Agritech Startups in India- An Analysis of Growth Potential and Entrepreneurial Prospects

Navdeep Kumar
Assistant Professor, PG Department of Commerce and Business Administration, Lyallpur Khalsa College, Jalandhar (Punjab)
E-mail: navdeepgandotra@gmail.com

Abstract

The inclusive growth of any nation largely depends upon the state of agriculture sector. At the same time, this segment is highly affected by the diverse challenges be it weather, productivity and sustainability. The economy of India is dominated by the agriculture. The advent of technological innovations and digital agriculture has considerable transformational impact on the farming practices. A large number of entrepreneurs have taken initiatives in the field of agritech innovation for exploiting the potential with the establishment of agritech startups to resolve the inherent issues concerning agriculture and allied activities. The present study takes a holistic approach towards technological innovation, ecosystem support and entrepreneurial opportunities of agritech startups in India. It brings together tech-centric and policy-research by pointing towards factors affecting the growth, scalability and farmer adoption of startups. With the help of analytical approach based on secondary data, the findings exhibits that agritech startups possesses immense growth potential for innovation driven agricultural entrepreneurship. The study also offers insights to policy makers, investors and entrepreneurs involved in the field of agritech startups.

Keywords: Agritech startups, Entrepreneurship, Agritech ecosystem, Digital Agriculture, Agritech Innovation.

SMS Journal of Entrepreneurship & Innovation (2026)
DOI: https://doi.org/10.21844/smsjei.v12i02.30005
Corresponding Author: Navdeep Kumar, Assistant Professor, PG Department of Commerce and Business Administration, Lyallpur Khalsa College, Jalandhar (Punjab), E-mail: navdeepgandotra@gmail.com
How to cite this article: Kumar N. (2026). Agritech Startups in India- An Analysis of Growth Potential and Entrepreneurial Prospects. *SMS Journal of Entrepreneurship & Innovation. 2025; 12(1):*58-71
Source of support: Nil.
Conflict of interest: None

Introduction

The advent of technology all over the world have brought paradigm shift in doing activities and agriculture sector is also no exception in this era. The technological disruptions in this sector have revolutionized the traditional agricultural practices. The technological development has enabled the use of technology in the diverse agriculture related activities to facilitate the agriculture process more efficient and productive. Various innovations in technology related services in agriculture include:-

- E-commerce.
- Nano technology.
- Fintech Firms.
- Big Data.

- Farming Services.
- Precision Farming.
- Smart machines.
- Post harvest technologies.

The developed countries promote startup ecosystem as a long-term economic policy that encourages developing nations to boost investment in the startups to promote innovation and economic growth. The agritech startups are capable in transforming the economic scenario at both national and global levels with the blend of innovation and creativity as well as entrepreneurship development among young generation (Ray, 2024).

The evolution of agri tech start ups is boon for the agriculture sector especially for agrarian economy like India (Gupta, 2019). With the rising demand of food production coupled with increased population calls for transformation in this sector. Agritech startups have become a major facilitator of agricultural transformation by incorporating digital technologies into supply chain and farming systems. These technologies are destined to help increase productivity, enhance market connections, minimize inefficiencies, and promote sustainable agricultural processes within a structurally agricultural ecosystem (Tripathi et al., 2024).

The Government of India has also framed policies for the promotion of agri tech startups by providing all kind of facilities and assistance required to make this area more viable and dynamic. It would generate more entrepreneurial opportunities to the young generation along with the provision of enhanced employment opportunities. The growth of agritech stratups in India has a close association with the growth of investment inflows, the reach of smartphones in rural communities, and the growth of digital consultative programs to farmers (Sharma & Patel, 2025). Nevertheless, studies also view unrelenting problems like fragmentation of data, poor connectivity of the last-mile, and poor digital literacy of small and marginal farmers that hinder adoption of technology at a large scale (FAO, 2023).

Agritech startups play a crucial role in promoting environmental sustainability and climate resilience through innovations such as precision farming, smart irrigation systems, AI-based crop monitoring, weather forecasting tools, drone technology, and digital advisory services. These technologies help farmers use resources more efficiently, to mitigate waste, greenhouse gas emissions, and to help make informed decisions. In this regard, agritech solutions support sustainable agriculture, enhance the living of farmers and contribute to food security in a context of climate change (Khan, 2023).

