AGRICULTURE STARTUPS IN RURAL & URBAN INDIA: AN OVERVIEW

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ABSTRACT

According to Census (2011), more than 50% of India's total workforce is engaged in agriculture and allied sector activities and the sector itself accounts for 18.8% (First Advance Estimates) of country's Gross Value Added (GVA) for the year 2021-22 (at current prices). With the increasing adoption of digital technologies and the rise of startups, the sector is poised for rapid growth in the coming years. Agritech startups are developing innovative solutions for various aspects of agriculture, including precision farming, supply chain management, and market linkages.

KEYWORDS: Agriculture, Startups, Agri tech, Fintech companies, IOT, Bigdata, Innovations, Government

According to Census (2011), more than 50% of India's total workforce is engaged in agriculture and allied sector activities and the sector itself accounts for 18.8% (First Advance Estimates) of country's Gross Value Added (GVA) for the year 2021-22 (at current prices). India holds the record for second-largest agricultural land in the world, with around 60% rural Indian households making their living from agriculture.

In recent years, there has been a surge of agritech startups, which are being termed as the "ray of hope" in Indian agriculture. Additionally, it is becoming more and more evident that agritech startups can provide relevant and innovative solutions to the challenges faced across the agricultural value chain.

Examples of countries like Israel, China and US can be taken for understanding the transformational impact using technology can have on revolutionizing agricultural practices and subsequently, the lives of people associated with the agricultural industry. The use of AI, IoT, Big Data Analytics, drones for farm mapping, ICT applications, technology for weather forecasting, amongst numerous other technological applications prove to show the potential Indian agritech startups have in transforming the country's agriculture industry.

There are some challenges faced by the startups working in this industry. Lack of information on sowing and pre-harvest activities, lack of awareness of government policies at farm level, lack of infrastructure and connectivity, lack of skilled labour for adopting tech integration at farm level, amongst others are some of the challenges faced by startups working in this industry.

To overcome these challenges, both government and private players alike are taking various initiatives. In Budget 2023, 'Agriculture Accelerator Fund' was introduced to encourage agri start-ups founded by young entrepreneurs in rural areas and the agricultural credit target was also increased to Rs 20 lakh crore with a focus on animal husbandry, dairy, and fisheries (Budget 2023). Additionally, there are numerous startups emerging in the agriculture sector despite all the challenges faced by the sector. These startups are not only bringing in new and innovative solutions to solve some of the core challenges but are also providing employment opportunities and improving livelihoods of stakeholders associated with the sector.

As of 10th April 2023, there are around 374 Department for Promotion of Industry and Industrial Trade (DPIIT) recognized startups in the agriculture industry spread across 490 districts, providing employment to around 38,000 people (Data as of 10th April 2023). Additionally, there are about 2207 DPIIT recognized startups in the Agri-Tech industry spread across 360 districts, providing employment to more than 18,000 people. The highest number of recognized startups in this sector are in Maharashtra ~459 (Data as of 17th April 2023).

STARTUPS IN THE SPOTLIGHT:

1. **FRUVETECH PRIVATE LIMITED**
   The startup is focused on development of a device to enhance shelf life of fruits using an innovative idea.
2. **WOLKUS TECHNOLOGY SOLUTIONS PRIVATE LIMITED**
   The startup under the brand named 'Fasal', develops an AI-powered IoT platform for precision agriculture.
3. **NATURA CROP CARE**
   The startup has developed biological and botanical products to meet the demand of residue free produce which help the farmers across in managing the plant-soil health and plant nutrition.

WAY FORWARD

To further grow this sector, examples of countries like Israel, China and US can be taken for understanding the transformational impact using technology can have on revolutionizing agricultural practices and subsequently, the lives of people associated with the agricultural industry. The use of AI, IoT, Big Data Analytics, drones for farm mapping, ICT applications, technology for weather forecasting, amongst numerous other technological applications prove to show the potential Indian agritech startups have in transforming the country's agriculture industry.

