



## Agri-Tech Startups: Transforming the Future of Agriculture

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India's technology revolution is advancing rapidly, touching nearly every industry with transformative innovations. However, agriculture—a sector vital to the country's economy and livelihood, employing over half of its 1.3 billion people—has traditionally been slower to embrace technological advancements. In recent years, Agri-tech startups have emerged as game changers, integrating cutting-edge technologies such as artificial intelligence (AI), the Internet of Things (IoT), blockchain, and robotics into agricultural practices. According to the well-known definition by Steve Blank (Blank, 2010) “a startup is a company, a partnership or temporary organization designed to search for a repeatable and scalable business model”. These startups are addressing critical challenges, enhancing farm productivity, fostering sustainability, and contributing to solutions for global issues like food security. In agrarian economies like India, where agriculture significantly impacts GDP, the rise of Agri-tech startups signals a pivotal shift toward modern, technology-driven farming.

### Status of Agri-Startups in India

India is emerging as a strong contender in the global agritech domain, competing with major players like the US and China. According to AgFunder, investments in India's agritech sector surged from \$619 million in the first half of 2020 to \$2 billion during the same period in 2021, making it the third-largest recipient of agritech funding globally. A recent EY report estimates that the Indian agritech market has the potential to reach \$24 billion by 2025, though only 1% of this potential has been realized so far. The funding landscape for Indian agritech startups has witnessed substantial growth over the past decade. From 2010 to 2019, the sector attracted \$1.9 billion in investments, with \$1.7 billion of this inflow occurring between 2014 and 2019, underscoring its rapid evolution. By June 2019, agritech startups had raised \$248 million, signalling increasing investor confidence in the sector. Although funding dipped slightly in 2020, with startups securing \$204 million, this also highlights the largely untapped potential of agritech in India. In 2021, the momentum rebounded as Indian agritech startups raised \$684 million across 47 deals (Dayalani, 2020). These figures reflect the sector's vibrancy and its readiness for exponential growth with appropriate policy interventions and infrastructural advancements.

Indian agritech start-ups primarily operate in markets dominated by e-commerce companies, offering fresh and organic produce directly from farmers to consumers. In 2013, India had only 43 agritech startups. By 2023, this number had grown exponentially to over 2800 (Startup India). In recent years, numerous startups have introduced innovative, practical solutions to address critical agricultural challenges. These include technologies such as biogas plants, solar-powered cold storage units, drones, weather forecasting systems, advanced seed drills, vertical farming techniques, fencing solutions, and water pumping systems etc (Sachitanand, R., 2018). Key areas of focus for these startups include supply chain optimization, big data analytics, market linkages, Farming-as-a-Service (FaaS), and

Internet of Things (IoT)-based solutions. From weather prediction and drone-based monitoring to input procurement, farm equipment rental, online vegetable sales, farm mechanization, and protected agronomy, these startups are revolutionizing agriculture in India. Leveraging cutting-edge technologies such as artificial intelligence (AI), machine learning (ML), drones, and geoinformatics, agritech startups are harnessing big data to enhance agricultural productivity and sustainability.

### What helped Agri digital startups to mushroom?

Historically, investing in agri-tech was deemed unviable, with minimal activity in the sector until about a decade ago. However, a pivotal change occurred around 2015, when venture capitalists, having saturated the B2C startup space, began shifting their focus toward B2B opportunities, particularly in agriculture. Early investments in agri-tech were concentrated on farm-to-consumer brands, B2B agri-marketplaces, and rural fintech solutions for farmers.

Nearly 70% of rural households depend on agriculture as their primary source of livelihood, making farmers a substantial segment of the rural population now accessing the internet. Recent advancements in mobile internet and the increasing penetration of smartphones in rural areas have provided the digital foundation for scalable business-to-farmer (B2F) and business-to-business-to-farmer (B2B2F) models. The increasing availability of smartphones and mobile internet, coupled with the growing use of communication apps, has empowered farmers to share information, access advisory services, and find solutions to agricultural challenges. Additionally, supportive government schemes aimed at rural development have played a pivotal role in accelerating the adoption of technology in agriculture (Sachitanand, 2018; Ganguly & Euchner, 2018). Digital platforms now enable farmers to enhance their productivity, reduce operating costs, and secure fair market prices for their produce. These developments have fostered a supportive agri-tech ecosystem, with active participation from accelerators, corporates, and venture capitalists at various stages of growth.

The COVID-19 pandemic acted as a catalyst, driving farmers toward digital platforms for market access and modernizing agriculture. During the lockdown, agri-tech startups provided critical support to the sector, easing operational challenges and facilitating digital adoption. The introduction of the 2020 farm laws further stimulated collaboration among farmers, Farmer Producer Organizations (FPOs), and cooperatives, enhancing their openness to innovation and technology adoption (Gulati et al., 2022). This have collectively paved the way for the unprecedented growth of agri-tech startups, reshaping the agricultural landscape in India.

