Innovative Agri-Startups : Boosting the Future of Agriculture in India

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Abstract

Agriculture is regarded as India's economic backbone. It contributes significantly to national income, employment, and foreign exchange earnings. The commitment of agriculture and its related divisions to outside trade benefits was diminished from 44.24% in 1960–1961 to 14.34% in 2020-2021. Despite the decay in its share of national yield and business, farming and related segments proceed to be the essential root of pay for over half of India's population. Agri-startups and agribusinesses are shaping noteworthy numbers around the nation to hold up rural esteem expansion exercises and give innovative advances, products, and administrations for advancement of agriculture . The scaling-up of agri-startups is being encouraged by the government of India. Startup India, Rashtriya Krishi Vikas Yojana – Remunerative Approaches for Agricultural and Allied Sector Rejuvenation (RKVY-RAFTAAR), agri-entrepreneurship, development component, startup incubation, and development are fiscally bolstered by Department of Biotehnology (DBT), Department of Science and Technology (DST), National Bank for Agriculture and Rural Development (NABARD) and National Institution for Transforming India (NITI) Aayog. The purpose of this paper was to examine the influence of innovative agri-startups in assisting farmers and entrepreneurs in meeting their demands.

Keywords : **Agriculture, employment, incubation, innovation, start-up**

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India is primarily an agrarian economy with agriculture providing living for 55% of the population. Agriculture has swiftly evolved into agricultural business in terms of method and structure over the last two decades, fueled by policies of government of India and significant industry and institutional engagement. However, in the recent decade, the sector has been flooded with educated millennials driven by ideas, passion, and inventions to develop novel types of technology and business models, transforming agriculture from a primitive to a high-tech industry. These businesses fill the gaps in the agriculture value chain by offering farmers and customers efficient products, technologies, and services. Its expansion of all innovational and mechanical new businesses are set to modernize the nourishment of agriculture division from ICT apps to farm automation, from climate determining by drones, inputs retailing and gear leasing to online vegetable promotion, from poultry and dairy ventures to savvy agriculture, and from secured development to inventive nourishment handling and bundling.

The government has also ably backed these companies through initiatives such as Skill India, Start-Up India, Stand-Up India, Micro Unit Development, Refinance Agency (Mudra, n.d.), Agri-Clinics, and Agri-Business Centre (AC&ABC) schemes, all aiming to assist emerging entrepreneurs in launching and scaling new businesses. Despite initial success, many existing agricultural firms are having difficulties in scaling and expanding. They are searching for

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unused plans, advancements, and assets to assist them to reach new targets. With respect to this, Indian Chamber of Nourishment and Farming (ICFA) organized the first All India Agri-Startups conclave 2018. Plans to welcome and nourish all agri-startups together on a single stage to share their victory stories, investigate commerce and promoting organizations, as well as innovation and budgetary tie-ups and organization openings (Indian Council of Food and Agriulture, 2018).

Agri-startups and agri-businesses are sprouting up all over India to hold up agricultural value chain activities and to provide improved innovative technologies, goods, and services to agricultural development contributors, such as farmers and end users. There has been a noticeable cultural change towards entrepreneurial development in recent years, particularly in the shape of agristartups and firms. Key features of development stages of startups is depicted in Table 1. Startup India and the Government of India programmes such as RKVY- RAFTAAR, Agri-entrepreneurship and Innovation components, DBT, DST, NABARD and NITI Aayog's startup incubation and innovation finance support agri-startups to scale up. Similarly, the Infrastructure Development Fund for Agriculture and Animal Husbandry, Fisheries (PM Matsya Sampada Yojana), Food Processing (PM Kisan Sampada Yojana), and the Ministry of Food Processing and Industries' Vocal for Local Initiative to promote micro food enterprises are promoting and supporting the agri-business eco-system (Raj & Deshmukh, 2021).