With the increasing adoption of digital technologies and the rise of startups, the sector is poised for rapid growth in the coming years. Agritech startups are developing innovative solutions for various aspects of agriculture, including precision farming, supply chain management, and market linkages. These technologies can help improve productivity, reduce costs, and increase the income of farmers. As the sector continues to grow, it has the potential to not only transform India's agriculture sector but also create new employment opportunities and contribute towards the growth of the country's economy. As we move forward, it is important for agriculture startups to stay focused on their mission of self-reliance and sustainability, building on the successes of the past. The vision of a self-reliant India is deeply embedded in the startup ecosystem and will remain a guiding force for the years to come.

One of the more pressing challenges of the sector is infrastructure. The National Institute of Agricultural Management states that supply chain management in India is fraught with problems mainly due to the outdated habits of the agricultural industry. Now, a wave of agritech startups are addressing supply chain management and enhancing the sector's marketing infrastructure, key developments that will eventually raise farmers' incomes. The lack of these support and service networks has created an agrarian distress in the country and among the farmers. And during we notice a surge of Agritech Startups that have become a ray of hope in Indian agriculture.

CHALLENGES IN AGRI STARTUP IN INDIA

LACK OF FINANCING: Distributors frequently serve as lenders, and the majority of farm debt is generated by the use of pesticides and non-pest-resistant seeds. Furthermore, the final consumer—the farmer—rarely receives domestic subsidies and investments that are mentioned in programs.

INADEQUATE IRRIGATION: In India, agriculture is a dispersed industry that spans 600,000 communities, and the majority of the country's water supply (around 70%) still comes from rainfall. At the same time, the average depth of groundwater is gradually decreasing from 1,000 feet every year.

FARM SIZE VS PRODUCTIVITY: Research has indicated a negative correlation between farm productivity and size. Because Indian farms are dispersed and small—70% of them are less than one hectare, compared to the national average of less than two hectares—farm yields are notably low. The average sizes in the US and Europe are 150x and 30x larger than those in India.

INEFFICIENT SUPPLY CHAIN: Strong incumbents have control over the supply chain, distribution, seeds, pesticides, and financing used in farming. These systems also have full access to the distribution networks that supply about 8 million Kiranas (Groceries) nationwide.

MIDDLEMEN AND AGENTS: The agents and middlemen who own the disjointed supply chains govern the farmer's demand-side demands. They also set the price for produce. For example, it is estimated that 20% of the product sold by organized stores comes directly from farmers, with the remaining portion coming from mandis. Although traders need a license to operate in a mandi, wholesale and retail traders, as well as food processing firms, are not permitted to purchase produce that is categorized as notified agricultural products (vegetables, grains, etc.) straight from farmers. This makes mandis less than ideal farmers' markets. Products that have been notified must be delivered to the market committee and put up for auction in front of the farmers. The majority of market committees lack transparency and technological intervention to guarantee seamless operations, and they have failed to give farmers a competitive platform.

AGRITECH STARTUPS

Currently, there are nearly 2500 [Startup India Database as on 31st December 2023] Agritech startups recognized by Startup India. These Agritech startups in India have been termed as the "ray of hope", driving innovation and transforming the way agriculture is traditionally done in India. Estimates place the number of actively operating agritech startups around 600-700.