### Agri-tech startups: technology to the rescue

Below are some examples of how these startups are applying technology to drive innovation in agriculture:

#### 1. Precision Agriculture:

- **CropIn:** Uses AI to analyze data from sensors, satellite imagery, and historical records to provide insights for better decision-making, leading to higher yields and improved quality.
- **Fasal:** Leverages AI-powered image analysis to provide farmers with real-time insights into crop health, soil conditions, and pest infestations.
- **Skymet Weather Services:** Offers highly accurate and location-specific weather forecasts, enabling farmers to make informed decisions about planting, irrigation, and harvesting.

#### 2. Smart Irrigation Systems:

- **WaterBit:** Develops IoT-based irrigation systems that automate water delivery based on soil moisture and weather data.
- **CropX:** Uses AI and machine learning to analyze soil data, weather forecasts, and crop growth models to optimize irrigation schedules and reduce water waste.

- **Rain Bird:** Offers a range of smart irrigation controllers and sensors that allow farmers to automate and optimize their irrigation systems.
- 3. **Advanced Seed Technologies:**
  - **Bayer Crop Science:** Develops innovative seed varieties that are resistant to pests, diseases, and adverse weather conditions, leading to higher yields and improved quality.
- 4. **Real-Time Tracking:**
  - **Ninjacart:** This supply chain platform uses technology to track the movement of fresh produce from farms to markets. This real-time tracking helps reduce food waste and ensure the quality of the produce
- 5. **E-commerce Platforms:**
  - **Ninjacart:** Connects farmers directly to retailers and restaurants, reducing food wastage and ensuring fair prices.
  - **DeHaat:** Provides a comprehensive platform for farmers, including e-commerce, input supply, and financial services.
- 6. **Cold Chain Logistics:**
  - **ColdEX:** Offers temperature-controlled logistics solutions to maintain the quality of perishable products, reducing post-harvest losses and ensuring that products reach consumers in optimal condition.
  - **Ninjacart:** While primarily a supply chain platform, Ninjacart also focuses on cold chain logistics to ensure the freshness of produce. They have invested in temperature-controlled warehouses and transportation to minimize spoilage.
- 7. **Digital lending**
  - **KhetiGaadi:** This agritech platform provides various financial services to farmers, including digital loans. They use a combination of technology and field-level data to assess creditworthiness and disburse loans to farmers.
  - **Samunnati:** This company offers a range of financial services to rural communities, including digital lending. They use technology to streamline the loan process and ensure timely disbursement of funds to farmers.
- 8. **Insurance Solutions:**
  - **Samunnati:** Provides customized insurance products that protect farmers against a variety of risks, such as crop failure, natural disasters, and market fluctuations. These insurance products can help farmers mitigate financial losses and build resilience.
- 9. **Organic Farming Solutions:**
  - **Samunnati:** Promotes sustainable farming practices, including organic farming, natural pest control, and agroforestry. Samunnati works with farmers to help them transition to organic farming practices, providing training, technical assistance, and access to organic inputs. The company also helps farmers to market their organic products and connect with buyers.
- 10. **Soil Health Monitoring:**
  - **Gramophone:** Offers soil testing, fertilizer recommendations, and crop advisory services.
  - **KrishiTantra:** This company specializes in soil data and health, providing farmers with insights into soil quality and fertility. Their data-driven approach helps farmers make informed decisions about crop selection, fertilization, and irrigation
- 11. **Market Intelligence:**
  - **BigHaat:** Provides real-time market information on prices, demand, and supply trends, helping farmers make informed decisions about their production and sales.
  - **DeHaat:** This comprehensive platform offers market intelligence, connecting farmers directly to buyers and providing real-time price information.
  - **Ninjacart:** This supply chain platform uses technology to track market demand and supply, helping farmers optimize their production and pricing strategies.

- **BigHaat:** This online marketplace provides farmers with real-time market information, including prices, demand, and supply trends.
- **CropIn:** By analysing data from various sources, CropIn can provide insights into market trends, helping farmers make informed decisions about what to plant and when to sell.

## 12. E-Marketplaces:

- **Agribazaar:** Connects farmers with buyers, providing a platform for them to discover the best prices and market opportunities.
- **Gramophone:** Offers a digital marketplace for farmers to sell their produce directly to consumers, as well as a platform to connect with buyers and sellers of agricultural inputs.
- **BigHaat:** This online marketplace connects farmers directly to consumers, eliminating intermediaries and ensuring fair prices for farmers. It offers a wide range of agricultural products, from fresh produce to processed foods.

By leveraging technology and innovation, these agritech startups are empowering farmers, increasing agricultural productivity, and ensuring food security for a growing global population.

## Conclusion

Agri-tech startups are pioneering a new era in agriculture, leveraging cutting-edge technologies to transform traditional farming practices. By harnessing the power of innovation, these startups are significantly improving farm productivity, ensuring sustainable agricultural practices, and addressing pressing global challenges such as food security and climate change. As these startups continue to develop groundbreaking solutions, fostering collaboration among farmers, policymakers, and investors becomes crucial. By working together, we can create an ecosystem that nurtures the growth of technology-driven farming, empowering farmers and securing a sustainable future for our planet. With their transformative potential, agri-tech startups are not only enhancing the livelihoods of farmers but also paving the way for a more sustainable and food-secure world.

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