Table 1. Key Features of Development Stages of Startup

Stages	Name	Key Features of Development
Stage I	**Ideation**	• Prospective product or service enhancement for broad target market. • The presence of a solitary individual or a hazy group. • Some preliminary business models and suggestions for how the concept could provide value or generate revenue.
Stage II	**Concept development**	• Characterize the startup's mission and vision, as well as the initial strategy. • Setting major milestones and objectives over the next coming years. • Origination of a core team of co-founders with complementary abilities, as well as a business plan and ownership rights.
Stage III	**Commitment**	• A well-balanced founding team with similar visions, goals, and attitudes. • Creating an MVP (Minimum Viable Product) for people to test their company concept. • The SHA : Shareholder Agreement is signed by the co-founders.
Stage IV	**Validation**	• Founders are scrambling to come up with the correct product strategy and brand positioning to attract possible Series Agribusiness venture capital. • Through initial user growth, it is a necessary stage from the perspective of the founders, employees, beginning customers, and gem investors. • During this stage of a company, the majority of startups lose their way.
Stage V	**Scaling up**	• Focus on KPI (Key Performance Indicators) based user, customer, revenue or market share growth in the target market. • Most time is spent on hiring resources, improving, and distributing products to the target market, and implementing new or existing processes. • Fast-growing potential.
Stage VI	**Establishment of startup**	• Achieved good growth rate and is expected to be sustained. • It is now easier to obtain money and customers. • Based on the vision, mission, and target the company will move to operate *as if it were a startup.* • Founders or investors may choose to leave or stay with the business.

(Startupcommons, n.d.)

Agri-Startups in India

The agriculture sector is a top focus for India's government which wants to double farmers' income and achieve profitable GDP growth. It also helps to maintain youth interest in agriculture and related industries, which offer numerous job prospects. The importance of focusing on the agricultural revolution is critical because it can bring growth to 50% of the population that is reliant on it. To help achieve this goal, the Government of India launched the "Innovation and Agri-entrepreneurship Development Programme" under the aegis of the Rashtriya Krishi Vikas Yojana (RKVY), which aims to develop and encourage agripreneurship in India. RKVY-RAFTAAR program was introduced to support innovation and entrepreneurship in the agriculture sector. The RKVY-RAFTAAR initiative was created to encourage agribusiness innovation and entrepreneurship. The initiative has built the largest agro incubator network in the world with a total of 29 incubators, each of which runs incubation programmes to help agri start-ups. It assists agricultural start-ups in expanding their operations and commercializing their products. Furthermore, with the help of ICAR, RKVY wants to strengthen the existing RAFTAAR Agri-Business Incubator (R-ABI) and 50 Agri-Business Incubation Centres (ABICs) in terms of revival and development, seed-stage funding (85% grant upto a maximum of 25 lakhs), agripreneurship orientation and idea stage funding. With this support, start-ups in productivity, post-harvest engagement, and related fields (fisheries, poultry, animal husbandry etc.) are working to address difficulties in agriculture such as inadequate infrastructure, market accessibility, and antiquated equipment, and supply management in agriculture.

The Department of Science and Technology, NIDHI-PRAYAS scheme provides financial assistance upto ten lakhs to agricultural businesses. Under its Biotechnology Industry Research Assistance Council (BIRAC) division, DBT promotes agribusiness bio-incubators. It also has a Biotechnology Ignition Grant (BIG) that helps startups. This programme is designed to help with concepts that require finance and guidance. The scheme provides financial support upto ₹ 50 lakhs for research ideas having commercialization potential. Apart from this, the Small Farmers Agri-Business Consortium (SFAC) offers financial assistance to qualifying projects in the form of interest-free loan. As a Knowledge Partner, Department of Agriculture co-operation and Farmers Welfare (DAC & FW) has worked with institutes to ensure professional mentorship for budding Agri-startups (Chandana & Madhuri, 2020):

