## 3. Digital Agriculture

Aim

MahaAGRITECH is a successful demonstration of digital agriculture solutions at the state level - with synergistic use of digital technologies for decision support and management in agriculture in Maharashtra state. MahaAGRITECH project has been implemented since June 2019, jointly with the Maharashtra Remote Sensing Applications Centre (MRSAC), NRSC, and the Department of Agriculture, Government of Maharashtra. Multi-sensor satellite data, drones, mobile-based field data, and many other datasets are used in the project, supporting farmer-centric and planning-centric activities in agriculture decision-making as well as the major ongoing programmers – crop insurance, crop risk assessment, drought management, agro-advisory, etc. The project deliverables flow into the "crop info" module in a dedicated geoportal. (http://mrsac.maharashtra.gov.in/mahaagritech)
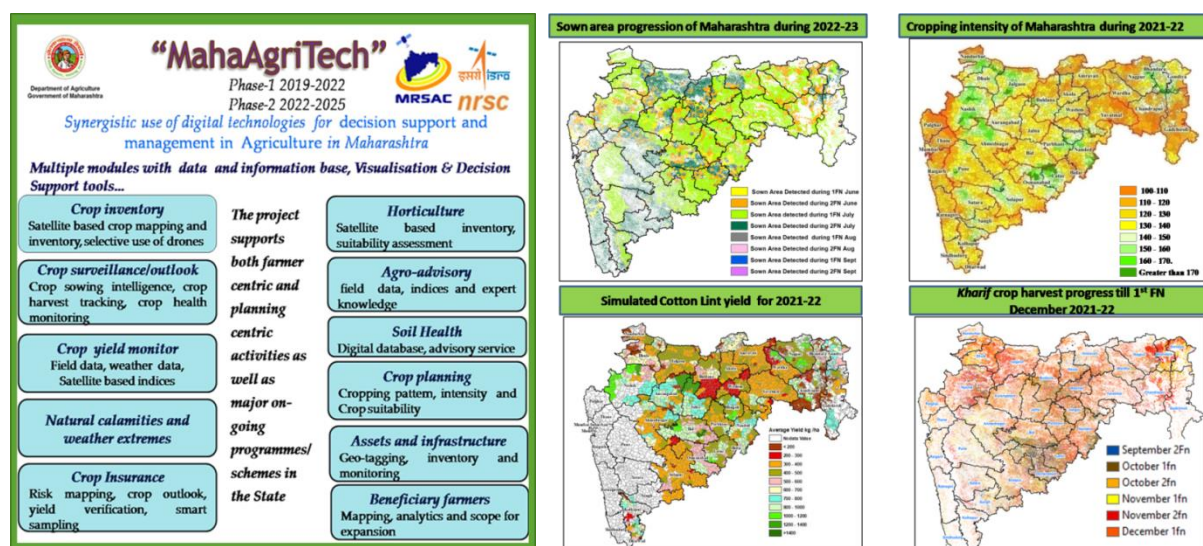
Scope

The overall scope of the project is as follows:
- 1. Crop mapping and inventory of major field and horticulture crops in Maharashtra
- 2. Development of crop planning tools and crop surveillance system with Mobile apps (CROPSAP), weather data (AWS), and satellite-based indices.
- 3. Data Analytics for providing seasonal crop condition information and periodic advisories.
- 4. Development and management of Drought Monitoring System (MahaMADAT) – providing drought indices to support drought declaration at the circle level.

- Crop yield modeling (process based/machine learning) for pre-harvest assessment of crop yields/indicative crop yields for major crops (soybean, cotton, and paddy).
- Crop insurance solutions - Monitoring the insurance coverage based on insurance and cadastral data, risk index for clustering, CCE data analysis, and feasibility studies for implementing smart sampling techniques.
- Asset inventory - Analysis of geo-tagged assets created under different schemes and generation of value-added information products for decision support for cadastral level mapping of farmer-beneficiaries of various centrally sponsored schemes and generation of value-added information products
- Software development for automation, dashboards, web tools, visualization, and decision support.

Deliverables include fortnightly crop sowing/crop harvest information in the form of maps and statistics for *Kharif* and *rabi* seasons, cropping intensity map at circle/taluka/district level, crop health and drought indices at revenue circle level estimates on the production of major crops in Kharif (soybean, cotton, and paddy) along with error level(with reference to CCE data), crop risk affected area maps and statistics for selected and feasible risk events, etc. These information products are hosted on a web-enabled Decision Support System.

Current constraints/challenges

Monitoring crop sowing progress during the initial phase of Kharif season till the end of July is technologically challenging due to very low spectral emergence. The availability of high-quality crop yield data is a limitation for technology-based yield estimation at a finer scale. A coarse soil database (1:50K scale) is another limiting factor for soil health assessment. Detecting crop damage and crop stress at the local scale in near real-time with medium-resolution satellite data is a major challenge in addressing crop insurance-related issues.

Expected Outcome

MahaAgritech is the first of its kind project in the country to successfully demonstrate the operationalization of digital agriculture solutions at the state level with all the deliverables generated at a finer scale of a revenue circle. This project facilitates the development of a regional-scale agriculture monitoring framework and decision support tool enabling decision-makers to facilitate farmers' development.

Timeframe

The agriculture outlook information like seasonal crop sown area, sowing, and harvest progress is being generated nationwide using a web-enabled semi-automatic tool. The technology demonstrated in the MahaAgritech project can be implemented in other

states of India with the participation of the State Agriculture Department and the Remote Sensing Centre. The same can be upscaled to the National level in 1-2 years.