Rise of Agri-tech in India

This editorial is based on <u>"Can drones replace tractors someday?"</u> which was published in the Hindu on 17/02/2023. It discusses the rise of technology in the agriculture sector and related challenges.

Transformative technological solutions are increasing in the agricultural sector, leading to the rise of over 1,300 start-ups aimed at addressing the untapped potential of the agri-tech space. Up until 2021, **India received investments of over USD 1.6 billion** in agri-tech, being the third highest globally.

The agri-tech industry is one of the **most important pillars to build a sustainable future** due to its high demand in India and the global market. The Economic Survey of India 2022-23 highlighted that India's agriculture sector has grown 4.6% over the last six years with over 1000 agri-tech start-ups having emerged in the sector. Infrastructural development plays a key role in building a robust agri-tech sector.

In the modern era of technology, it is not wise to neglect the technology in the agriculture sector. So, the need of the hour is to reassess the significance and challenges of agri-tech in India.

What is the Role of Technology in Agrarian Changes?

- **Role of Drones:**
    - Drones, also known as **Unmanned Aerial Vehicles (UAVs), have the potential to significantly transform** agriculture and bring about various changes.
    - Drone has several applications in <u>aerial seeding</u>, **pesticide spraying** and remote data collection for research.
- **Role of Agri-Start-ups:**
    - Agri tech start-ups can play a significant role in bringing about agrarian changes by introducing innovative technology and modern practices in the agriculture sector.
    - Agri tech start-ups can contribute to agrarian changes by improving Farming Techniques, Increasing Efficiency, Access to Finance etc.
- **Precision Agriculture:**
    - Technology such as GPS, drones, and sensors are being used to monitor crops, soil, and weather conditions.
    - This allows farmers to make data-driven decisions and optimize resource management such as water and fertilizer usage.
- **Agricultural Machinery:**
    - Mechanization has been a key factor in improving the productivity of the agrarian sector.

- Modern agricultural machinery such as tractors, harvesters, and seed drills have enabled farmers to increase their efficiency and reduce labour costs.
- **Biotechnology:**
  - [Biotechnology](#) has been used to develop crops that are resistant to pests and diseases, drought-resistant, and have increased yield.
  - This has resulted in increased productivity, reduced crop loss, and better quality crops.
- **Food Processing and Preservation:**
  - Technology has enabled the development of food processing and preservation techniques that ensure food is safe and has a longer shelf life.
  - This has reduced food waste and ensured that crops can be stored and transported more efficiently.
- **Market Access:**
  - Technology has enabled farmers to have better access to markets, both locally and internationally.
  - The internet and [e-commerce](#) have made it possible for farmers to connect with buyers and sell their products directly, bypassing middlemen and increasing profits.

What are the Related Steps taken?

- **[Digital Agriculture Mission (DAM) Initiative:](#)**
  - It was launched in September 2021 to help agri-tech start-ups by leveraging advances in cloud computing, earth observation, remote sensing, data, and AI/ML models.
- **AgriStack:**
  - The Ministry of Agriculture and Farmers Welfare has planned creating 'AgriStack' - a collection of technology-based interventions in agriculture.
- **Unified Farmer Service Platform (UFSP):**
  - UFSP is a combination of Core Infrastructure, Data, Applications and Tools that enable seamless interoperability of various public and private IT systems in the agriculture ecosystem across the country.
- [Sub-Mission on Agricultural Mechanization (SMAM) scheme:](#)
  - SMAM scheme was launched in 2014-15 with the objectives of increasing the reach of farm mechanization to small and marginal farmers and to the regions & difficult areas where farm power availability is low.

What are the Issues with Agri-Tech in India?

- **Limited Digital Literacy:**
  - Despite India's strides in digitalization, many farmers lack digital literacy and access to technology, making it challenging to adopt agri-tech solutions.
- **High Upfront Costs:**
  - Many agri-tech solutions require significant upfront investment, which can be a significant barrier for small-scale farmers who may not have the resources to invest.
- **Fragmented Land Holdings:**
  - Most farmers in India have **small and fragmented land holdings**, making it difficult to adopt large-scale mechanization solutions, which are more cost-effective.
- **Limited Infrastructure:**
  - Limited availability of basic infrastructure, such as electricity and internet connectivity, can hamper the adoption and effectiveness of agri-tech solutions.
- **Inadequate Government Policies:**
  - The government's policies and programs for promoting agri-tech are often inadequate, inconsistent, or poorly implemented, hindering their effectiveness.
- **Lack of Collaboration:**
  - The lack of collaboration between stakeholders, including farmers, private sector players, and the government, can limit the development and adoption of effective agri-tech solutions.
- **Limited Market Access:**

- Even if farmers adopt agri-tech solutions, they may face challenges accessing markets to sell their produce due to a lack of market linkages and limited market information.
  - **Issue with Regulation of Drones:**
    - Privacy is a major concern that looms over the trajectory of this sector since aerial vehicles come equipped with sophisticated sensors and cameras.

What Should be the Way Forward?

- **Encouraging the Adoption of Modern Technology:**
  - The government should encourage farmers to adopt modern technology in farming. This can be done by providing subsidies and financial incentives for purchasing and using modern equipment and techniques.
- **Promote Farmer-Centric Research:**
  - Agricultural research **should focus on the needs and priorities of farmers.**
  - Scientists should work closely with farmers to develop technology and practices that are suitable for local conditions.
- **Improve Access to Technology:**
  - Small farmers in India often lack access to modern technology, including irrigation, mechanization, and crop management tools.
  - Research institutions **should focus on developing affordable and accessible technologies** that can improve agricultural productivity.
- **Promote Education and Training:**
  - Agriculture-related education and training should be made available to farmers, researchers, and other stakeholders.
  - This can **help to promote the adoption of new technologies and practices**, as well as facilitate knowledge transfer.
- **Improving Drone Regulation:**
  - Drone regulation is a critical issue that requires careful consideration to ensure the safety and privacy of individuals and communities.
  - Some ways to improve regulation are developing a clear and consistent set of regulations, Enforcing privacy laws etc.

__Drishti Mains Question__

What are the key factors driving the rise of agri tech in India, and what are the major challenges faced by the sector in achieving its full potential?

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q. Consider the following statements: (2017)

The nation-wide 'Soil Health Card Scheme' aims at

1. expanding the cultivable area under irrigation.
2. enabling the banks to assess the quantum of loans to be granted to farmers on the basis of soil quality.
3. checking the overuse of fertilizers in farmlands.

Which of the above statements is/are correct?

(a) 1 and 2 only

(b) 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

Ans: (b)

Expl:

- Soil Health Card (SHC) is a GoI scheme promoted by the Department of Agriculture and Co-operation under the Ministry of Agriculture and Farmers' Welfare. It is being implemented through the Department of Agriculture of all the State and Union Territory Governments.
- A SHC is meant to give each farmer, soil nutrient status of the holding and advise on the dosage of fertilizers and also the needed soil amendments, that should be applied to maintain soil health in the long run.
- The main aim behind the scheme is to find out the type of a particular soil and then provide ways in which farmers can improve it.