(1) National Institute of Agricultural Marketing (NIAM), Jaipur

(2) National Institute of Agriculture Extension Management, (MANAGE), Hyderabad

(3) Indian Agricultural Research Institute (IARI), PUSA, New Delhi

(4) University of Agricultural Sciences (UAS), Dharwad, Karnataka

(5) Assam Agricultural University (AAU), Jorhat, Assam

Need of Agri-Startups

With increased cell coverage and internet connectivity in rural regions, businesses in the agriculture sector are fast growing, with an emphasis on employing various technologies to solve difficulties affecting farmers. Focus areas for agri-startups are mentioned in Table 2. Some agri-startup companies are working in India based on their focus area as given in Table 3. However, it has become a necessity of the hour and innovators, scientists, and founders are seeing the need for startups to improve the agricultural industry in a sustainable manner for the following reasons:

- Keep farm goods from becoming perishable.
- Lessen the effects of climate change.
- Strengthen the infrastructure for storage.

Table 2. Focus Areas for Agri-Startups

S. No.	Focus Area	Services	Startups
1.	**Big data**	Determine soil and crop health, use drones based system to collect information from the field and help farmers to make data-driven decisions to increase productivity and lower unit costs.	Agrostar, RML
2.	**Farming as a service**	As modern equipment is expensive, agri-equipment rental businesses can help small and marginal farmers cut their input expenses.	EM3, Ravgo, Oxen, and Farmart
3.	**Market linkage models**	Sowing and harvesting estimate that is precise and timely in relation to consumer demand.	Mera Kisan
4.	**Fintech for farmers**	Create a credit profile environment for funders and lenders by digitizing payments to be paid by farmers/crop growers via individual farmers/crop growers' accounts.	PayAgri
5.	**IoT for farmers**	High-precision crop control, data collecting, automated farming, information regarding rainfall patterns, crop outputs, nutrition, and pest infestation, all are the examples of smart farming.	Airwood, Cropin

(Chandana & Madhuri, 2020)

Table 3. Agri-startup Companies and Their Focus in India

S. No.	Name of Startups	Focus
1.	**Boheco**	Incorporated in 2013, Bombay Hemp Company promotes Indian agriculture and sustainable lifestyle. It helps regional farmers cultivate crops by supplying high-quality seeds, best growing procedures, and innovative agro-products.
2.	**Agricx Lab**	Image based quality assessment that is accurate, rapid, portable, and simple to use. It now provides services to warehouses and businesses and plans to extend these throughout the food supply chain.
3.	**Gold Farm**	Bangalore-based agri-tech business provides mobile application based tractor booking stage for Indian crop growers/farmers, as well as solar water pumps for farmers in power-deficient areas. The goal of this company is to help a million Indian farmers double their farm revenue by 2022.
4.	**Agrowave**	It is essentially an Indian supply chain startup. Its fruit and vegetable mobile e-vendor services small and medium businesses directly through farmers. It offers services such as employing Machine Learning to map production and demand, plans to use block chain mechanism for tracking, and uses AI for good map quality.
5.	**FASAL**	Wolkus Technology Solutions has created an Agri-tech platform. It is an AI-powered IoT stage for the horticulture biological system that keeps track of a wide range of developing circumstances. To make on-farm predictions, its employs artificial intelligence (AI) and data science.
6.	**Airwood**	With the assistance of next-generation Agri-data science and AI, Airwood utilizes Real-time Insights and Agri 4.0 to unravel unmanageable issues. Its real-time Exactness agribusiness arrangements stabilize and upgrade yield by checking more than 50 factors two times and the supply motor controls the planting material and just-in-time harvests to accurately coordinate supply and request, thereby multiplying cost realization and payment for farmers.
7.	**CropIn**	This Karnataka-based company headquartered in Bangalore has digitized 3.1 million sections of land of agriculture and changed the lives of 1.6 million farmers. It accumulated data on 265 crops and 3500 kinds of crops. It is a major agri-startup company that provides software as a service based arrangement to agribusinesses all over the world. CropIn makes different businesses utilize innovation to effectively drive their goals around digitization, compliance, supportability, and traceability by permitting them to examine and get information in real-time to extricate real-time noteworthy experiences on standing crops.
8.	**EM3 Agri services**	It was founded in 2014 by Rohtash Mal and Adwitiya Mal as an Agritech firm in India. It offers pay-per-use agricultural services for advancement, arrive at planning, seeding, sowing, planting, gathering, and post-harvest field management. Among other things, farmers also use a smartphone app to access their farming services.
9.	**Ninjacart**	Ninjacart is India's biggest and is at agri-promoting stage, utilizing innovation to unravel one of