Further, Agritech innovations are changing the face of agri-innovation by producing more in less time and with minimum impact on the environment. The innovations result in tangible environmental benefits, such as greenhouse gas reduction, saving water, increasing soil health, minimizing chemical pollution and protecting biodiversity. Their effect can be measured by reducing carbon emissions, water-use efficiency, soil organic carbon, fertilizer/pesticide usage and crop yield. Agritech integrates high-tech solutions and these indicators to cultivate sustainable agriculture, safeguarding the natural resources for the future.

Even though agritech startups in India are expanding at an impressive pace but their long-term growth potential is restricted by structural inefficiencies of the agricultural ecosystem. Additionally, gaps between technological innovation and ground-level agricultural needs limit the scalability and sustainability of agritech business models. Thus, the growth potential and entrepreneurial opportunities of agritech startups in India need to be assessed in this context.

Literature Review

Growth of the Agritech Startup Ecosystem

The growth and expansion of the agriculture sector is vital for the all-inclusive development of any country, irrespective of the level of development of that nation. The progress of other sectors of the economy is also greatly dependent upon the growth patterns of the agriculture sector. According to the estimations of United Nations, the global population is expected to be around 9 million by 2050, resulting thereby increase in the food demand. In order to cope with these rising requirements, there is dire need to adopt timely measures to increase the agriculture production (OECD, 2019). Many developed economies all over the world have taken several steps to adopt technology along with the development of the agripreneurs to ensure the sustainable development of the agriculture sector.

As per the projections of FICCI, additional 6 million food production would be required to fulfill the requirements of rising population by 2030 (FICCI, 2018). It calls for structural transformation in the whole agricultural supply chain with the adoption of technological innovations at large. There is huge potential for the agri startups to contribute towards the overall socio-economic welfare and upliftment of the farmers along with the generation and promotion of innovations in the entrepreneurship capabilities among the young generation. In India, there are 5577 agriculture startups out of which, 2608 are Agritech, 861 organic agriculture, 175 horticulture, 888 food processing, 320 animal husbandry and dairy farming and 76 fisheries as of July 2023 (www.startupindia.gov.in) focusing on leveraging technology and innovations to progress farm productivity, augmenting supply chain proficiency, encouraging sustainable practices and empowering farmers. India occupies a dignified place and ranks among the leading nations as far as number of startups and employment generation is concerned. As far as agri tech startups are concerned, India places among top countries (FICCI, 2018).

Technological Innovations in Agritech

Furthermore, the technology led innovations in the agriculture sector through agri startups are capable in solving the problems relating to climate change, value addition, supply chain and ensuring food security (Singh, 2023; Chaurasia et al. 2025).Many agritechstatups that have established in India have demonstrated noteworthy and inspiring performance. The Indian government has taken several steps and measures topromote agritech startups for the sustainable growth and development (Uygun et al. 2020).The escalation of startups extensively depends upon the structure of startup ecosystem. The state of startup ecosystem of a country lays foundation for the healthy creation and promotion of the startups in the diverse fields of the economy. It requires a fine blend of research institutions, educational orgaisations and financing agencies to ensure the growth of startups by providing them all type of required assistance and facilities (Kasteler, 2017 and Raghav, 2016).The development of agri startups is of extreme significance for value addition in the agriculture sector (NitiAyog, 2023). The technological innovations developed by Indian agri-tech start-ups are aimed at strengthening agricultural supply chains by means of the integration of internet services, big-data analytics, digital platforms, artificial intelligence and the Internet of Things. Their input is especially important in the context of the COVID-19 outbreak as supply-chain failures were quite severe. With panic-driven mass buying and artificial shortage, the agri-tech start-ups were able to guarantee continuity by successfully connecting farmers, producers, distributors, retailers, and consumers (Adhya and Sahoo, 2022).

Entrepreneurial Ecosystem, Growth Opportunities, and Challenges

The significant literature stream focuses on an entrepreneurial and ecosystem approach to agritech startups. According to EY (2023) and industry reports, the agritech ecosystem of India is growing exponentially as a result of the growing venture capital inflow, government programs, and the rising population of smartphones in rural locations. On the same note, Sharma and Patel (2025) emphasise that new agribusiness models centered around farm-to-market connections and advisory services are being made possible through digital platforms. Besides this, Kumar and Singh (2023) offer a more balanced view by studying the innovations of the supply chain in agritech startups and pinpointing the efficiencies and operational limitations.

