Precision Farming

Why in news?

India's food requirement is likely to go up from the present level of 330 million tonne (MT) to more than 500 MT by 2050. India needs to meet the growing demand for food amidst shrinking land size.

What is 'Precision farming'?

- Precision farming is a site-specific crop management concept.
- It is based on observing, measuring and responding to inter- and intra-field variability in crops.
- This involves leveraging digital tools such as *AI, Machine Learning, and IoT* to optimise crop yield and quality while minimising costs and resources.
- It is also referred to as precision agriculture, satellite agriculture, and site-specific crop management (SSCM).

How Precision farming happens?

- The following things are needed to increase the efficiency of the input resources
  - Quality estimation of the seeds to be cropped
  - Well-prepared soil
  - Precise seeding advisory
- **Farming Stage -** Based on the soil health analytics, the amount and type or micro/macro nutrients is decided and added to the soil.
- IoT enabled soil sensors combined with remotely sensed data through drones/satellites and fast processing determines what the soil needs.
- This information is either send as a notification to the farmer's phone or through a central server.

What are the benefits of precision farming?

- In order to meet the growing demand for food amidst shrinking land size, precision farming is a promising solution avoiding crop failure.
- **Harvesting stage -** Any errors at this stage can result in crop failure.
- *Crop surveillance* is the only way that a farmer can ensure a timely harvest, especially when dealing with seasonal crops.
- It also helps in understanding and planning for the next farming season.
- Effective inspection of the field with infrared cameras and based on their real-time information improves crop surveillance.
- *Data-based harvesting* decisions are the next important step that can increase the

efficiency of farming decisions.
- IoT and analytical tools can identify the parameters for harvesting in real-time.
- Farmers can estimate when the *nutritional content* is highest in the crop through digital tools and determine the correct time of harvesting.
- For example, the harvesting of sugarcane crop can be done based on sugar content in the plant and not by its size.
- **Post-harvest stage -** Digital tools helps farmers with price, storage, transportation and logistics information.
- Precision technology can play a useful role in '*traceability in supply chain*', particularly in exports.

What are the issues in adapting to precision farming?

- There is a slow uptake of digital agriculture due to various data collection and analytics hindrances.
- **Data collection -** The prominence of *segregated smallholder* farms in the country, which makes data gathering a complicated activity.
- **Lack of centralised Repository -** Data of different geographical locations, weather, soil types, crop types, and other parameters are needed to make a viable advanced technology-based model.
- At present, there isn't a centralised repository of different varieties of data stacks to be used in agriculture.
- **Cadastral data -** To improve analytics, Cadastral data with administrative boundaries and geo-coded soil data must be made available through public sources.
- At present, only few States have GIS maps of cadastral boundaries which limits the potential of wide scale implementations of digital solutions.
- **Disparate data -** Rich data sets like soil health card on micro-nutrients, are disparate and not interoperable, limiting analytics and value creation.
- **Affordability -** technological interventions used in precision farming is unaffordable for Indian farmers.

What is the way forward?

- **Farm Digitization** - Scaling up of digital agriculture in India by bringing digitisation to the farm.
- **Effective partnership** - Learnings can be drawn from several successful examples of partnerships between stakeholders within India and around the globe.
- **Digital Infrastructure** - Development of digital public infrastructure for farmers covering all areas from input to output.
- **Accessibility** - Government subsidising the cost of technology to enable them move towards digital technology.
- **Carbon trade** - Creation of carbon credits for the farmers would encourage the adoption of precision agriculture.

Reference

Business Line - Precision farming vital to meet food demand

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