		the foremost troublesome supply chain issues. It connects producers of veggies and natural products with businesses. Accel Accomplices, Nandan Nilekani, Mistletoe (Japan), and Qualcomm Ventures have all contributed to the company.
10.	**Farm Link**	FarmLink is a data science and technology firm dedicated to assisting farmers. Its objective is to improve the utilization of high-quality information and accuracy agribusiness apparatuses to assist ranchers increase their efficiency, benefit, and long-term practicality.

(Chandana & Madhuri, 2020)

- Enhance soil fertility through judicious application of bio-fertilizers, bio-pesticides, and other bio-products.
- Give information and direction on the availability of inputs and their supply, as well as the availability of agri-equipments.
- Integrating traditional knowledge, native perception, and farmer ability with contemporary technologies (Ohlan & Raj, 2020).

Promotion of Agri-Startups Through Government of India Initiatives

The following are some of the steps taken by the Government of India to promote and develop Agri-startups in India:

(1) Rashtriya Krishi Vikas Yojana - Remunerative Approaches for Agricultural and Allied Sector Rejuvenation (RKVY-RAFTAAR)

The Rashtriya Krishi Vikas Yojana - Remunerative Approaches for Agricultural and Allied Sector Rejuvenation (RKVY-RAFTAAR) scheme was launched in 2018 by the Department of Agriculture Cooperation and Farmers Welfare (DAC&FW), Ministry of Agriculture and Farmers Welfare, under the section "Innovation and Agri-entrepreneurship Developmen". This program supplies money related help and sustains the brooding environment. Its objective is to back agrarian start-ups and contributes straightforwardly or in a roundabout way to expanding farmers' pay by giving them modern choices and giving occupations to adolescents. 24 RKVY-RAFTAAR Agribusiness Incubation centres have been built across India as part of the scheme, and five knowledge partners have been entrusted with their support. The five knowledge partners are the National Institute of Agricultural Extension Management in Hyderabad, the National Institute of Agricultural Marketing (NIAM) in Jaipur, the Indian Agricultural Research Institute (IARI) in New Delhi, the University of Agriculture Science in Dharwad, and the Assam Agriculture University in Jorhat. The programme aimed to help entrepreneurs at ideation and scaling up stages of their development.

The Agripreneurship Orientation programme is designed for entrepreneurs in the early stages of their business. They are given two months of training, a monthly salary of ₹ 10,000 for internship and mentoring to help turn an idea into a prototype and a grant-in aid of up to ₹ 5,00,000 for each firm. The Startup Agribusiness Incubation programme is designed to help scale-up startups. They receive two months of training, business support, and a grant in aid of upto ₹ 25,00,000. Startups are given handholding support for a year after getting the grant until the award is used up in aid amount. It funded a total of 346 start-ups in the agricultural and its allied sectors in the fiscal year 2019–2020. Agro-processing, post-harvest, food technology and value addition, Artificial Intelligence (AI), Internet of things (IoT), Information and Communications Technology (ICT), precision farming, digital agriculture, Block chain technology, agricultural logistics, value and supply chain management, online/virtual platform, agricultural extension, agricultural inputs, farm mechanization and innovations, organic farming and products, natural resource management, renewable energy, waste to wealth, agricultural extension, agricultural inputs, farm mechanization and innovations. With their interventions, all of these firms are addressing important concerns in the agriculture sector (Centre for Innovation and Agripreneurship, n.d.).