Research Gap

Despite the huge growth potential for the technology led entrepreneurs in this segment, there are very few studies that are available in the Indian context dealing with the growth prospects of the agritech startups for entrepreneurial opportunities in India. The technological potential of agritech startups and the digital transformation of agriculture, in general, are widely discussed in existing literature, integrated and context-specific analysis of the agritech ecosystem in India remains lacking. There is a research gap that needs to be addressed in form of an analytical framework that will consider technology innovation to determine the growth potential and entrepreneurial prospects of agritech startups in India. Through the case studies of various agritech startups functioning in India, the current study is an effort to fill this gap in this context.

Conceptual Framework

The current study is premised on the idea that technology, finance, and institutions influence the growth potential and entrepreneurial opportunities of agritech startups in India. The main elements that impact the growth of agritech start-ups are technological innovation, adoption of digital agriculture, access to funding, support from the government and entrepreneurial skills. These enable the use of sustainable and climate-resilient agricultural methods, such as precision farming, and smart irrigation, as well as resource-efficient farming and climate-smart advisory services.

Furthermore, Sustainability and climate resilience are considered intermediate factors that serve as connecting factors between Agritech startups and farmers and agricultural stakeholders. These practices are essential for the scalability and competitiveness of agritech enterprises, while also improving resource efficiency, minimizing environmental damage, and boosting farmers' resilience to climate-related threats. Thus, the successful implementation of innovations in line with sustainability is likely to increase the growth potential of agritech start-ups, grow entrepreneurial opportunities, and foster sustainable agricultural development. Therefore, the conceptual structure suggests that there is a positive association between technological and institutional support factors, environmental sustainability, climate resilient agricultural practices, and overall growth and entrepreneurial success of agritech startups in India.

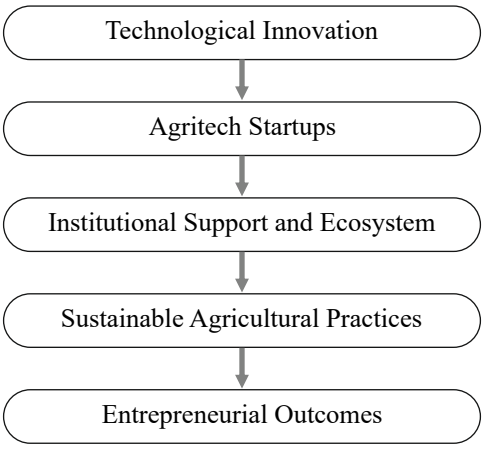


Figure 1: Conceptual Framework

Research Objectives

The major objectives of the present study includes:-

- To study the status and growth of agritech startups in India.
- To know the government initiatives and policy support for flourishing of agritech startups.
- To comprehend the role and functioning of the prominent Agritech Start-ups working in India.
- To recommend strategies to build a robust agritech start-up ecosystem and sustainable agriculture entrepreneurship in India.

Research Methodology

The research design is descriptive in nature to analyse the growth potential and entrepreneurial prospects of agritech startups in India. It is based on secondary sources of data including government reports, policy documents, industry publications, research articles and reliable startup databases. The sources analyzed in this study are those that are relevant, credible, reliable and recent. Moreover, only sources that contained significant content about agritech start-ups, environmental sustainability, entrepreneurial opportunities, and climate resilient agricultural practices in India were considered for the review. The descriptive approach is suitable since the research does focuses on bringing out clear and organized picture of the current state of affairs and trends within the agritech ecosystem. It is thus appropriate in giving an all-encompassing overview and analytical understanding of the prevailing environment of agritech entrepreneurship in India.

Analysis and Discussion

The changing nature of global economy, along with the increasing needs of the growing population, requires the exploration of innovative ways of improving the productivity, sustainability, and profitability of agriculture. The agritech industry in India is undergoing a robust growth due to the recent trends of high digital penetration, investor attention, and governmental support through digital agriculture missions and startup incubation programs. India is increasingly developing a startup ecosystem to promote and encourage entrepreneurship.

