Orbit (GEO)

These satellites are in orbit 35,863 km above the earth's surface along the equator. Objects in Geostationary orbit revolve around the earth at the same speed as the earth rotates. [5] This means GEO satellites remain in the same position relative to the surface of earth.

2.12 Low Earth Orbit (LEO)

LEO satellites are much closer to the earth than GEO satellites, ranging from 500 to 1,500 km above the surface.LEO satellites don't stay in fixed position relative to the surface, [4] and are only visible for 15 to 20 minutes each pass.A network of LEO satellites is necessary for LEO satellites to be useful.

2.13 Medium Earth Orbit (MEO)

A MEO satellite is in orbit somewhere between 8,000 km and 18,000 km above the earth's surface. MEO satellites are similar to LEO satellites in

functionality.MEO satellites are visible for much longer periods of time than LEO satellites, usually between 2 to 8 hours.MEO satellites have a larger coverage area than LEO satellites.

2.14 Molniya Orbit Satellites

Used by Russia for decades.Molniya Orbit is an elliptical orbit. The satellite remains in a nearly fixed position relative to earth for eight hours.A series of three Molniya satellites can act like a GEO satellite.Useful in near Polar Regions

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2.15 High Altitude Platform (HAP)

High Altitude Platform (HAP) is one of the newest ideas in satellite communication.A blimp or plane around 20 km above the earth's surface is used as a satellite.HAPs would have very small coverage area, but would have a comparatively strong signal.Cheaper to put in position, but would require a lot of them in a network.

3. Remote Sensing of Agriculture

Many remote sensing applications ar e devoted to the agricultural sector. Representative case studies are presented in the special issue "Advances in Remote Sensing of Agriculture". Here the selected application is discus a remote sensing using in satellite application is "**Assessment of crop phenological development**". [6]The phenological dynamics of terrestrial ecosystems reflect the response of the Earth's biosphere to inter- and intra-annual dynamics of the Earth's climate and hydrologic regimes. Remotely sensed satellite data possess significant potential for monitoring vegetation dynamics, due to their synoptic coverage and frequent temporal sampling. This enables the monitoring of simple phenological events, such as the start and peak of vegetation growth, both in natural ecosystems and in agricultural landscapes.in this Crop phenological development here review for Brazil and Australia phenological indicators .