(2) Department of Science and Technology (DST)

Science Technology and Entrepreneurship Park run by the Department of Science and Technology was already operating in India, assisting prospective entrepreneurs in starting enterprises and scaling them up. These institutions focused mostly on firms that were backed up by more advanced technologies. The National Science and Technology Entrepreneurship Development Board (Department of Science & Technology, n.d.) which was founded in 1982 by the Indian government under the Department of Science and Technology is an institutional structure that aids in the promotion of knowledge-driven and technology-intensive firms. Through Science & Technology (S&T) initiatives, the Board which includes representatives from socio-economic and scientific ministries or departments attempts to turn "job-seekers" into "job-creators" (National Science & Technology Entrepreneurship Development Board, n.d.).

(3) Atal Innovadon Mission (AIM)

Atal Innovation Mission is the Indian government's flagship project to promote a culture of innovation and entrepreneurship in the country. It is a NITI Aayog initiative. AIM's goal is to create an umbrella platform to look after the country's innovation and entrepreneurship ecosystem by developing new programmes and policies to foster innovation in various sectors of the economy, providing platforms and collaboration opportunities for various stakeholders, developing new programmes and policies to foster innovation in various sectors of the economy (NITI Aayog, n.d.).

(4) Department of Biotechnology (DBT)

Department of Biotechnology, Government of India established the Biotechnology Industry Research Assistance Council (BIRAC), a not-for-profit Section 8, Schedule B public sector enterprise as an interface agency for strengthening and empowering the budding biotech enterprises to undertake strategic R&D based on research needs to develop relevant product. The BIRAC BIG grant provides financial help upto ₹ 50 lakh (Biotechnology Industry Research Assistance Council, n.d.).

(5) A Scheme for the Promotion of Innovation, Rural Industry and Entrepreneurship (ASPIRE)

The Ministry of MSME, Government of India has created a scheme for the Promotion of Innovation, Rural Industry, and Entrepreneurship (ASPIRE). Livelihood business incubators as well as technology business incubators can be established under the scheme. At the brainstorming stage, startups can obtain ₹ 4 lakh and at the scale-up stage, they can get up to ₹ 20 lakh (StartupIndia, n.d.).

(6) Pradhan Mantri Mudra Yojana (PMMY)

The Indian Prime Minister introduced Pradhan Mantri Mudra Yojana under which MUDRA banks provide low-interest loans to microfinance organizations and non-banking financial companies which provide low-interest loans for startups and MSMEs. The MUDRA initiative allows for loans of upto ₹ 10 lakh (Mudra, n.d.).

(7) Agri-Clinics and Agri-Business Centres (AC&ABC), Ministry of Agriculture and Farmers Welfare

The Agri-clinics and Agribusiness Centres (AC&ABC) are an innovative scheme propelled by the Ministry of Agriculture and Farmers Welfare of the Government of India and executed by the National Institute of Agricultural Extension Management and the National Bank for Agriculture and Rural Development to bring suitable/improved farming methods to all farmers in the country. It aims to provide agricultural graduates with self-employment opportunities through entrepreneurship development training and appropriate financial-subsidy support to establish

agri-enterprises and consultancy services to assist farmers, as well as to supplement public extension systems for overall agricultural development. So far, 74,761 entrepreneurs have been trained and 31,391 agripreneurs have launched their agricultural businesses (Ministry of Agriculture and Farmers Welfare, n.d.).