Agritech startups are implementing AI-based crop advisory, IoT-supported soil and irrigation monitoring, drone technology, and blockchain-supported supply chain tracking. These innovations increase precision, efficiency and

transparency of the agricultural operations dramatically. Although the use of advanced technologies is highly debated in literature as a transformative tool, the practical usability in India is limited by low digital literacy and poor infrastructure and language barriers. This puts a difference between the supply of technology and the readiness of the farmer, which restrains the successful diffusion.

Entrepreneurship is central to the enhancement of economic development by creation of innovation, creation of employment, and income enhancement. India is the third country in the world with the highest number of registered startups. There has been a strong move towards novelty and start-up firms and a generation of young professionals has taken the entrepreneurial path. Further, the agritech ecosystem has high entrepreneurial potential with its growing smartphone penetration, rural digital infrastructure growth, and growing need to find efficient solutions to supply chains. Nevertheless, there are critical problems that are structural. Incorporated landholdings, erratic climatic factors, absence of real-time agricultural information, and poor logistics systems continue to hamper efficiency in operations. India demonstrates a greater intensity of innovation than developed agritech systems, but far less system integration, which implies an opportunity creation-execution gap.

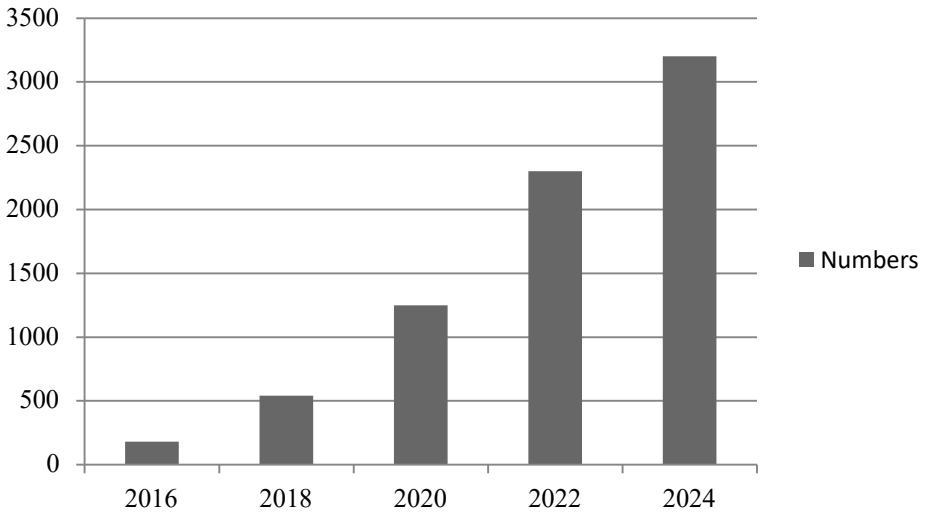
There is huge growth potential for the technology led entrepreneurs in the form of agritech startups to resolve the issues of agriculture segment in India to make this field more vibrant and productive along with the creation of innovative entrepreneurs to use technology for feasibility and sustainability. Over the years, the growth of agritech startups has shown impressive growth in terms of number of startups as shown in Table 1 and Figure 1 as shown below. The number of agritech startups in India has risen drastically for the Year 2016 from 180 to 3200 in the Year 2024. It evidently signals towards the vast potential that needs to be exploited.

Table 1: Year Wise Growth of Agri-Startups in India from 2016 to 2024

Year	Numbers
2016	180
2018	540
2020	1250
2022	2300
2024	3200

Source: Startups India (2024)

The ecosystem in India pertaining to the agriculture sector has witnessed transformation to ensure food security through appropriate policies. The agriculture startups have depicted huge growth owing to the technology and government support. A major move has surfaced with the increase of agri-startups that employ technologies to tackle grave blocks across the agricultural supply chain agri tech startups are drastically altering the farming landscape.