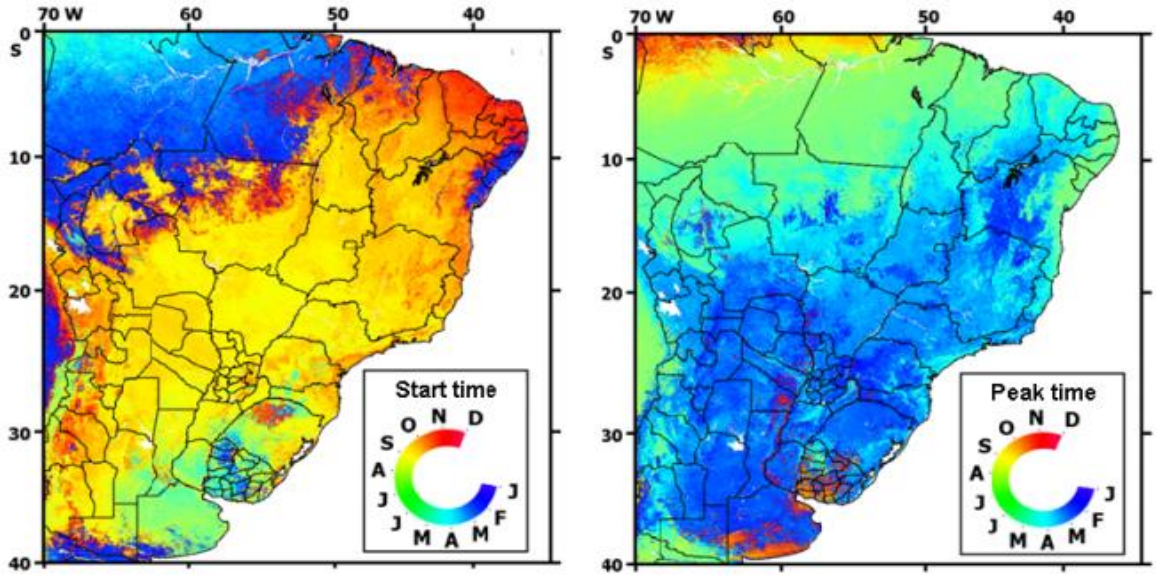

Figure 1

Above figure1 shows satellite-derived phenological indicators: average start of season (SOS) and peak of season (POS) in Brazil.

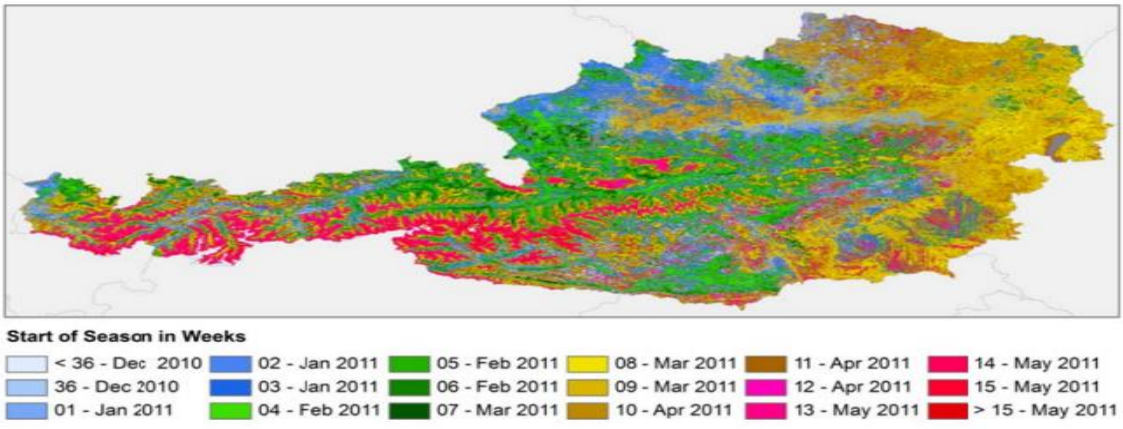

Figure 2

The above figure2 shows moderate Resolution image spectoradiometer (MODIS)derived starts of season (SOS) in 2011 in Austria.

In this **Assessment of crop phenological development** approach modeling the entire time series . A fitted curve simplifies the parameterization necessary for identification of metrics, such as start of season. In addition, data gaps are easily handled.using this method in our Indian agriculture people remotely work and access the data so the time and unexpected losses will be reduced.

4. Earth observation satellites (EOS)

EOS sensors provide measurements of crop reflectance and structure that can be related to biophysical properties, such as LAI, height, yield and growth stage (Figure 3). However, it is important to note that EOS rarely provides direct measurements of these biophysical properties; instead, it is common to exploit [7] EOS data within a data science approach and use crop models to link EO measurements to crop dynamics of interest (Figure 4)Yield prediction is a major area of interest within agriculture and numerous models have been developed for crops including wheat, maize, sugar beet and potatoes. Typically, a series of direct ground measurements of the crop are recorded throughout the year, such as tiller number, leaf area index, and crop height, weed infestation, and are used to monitor production. Yield is then usually forecast using regression against previously measuredyield data. Key parameters that can be estimated from EO are increasingly incorporated into yield models, for example weed infestations from high spatial resolution data or vegetation indices used to infer LAI. The main advantage of EO in this context is the ability to rapidly assess parameters over far larger spatial areas than can be recorded on the ground.EO data can also be incorporated with more complicated numerical crop models that use agro-meteorological parameters (eg temperature, rainfall, radiation, crop type, soil type, nutrient availability) to estimate crop biomass, health and yield. EO data can be directly fed into thesemodels, providing spatial and temporal data necessary to update the model during the season and improve predictions. These systems can operate at local scales, such as Fruitlook (www.fruitlook.co.za), which is a pre-operational service offering South African grape and deciduous tree grower’s weekly estimates of eight crop parameters to inform them on crop growth, water use and nutrient status, together with a forecast of soil moisture

content. Fruitlook obtains its estimates by directly feeding EO data into energy and water balance algorithms.