(8) Initiatives of Indian Council of Agriculture Research (ICAR)

ICAR has launched many projects to boost agribusiness and technology transfer. The following are some of the initiatives: IP & TM (Intellectual Property and Technology Management) is a term that refers to the management of intellectual property and technology. The IP & TM programme, which was launched in 2008 can be considered as a catalyst for policy implementation. Institute Technology Management Units (ITMU) were developed across all 100 institutes of ICAR as part of the project. Five Zonal Technology Management Units (ZTMU) were established with the responsibility of overseeing the activities of ITMUs in each zone. The scheme was overseen by the IP&TM unit at the ICAR headquarters. Agriculture Technology Management Committee (ATMC), which included recognized specialists and ICAR's top management led the way. Business Planning and Development (BPD) units were established at ICAR institutions and universities, thanks to World Bank support through the National Agricultural Innovation Project. Initially, 10 BPD units were formed under this programme, five in ICAR institutes and five in state agricultural universities. In 2013–14, 12 more BPD units were built based on experience. To scale up the system, this project brought together ICRISAT, ICAR, and the World Bank.

Agribusiness Incubation Centres - The Indian Council of Agricultural Research (ICAR) has built 50 Agribusiness Incubation Centre in its Research Institutions and state agricultural universities. The Agri Entrepreneur Growth Foundation (AEGF) was founded in 2019 by Syngenta Foundation India and Tata Trusts. The Agri-Entrepreneurship Growth Fund (AEGF) takes a decentralized strategy to empower rural youth and train them to become Agri-Entrepreneurs (AEs) in rural areas. As a result, the AEs began to play important roles in the development of agriculture in their surrounding areas. This project brings together previously inaccessible services, including loans, market linkage, access to high-quality input, and crop advice under one roof for affiliated farmers, allowing them to make use of previously unavailable services and generate higher profits. It plans to create 1,00,000 AEs over the next five years, to eventually help 20 million small-holders. The Startup India web portal lists many different government programmes that support Agri-startups and businesses (Raj & Deshmukh, 2021).

State Government Initiatives

Following the lead of the Centre, all states developed state specific startup policies to encourage agri-startups. A few of them are listed next. Kerala has established the Kerala Startup Mission (KSUM) as a government startup nodal organization. KSUM supports the startup ecosystem through various sections such as public-private partnerships, infrastructure, funding, human capital development, governance, global collaborations, and scaling up existing and new startup enterprises, using the Startup-Boot-Scale-Up model for moving quickly from ideas to IPO. Telangana has established T-Hub, India's largest incubation centre. Andhra Pradesh has set aside a 17,000-square-foot Technological Research and Innovation Park as an R&D laboratory, and has also established a ₹ 100 crore Initial Innovation Fund for businesses. Madhya Pradesh government has teamed up with Small Industries Development Bank of India (SIDBI) to establish a fund of ₹ 200 crore. A start-up oasis programme has also been launched in Rajasthan (Raj & Deshmukh, 2021).

Challenges and Problems in Agri-Startups

↳ **Inadequate supply network :** An efficient supply chain determines the availability of resources such as seed, chemicals, and distribution. Inadequate supply chain is thus, a significant barrier for start-ups.

↳ **Agents and middlemen :** An intermediary who owns the fragmented supply guards the farmer's demands.

According to estimates, organized retailers obtain 20% of their produce directly from farmers and mandis. Mandis, on the other hand, are not a great market for farmers because traders must have a license to trade in them.

- **Lack of funding :** Domestic subsidies and policy investments rarely reach the farmers who are the end-users.

- **Inadequate irrigation :** The majority of India's regions still rely on rainfall for water. Second, the groundwater level is dropping from an average depth of 1,000 feet each year.

- **Agricultural size vs. Productivity :** Farms in India are unequal and small with 70% of farms having less than one hectare, resulting in low farm yields.

- **Inflexible old models :** Previous models are difficult to break and produce new business because they are too rigid. The business model has been a major issue for the rejection of funding for agri start-ups.

- **Lack of subject matter mentors or experts :** The issue is that there aren't many experts in this field. There is a need for educational support for the next generation of workers in the industry.