Source: Table 1

Figure 2: Growth of Agri-Startups in India from 2016 to 2024

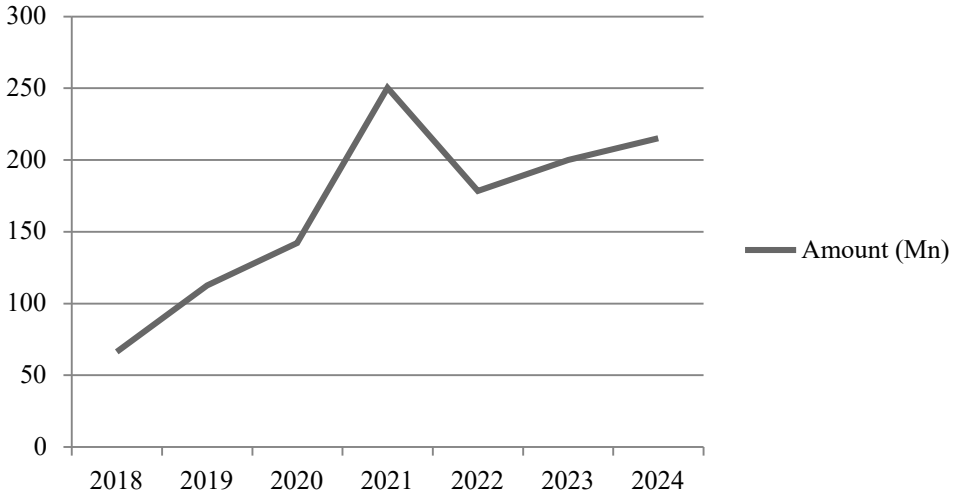
This development is due to the government policy, accelerators, and increased investment (Choudhury et. al, 2024).The prominent schemes and programmes for growth and development of startups by the government of India includes Startup India, Make in India, ASPIRE, Atal Innovation Mission, New Gen IEDC, VCA, Dairy Entrepreneurship among others.The government of India announced in the recent budget tonset up Agriculture Accelerator Fund to encourage agri startups in India for transforming agriculture sectot by increasing profitability and productivity (Mitter, 2023).

Table 2: Agritech Startups Investment in India from the Year 2018 to 2024

Year	Amount (Mn)
2018	66.3
2019	112.6
2020	142.0
2021	250.2
2022	178.4
2023	199.8
2024	215 (estimated)

Source: Invest India (2024)

Table 2 and Figure 2 depict the amount invested in agritech startups from the year 2018 to 2024. Agritech startups received huge investment over the years. It shows the level of confidence of the investors as well as future prospects of these ventures both at domestic and global levels.



Source: Table 2

Figure 3: Investment in Indian Agritech Startups from the Year 2018 to 2024

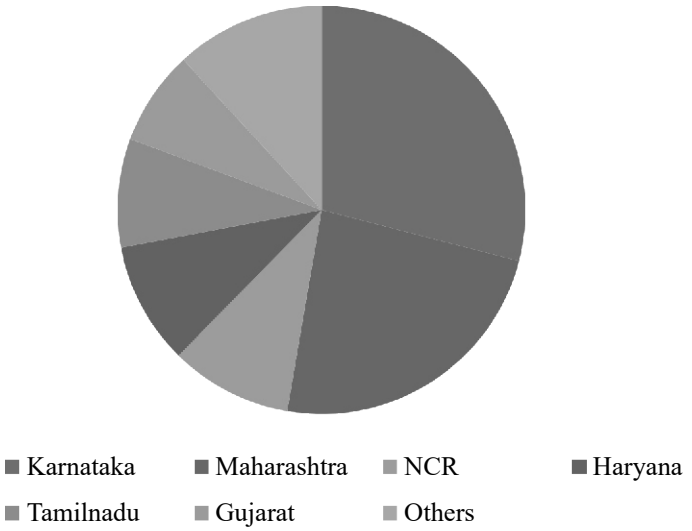
The amount of investment also increased from the year 2018 to 2024 from 66.3 million to 215 million in 2024. It signals towards the increased confidence of the investors in the potential and prospects in this sector.

Table 3: State –wise Number of Agritech Startups in India

State Share	
Karnataka	27%
Maharashtra	22%
NCR	9%
Haryana	9%
Tamilnadu	8%
Gujarat	7%
Others	11%

Source: Nassocam (2018)

The growth of agritech startups with reference to the states, table 3 and Figure 2 clearly demonstrates that two states i.e. Karnataka and Maharashtra are leaders with 27 percent and 22 percent share of agritech startups as compared to other states. It is due to the technology hub destination status of these two states supported by the state government policies. In order to reap the full benefits, other states also need to devise plans and policies for sustainable agriculture development.



