Comprehensive Remote Sensing Observation on Crop Progress (CROP)

Prelims – *Current events of national and international importance.*

Mains (GS III) – *Science and Technology- developments and their applications and effects in everyday life | e-technology in the aid of farmers.*

Why in news?

Recently ISRO has estimated the total wheat production from eight major wheat-growing states using Comprehensive Remote Sensing Observation on Crop Progress (CROP).

- **CROP** – It is a *semi-automated and scalable framework* developed by ISRO's National Remote Sensing Centre (NRSC).
- **Function** – It enables near real-time monitoring of crop sowing and harvesting during the ***Rabi season*** across India.
- **Data sources** – The framework uses remote sensing datasets of *Optical sensors and Synthetic Aperture Radar (SAR)* from multiple satellites,
    - EOS-04 (RISAT-1A)
    - EOS-06 (Oceansat-3)
    - Resourcesat-2A
- Optical sensors capture visible and near-infrared light, SAR uses microwaves to create images, offering all-weather information.
- **Methodology** – The system assimilates several satellite-derived parameters into a process-based crop growth simulation model using,
    - Crop area measurements
    - Sowing date information
    - In-season crop condition data by assessing the health and development of crops during their growth cycle.

A process-based crop growth simulation model is a tool that imitate the growth and development of crops by modelling the fundamental processes that govern plant growth and development.

- It uses these inputs along with *additional parameters like weather data, soil conditions, and crop-specific growth characteristics* to imitate how the crops develop over time and predict yield and production.
- A remote sensing-based *Vegetation Health Index (VHI)* has been employed to monitor crop conditions and drought stress.
- **Major wheat producing states in India** – The 8 major wheat-growing states covered

in the assessment are Uttar Pradesh, Madhya Pradesh, Rajasthan, Punjab, Haryana, Bihar, Gujarat and Maharashtra.

- **Significance - Enhances Agricultural Policy Development**- Assists the Ministry of Agriculture with real-time monitoring of agricultural activities.
- **Strengthens Food Security** - Timely yield predictions facilitate effective food stock management and procurement strategies.
- **Supports Disaster Response** - Contributes to assessments of the impacts of droughts, floods, and pest infestations.
- **Fosters Technological Advancement -** Encourages the adoption of space-based precision agriculture and the integration of remote sensing in farm management.

Reference

The Hindu| ISRO satellites forecast wheat production