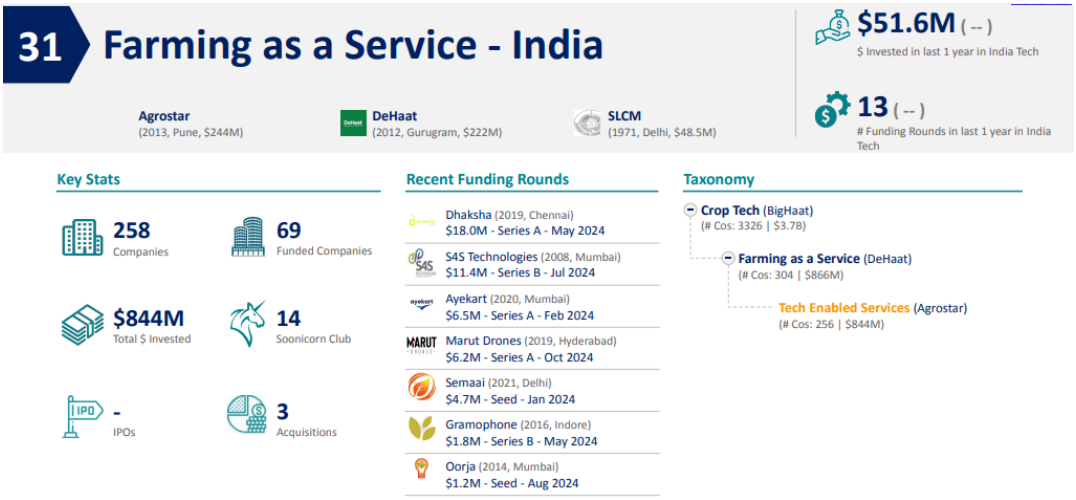
Sr. No.	Sub Sector	Startup
1)	Upstream (Input) Market Place Model (Matching Agri inputs sellers to Farmers)	a) Agrostar b) Ninjacart c) Agri hub d) Agronxy e) Bighaat f) Agrevoution
2)	Downstream (Output) Farm to Fork Supply chain model (Matching farmers to business or retail customers for fresh produce, processed food)	a) Krishi star b) Crofarm c) Bharat bazaar d) Sabziwala
3)	Farming as services	1) Farmart 2) EM 3) Ravgo 4) Oxen
5)	IOT/ Big data Innovation	a) Cropin b) Flyword innovation
6)	Engineering led Innovation	a) Kamal Kishan b) Khyti c) Drip tech
7)	Miscellaneous (Innovation in Agri products, dairy farming	a) SUMA Agro b) Cattle Mettle c) Laveda
8)	Ultrafast Groceries	a) Blinkit b) Zepto c) Swiggy

Source: Traxcn

AGRI TECH FUNDING

Source Tarxcn

Source Traxcn



Source Traxcn

FUNDING PATTERN

Name of the Agri Startup	Fund Raised	Funding Round	No. of Investors	Some prominent Investors
Ninjacart	358 millions	14	20	Fipkart, Qualcomm, Ventures, Walmart Accel Neoplus, ec
Agro star	112 million	7	11	Hero Moto Corp Limited, Aavishkar Venture Capital, Accel CDC Group etc.
Dehaat	194 millions	7	13	Propus Ventures, FMO, RTP Global Sofina
Cropin Technologies	33 millions	10	12	Prathithi Investments, Ankur Cpaital, ABC World Asia, Sahra Growth Capital

Source: https://www.crunchbase.com

The funding trends of the four agribusiness companies have been examined in this section. The funding trends of agribusiness companies are shown in the above table. The table above shows that these agri-tech companies are receiving the funds they need from the right investors and entrepreneurs. Actually, the government is eager to support these entrepreneurs by promoting public-private partnerships and connecting with NABARD to meet their mixed capital needs. The new technology that these agri-startups are bringing with them is actually intended to boost agricultural productivity.

Utilizing Contemporary Technology in These Agribusiness Startups An attempt has been made to comprehend how these agri-startup businesses are using technology to support farmers and boost agricultural output in this section.

1) **NINJA CARTS:** In essence, it makes decisions using data science, machine learning, and artificial intelligence. Weekly sales and procurement forecasts are created by combining historical demand data with a growth plan using diagnostic analytics techniques. Errors are eliminated and possible supply chain threats are identified using predictive analytics. As the farmers were not getting better pricing and the merchants not able to acquire fresh quality of goods Ninja Carts to bridge the gap, intends to eliminate the intermediaries in the food supply chain by offering robust technology and analytics.
2) **AGROSTAR:** This new business uses data and technology to help farmers get high-quality produce and close the knowledge gap caused by conventional methods. In fact, modern management techniques and digitization enhance farming's value. Agrostar leverages novel technical technique through mobile app to communicate with farmers to spot crop disease, speed up the loan procedure as well as boost supply chain analytics. Technology is being used to boost both crop yields and farmers' incomes.
3) **DEHAAT:** On a single platform, it links farmers with buyers and providers. It seeks to use cutting-edge technology to boost crop productivity. It uses technology powered by artificial intelligence to transform the farming industry's supply chain and production efficiency. The farmers' incomes rise as a result.