Source: Table 3

Figure 4: State Wise Percentage of Agritech Startups in India

Overall, the results show that the agritech ecosystem of India is marked by a high-potential but structurally dispersed environment of innovation. Although the enablers of technological advances and policy support are high, their influence is dampened by structural constraints and barriers to behavioral adoption. Thus, to ensure the full entrepreneurial potential of agritech startups in India is achieved, there is a need to bridge the divide between the development of technology, engagement with farmers, and the infrastructural preparedness.

Initiatives of Government of India

The government plans of AgriTech in India include a vast array of programmes and this encompasses:

Startup India

Start upindia Initiative is a program has a full-fledgedmulti dimensional platform that serves startups in all its development stages such as ideation and scale-up.

RKVY-RAFTAAR

Rashtriya Krishi Vikas Yojana(RKVY) is considered to be one of the biggest government AgriTech schemes. It allocates subsidies to establish incubation centres to start-up businesses with excellent AgriTech concept with the aim of facilitating innovation and agripreneurship through financial support and cultivation of the incubation environment. Start-ups related to agriculture and other related fields are also promoted so as to add directly and indirectly toward improving the income of farmers by availing opportunities to them and to create employment to the youth.

PMFME

PMFME (PM Micro food processing Enterprise Formalisation) is the formalisation of the micro food processing enterprises, to assist in the promotion of rural entrepreneurs by offering credit depending on training to establish micro-food processing enterprises. The PMFME scheme is a credit initiative that the rural entrepreneurs have access to credit which is needed in the start-up of the micro-food-processing businesses, with

specific selection of the funds and training.

Agri Infrastructure Fund

It is run by NABARD, which enables establishment of post-harvest systems such as storage systems, cold-storage, and processing systems that are required during the establishment of agribusiness. AIF assists the startup in developing the infrastructures required after harvests like storage, cold-storages and processing facilities.

PMKSY

Under the *Pradhan Mantri Kisan Samprada Yojana* (PMKSY) the government facilitates the establishment of food -processing zones, agro-marine processing and cold chain facilities, etc. This programme assists in development of food-processing systems, agro-marine processing, cold-chain systems.

AIM

Atal Innovation Mission (AIM) is put under the management of NITI Aayog and it is meant to instill entrepreneurship and innovation in the nation. It is oriented towards supporting the entrepreneurship and innovation in India. The mission will be missioned towards promotion of entrepreneurial and innovative practices in the country.

PM-KUSUM

The PM-KUSUM (*Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan*) initiative encourages farmers to irrigate their farms using solar energy, therefore, adopting the concept of energy security. This programme advances utilisation of sun energy in irrigation of the fields by the farmers in such a way that they would gain energy independence.

PMFBY

Pradhan Mantri Fasal Bima Yojana (PMFBY) is an institution that offers crop insurance to farmers and may be integrated into the AgriTech startup platforms. The PMFBY provides farmers with crop insurance cover, which could be incorporated in Agritech startups in their usage. AgriTech startups can make use of PMFBY to offer farming insurance to farmers.

Major Agritech Startups in India

As discussed earlier that around 450 agritech startups is in operation throughout the country. Such startups are engaged in solving inherent problem of the farming sector in India with the application of technology. The growth and success stories of major agritechstart ups have been discussed in the following discussion.

Agrostar

Agrostar came into existence in the year 2008 as its Head office in Pune, Maharashtra as a private limited company. Presently, its total funding amounts to $41m. It is a developer of a direct to farmer technology based application i.e. Agrostar Farmer APP to solve the farmers'problems relating to agriculture in a simple way.

Agnext

Agnext year was founded in the year 2016 in Mohali, Punjab. It is a fast-growing company operating technology for quality assessment in agriculture allied products. It specializes in providing techno based solutions for efficient value chain ranging from soil management to customer with the use of remote sensing, sensors, big data, GIS among others to reduce cost and improve

quality. It has emerged as top five agritech startups from Asia. It is a portfolio enterprise of Omnivore-venture capital fund. The key area of operation includes horticulture, plantation crops and floriculture and operates through a well designed technology base involving growers, processors, distributors and retailers.

Stellaps

Stellapps was started in the year 2011, as supply chain- end to end solutions for diary sector, in Bangalore by a group of IITians and experienced technocrats from Cisco, Wipro, Ericsson, Nortel etc. As milk is the major produce across the globe, needs to be optimally produced and supplied. This agritech startup initiated with IoT focusing on data and machine learning to enhance production of milk along with its supply mechanism on a qualitative basis via SmartMoo App involving milking procedures, animal health, cold chain and milk marketing.