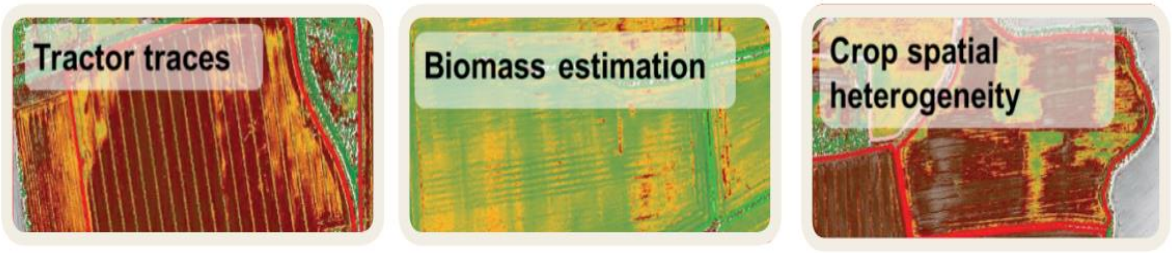

Figure 3Example measures derivable through assessment of EO data (Imagery Source – Planet)

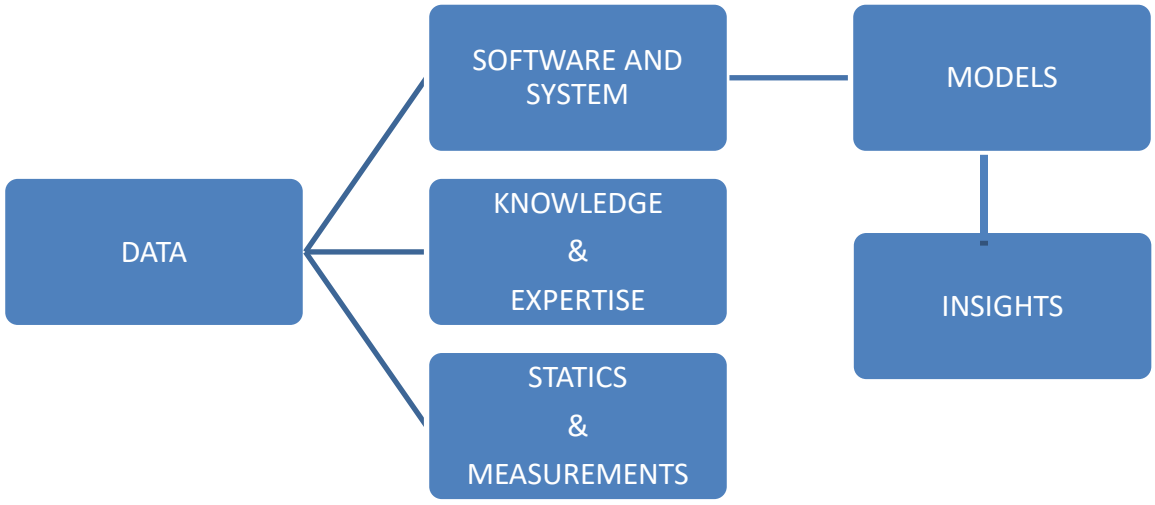

Figure 4System integration required to turn data into knowledge

5. Conclusion

Agriculture plays a vital role in the Indian economy. Over 70 per cent of the rural households depend on agriculture.to using the satellite we can avoid unwanted expenses of money and time, work. Now days our India changes into digital world to improving technology in many fields. Here I suggested if we use of satellite in Agriculture it can impure our Indian economy in this Agriculture field to using of Remote Sensing of Agriculture and Earth observation satellites (EOS)methods.

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