4) **CROPIN TECHNOLOGY:** This firm analyzes crop data for agricultural processors, input suppliers, and lenders using artificial intelligence, big data analytics, and remote sensing. It makes use of cutting-edge technologies for the revolution in smart farming. It aims to develop a sophisticated, networked data platform.

FOCUS AREAS FOR AGRI-TECH STARTUPS

1. BIG DATA: As we all know, data is the new oil, and developing farm-specific, data-driven diagnostics to assess crop and soil health will be a major area of opportunity in the future. In order to assess risk, startups are using drones or tractor-based technologies to gather data on the ground about the weather and agriculture. As smartphones become more widely used, farmers will be able to make precise decisions about their farming operations, which will boost output and income while lowering unit costs. For instance, Agrostar and RML Agtech are each investing INR 5 Cr ($776 K) to develop innovative picture recognition technology that would give farmers access to real-time information on crop diseases or pests.

2. FARMING-AS-A-SERVICE (FAAS): Another sector that is anticipated to gain market traction is the rental of agricultural equipment. Renting can relieve the farmer of the burden of input expenditures because contemporary equipment is costly and out of reach for the average farmer, and extended gestation periods are a common aspect of this industry. For instance, EM3 Agriservices rents out farming equipment and services to farmers on a pay-per-use basis. Goldfarm, Ravgo, Oxen Farm Solutions, and Farmart are some other startups.

3. MARKET LINKAGE MODELS: Innovations to assist farmers in accurately and promptly estimating when to plant and harvest in order to meet patterns of customer demand. For instance, MeraKisan.com enables Indian customers to purchase fresh produce and products from nearby farmers.

4. FINTECH FOR FARMERS: The majority of farm income is paid in cash, which gives Fintech companies the chance to digitize payments for farmers by connecting payment gateways to their accounts. Additionally, these startups have the ability to establish the credit profile environment for lenders and funders.

5. IOT FOR FARMERS: In the agricultural industry, smart farming—which includes ideas like data collection, automated farming methods, and high-precision crop control—will eliminate inefficiencies and increase output. Over time, farming methods can be improved by using data on crop yields, rainfall patterns, pest infestation, and soil nutrition. 9 For instance, Stellapps uses wearables, cloud computing, and data analytics to enhance agri-supply chain elements like milk production, procurement, cold chain, payments to farmers, and animal insurance.

GOVERNMENT INITIATIVES SCHEMES INITIATED BY CENTRAL GOVERNMENT

The Indian Govt. has placed a strong impetus on this sector and aims to double the income of farmers by 2022.

1. Pradhan Mantri Fasal Bima Yojana (PMFBY): The program was introduced in 2016 and offers farmers financial assistance to compensate for crop losses. The program includes annual horticultural and commercial crops, as well as rabi and kharif crops. PMFBY is a crop insurance policy that requires farmers to pay a premium based on the principal amount.

2. Pradhan Mantri Krishi Sinchayee Yojana (PMKSY): A total of USD 7.64 billion has been allocated under the project for irrigation investments, cultivable area expansion, improving on-farm water efficiency to minimize waste, promoting precision irrigation adoption, etc.

3. Paramparagat Krishi Vikas Yojana (PKVY): The program guarantees that organic farming is promoted, that chemical fertilizers are used in a balanced manner, and that farm produce quality is improved.

4. Agricultural Technology Management Agency (ATMA): Using a basic mobile phone, this method makes it easier to retrieve and enter data from internet-based web portals without the need for an internet connection. b. For farmers and other stakeholders, over dozens of cutting-edge technological services, such as USSD, are being operationalized.

CONCLUSION

As seen above, agri startups and businesses are transforming supply chains and agricultural farming. The Indian government is also taking a number of steps to promote the development of agritech companies in India. These companies are utilizing a range of artificial intelligence, data analytics, and machine learning technologies to help farmers and boost agricultural output. One of the main reasons for the country's food scarcity is the mismatch between farmers and retailers. Farmers are unable to get the best price for their products, and retailers are unable to get fresh, high-quality food to provide to consumers.

The main cause of this is the abundance of middlemen. The goal of agritech companies is to bridge this gap and help farmers and retailers by using technological innovations. These agritech companies also thrive by leveraging technology to improve harvesting practices, raise crop yields, and increase the productivity of the farming industry.

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