Ninjacart

Ninjacartis the biggest Supply Chain platform for fresh produce via in-house applications by creating a link among food consumers with the use of innovative technology.It was established in the year 2015. It facilitated farmers by providing those fair prices and ensuring fresh supply to the business without any wastage. It is a B2B supply chain enterprise that move 1400 tonnes of fresh produce from more than 12000 farmers to more than 600000 businesses within 12 hours with the help of technology based supply chain featured with economy, reliability and fast logistics management.

FASAL

FASAL was founded in 2018 in Bangaluru, developed by Wolkus Technology Solutions. It is artificial Intelligence based digital platform for agricultural ecosystem. Its IoT-SaaS platform generates real-time data and provides farm and crop specific suggestions to farmers through their mobilephones in their respective chosen languages. These innovative technologies provide information and solutions for soil, climate and crop conditions and reduce risks and costs and optimize output and revenues. Its area of specialization is horticulture involving crops of grapes, citrus fruits, tomatoes, pomegranates etc. by covering more than1000 farmers and 100 farms.

Intellolabs

It was commenced in 2016 in in Gurugram, Haryana. Its area of operation covers monitoring of grading and quality of agriculture produce by using tools of artificial intelligence like deep learning and computer vision in order to provide image based solutions via App. The use of this app ensures standardization of quality and transparency in the supply chain system.

Apart from the above startups in different spaces of agriculture and allied practices, there are large numbers of startups operating in India. Still, the number is not adequate as far as potential available in the Indian agriculture sector. However, the success stories of the agritech startups in the countries like USA, China, France, Israel, Germany, Greece etc. amply demonstrates that the use of technology is imperative for the progress of the agricultural economy. The growth journey of Indian agritech startups among others as discussed above, also explains the areas, use of technology and innovations by the founders even from the top technical institutions of the country.

Conclusion

Agritech startups in India have great growth and entrepreneurial potential.The technology based

innovative agricultural practices have exhibited noteworthy achievements by enhancing the efficiency of entire agriculture supply chain. Globally, agritech startups have emerged as game changer to reform the whole agriculture sector. Undoubtly, there prevails abundant opportunities in the field of agriculture for technology led entrepreneurs. However, there are certain challenges also including small farm size, mind set of traditional farmers, low funding, lesser penetration across the country in different states, uneducated farmers, cost of technology etc.

Recommendations

In order to tap the huge potential, the government should devise suitable policies both at central and state level to ensure successful expansion and ease of adoption by the small and poor farmers. The government should also widen the scope for further collaboration with the academic, technical and research institutions for developing entrepreneurship capabilities for inclusive and sustainable growth of the nation. In general, the agritech industry needs an equal emphasis on innovation, inclusivity, and infrastructural growth to achieve its potentials in entrepreneurship. To sum up:-

- Policies should focus on improving rural digital infrastructure to ensure wider access to technology.
- Programs aimed at enhancing farmers' digital literacy and awareness should be extended.
- Stronger public–private partnerships are required to construct trust and scale innovations efficiently.
- The government should simplify regulatory processes and provide financial incentives subsidies and incubation support for early-stage agritech startups.

Scope for Further Research

The present study also offers scope for further research in varied areas. The most significant aspect is the adoption models of technology based farming practices by the farmer community at large. The other area may include sustainability models for the agritech startups in the Indian context. Future studies, both empirical and mixed methods, including primary data on farmers, entrepreneurs, investors, and policymakers to obtain a better understanding of the issues at the ground level. The next line of research could also be aimed at quantitative evaluation of the effect of technologies on farm productivity and income level. Moreover, issues like agritech adoption models among farmers, role of digital literacy and financial inclusion in agritech adoption can be explored.

Limitations

The study also has certain limitation. Since the number of agritechstart ups are few as compared to the potential and growth prospects in this area. Thus, inadequate information and data is obtainable to draw wider implications. As this is descriptive study, based on secondary sources of data, findings are confined to the accuracy, accessibility, and relevance of the available published information. The study also offers a general national level analysis, which might not be fully representative of regional differences in the agricultural practices, development of infrastructure and adoption of technology in the various states of India.

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