- **Climate change :** Climate change is a significant issue that has a negative impact on agriculture. The agricultural industry is vulnerable to changes in weather and climate. As a result, rapid technological adoption is required to cope with these unavoidable changes.

- **Small and dispersed landholdings :** Small and dispersed landholdings of farmers limit the possibilities of technology scale-up, resulting in poor cost-effectiveness(Chandana & Madhuri, 2020).

Opportunities for Agri-Startups

- Reducing the use of water, fertilizer, pesticides, and other resources in agriculture is a major business potential because agriculture uses 80% of the freshwater available (NASSCOM, 2019).

- Food processing and export: India's food processing sector in terms of production, consumption, and export is ranked fifth. Flow and traceability can help farmers earn more money and export more goods.

- Streamlining the supply chain: Indian farmers lose ₹ 92,651 crores in post-harvest losses per year. Revenue for farmers can be increased by increasing cold chains, warehouses, and by having a substantial supply chain.

- Farmers and Internet of Things (IoT): In the agricultural business, smart farming, which includes concepts such as data collection, high-precision crop control, and automated farming practices will eliminate inefficiencies and boost output. Crop yields, rainfall patterns, pest infestations, and soil nutrition can be used to help farmers improve their tactics over time.

- Employment rationalization: Although India's agriculture industry employs 50% of the population, it contributes to only 16% of the country's GDP. As a result, farm mechanization and collection will be possible and the personnel will be rationalized and beneficially reallocated.

- Fintech for farmers: As agricultural income is primarily in cash, fintech start-ups will have the opportunity to digitize payments for farmers via payment gateways linked to their accounts (Surliya, Beniwal, & Maan, 2021).

Conclusion

Agriculture based start-ups in India are tackling the task of transforming the sector into a technology driven and smart one and the telecom sector has played a key role in making this happen. Farmers can now receive market information for every area of agriculture at the correct moment, whenever they need it, thanks to easy and cost-effective availability of the internet. In the future, the Government of India intends to encourage agri-startups to enhance agriculture

revenue. It will also assist farmers in becoming agripreneurs and provide excellent chances for existing agripreneurs to expand their businesses. Start-up India is an innovative strategy to provide technical know-how and financial aid to agripreneurs that encompasses numerous government and state government initiatives. This will benefit not just the entire economy, but also every individual since technology and agri-startups will open up new chances for growth and employment. In today's world, advancing agriculture through start-ups is a huge task and in order to overcome these obstacles, specific chances must be discovered. The importance of digital transformation and the start-up ecosystem in bringing new innovation to this sector is critical. More than five global agritech companies have been launched in the country during the last five years and many agri-startups are focusing on market association, innovative agriculture, superior approach to inputs and financing. These technological interventions/mechanisms help Indian farming to have sustainable and profitable ventures.

Limitations and Scope for Further Research

It is important to remember that this study has a number of limitations. It is vital to start by mentioning some internet information on innovation systems and agri-startups. There are insufficient studies, articles, and other publications that provide information on cutting-edge agri-startup systems. Most of the agri-startups are in the startup phase, so we need further studies in diversified areas such as agricultural inputs, production, and marketing. This is because innovative agri-startups can play a great role in diversification of agriculture or horticulture and in increasing the income of farmers through application of innovative technologies like drones, Artificial intelligence (AI), Agricultural Robotics, Internet of Things etc. New innovations in this industry are greatly aided by digital transformation and the startup environment. During the last five years, more than five Indian startups have established themselves in international agritech business. Many agri-startups are concentrating on market linkage, digital agriculture, greater access to inputs, and financing, all of which are gaining popularity.

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Authors' Contributions

Shiv Shankar Yadav did data collection, literature review, and wrote the manuscript. Sukhjinder Singh provided inputs and suggestions for finalizing the manuscript. Manish Verma helped in references styling and drafting of the manuscript.

Conflict of Interest

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in the manuscript.

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