

Agricultural Start-up Opportunities in India to address the goals of (Viksit Bharat) Developed India

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Introduction

The Indian agriculture has made incredible progress over the period of time and ensured in multi-fold increase in food grains, horticultural and animal products. At the same time, farmers face several challenges such as low farm incomes, fragmented supply chains, post-harvest losses and climate change issues. To manage these challenges, the emerging Agri- startups have solutions to develop various strategies for creating an enabling environment to find the Opportunities to address the goals of (Viksit Bharat) Developed India. Further, The National Agricultural Research and Education System (NARES) has also geared up to create the start-up ecosystems through Technology Business Incubators (TBI) supported under the National Initiative of Development and Harnessing Innovations (NIDHI) scheme of the Department of Science and Technology, Agribusiness Incubators (ABIs) in the Indian Council of Agricultural Research, and 29 ABIs in the State Agricultural Universities.

Agri startups in India

The Government of India initiatives such as the Innovation & Agri-Entrepreneurship Development program, RKVY–Agribusiness Incubators coupled with strategic collaborations with stakeholders have provide substantial momentum to the agri start-up ecosystem in India. The Agri-startups utilizes advanced technologies, data analytics, Artificial Intelligence & Machine Learning, big data, sensors, and satellite imaging to make agriculture more precise and sustainable and it enhances agricultural productivity and reduce post-harvest losses. The regions like Maharashtra, Telangana, Karnataka, Tamil Nadu, Gujarat, and Haryana and Western Uttar Pradesh have emerged as hotspots for agri-startup activity, benefiting from conducive policy environments and robust agricultural infrastructure. According to the *Start us Insights Platform* study on 1156 Agri startups in 37 Regional Hubs revealed that the Silicon Valley, London, New York City, Boston, and Los Angeles are home to 300 startups and account for 26% of global activity in agriculture. Emerging Indian hubs in New Delhi (26), Bangalore (21) and Mumbai (13) lead the national and region's activities. At the same time; as compared to the importance of agriculture, the number of agri-startup looks much less in number. Most of the high-growth agri-startups have been founded by young professionals with engineering

and management backgrounds. On the other hand, agricultural students graduate coming (under-graduation and post-graduation) every year from 75 agricultural universities has the potential in the area.

Challenges faced by the Agri-startups

- **Business model:** Most of the agri-startups are mainly oriented towards production and marketing of agricultural produce on their own. They are unable to connect to the real problems of large number of stakeholders in the value chain to expand their businesses. Therefore, after initial success at small scale, they find great difficulty in scaling up the business.
- **Lack of seed fund:** Agri-startups coming from humble background need funding support at initial stage to validate their ideas and develop minimum viable product (MVP). Small size grant opportunities are of very limited use for many of the agri-startups.
- **Lack of mentorship:** The budding entrepreneurs in agriculture sector also face problems of right mentors, who can support them in networking, finding resources and developing proper business plan.
- **Incubators' competence:** The agribusiness incubators located with agricultural universities and other research organizations are also in early learning stage and to provide needed support to start-ups, the incubators need to have network of professionals with different domain knowledge. The incubators are also expected to provide test bed facilities for some of the start-ups. Overall professional competence with agribusiness incubators need to be boost up in that.
- **Limited knowledge of available technology:** In agriculture sector, several commercially viable technologies (including digital technologies) are available with different research organizations, however the budding entrepreneurs either not aware of these technologies or they are not able to connect these technologies with the problems.

Also, the Agri-startups come upon several challenges, viz., limited access to capital, regulatory complexities, and technological limitations. Under this background, the Agri-

startups in India has crucial role in entrepreneurship to address the UNO's Sustainable Development Goals such as food security, rural livelihoods, environmental sustainability and water conservation, etc.

Agri-Startup Opportunities to address the goals of (*Viksit Bharat*) Developed India

Emergence of agri-startup eco-systems in India

The Andhra Pradesh, Karnataka and Kerala state governments have started promoting start-ups through state-specific start-up programmes even before the Government of India Start-up India scheme initiatives. Further, it also highlighted that the state-specific ecosystems have a larger role to play in regional start-up ecosystem-based development in India

Sustainable entrepreneurial ecosystem

The Agricultural- Start-up ecosystems promoted government-industry-academia triple helix interactions leading to the emergence of a modern industrial cluster followed by an information technology and biotechnology Research and development of the sustainable entrepreneurial ecosystem focuses on sustainable development and how entrepreneurs can work to achieve innovative, risky, and profitable entrepreneurial activity while maintaining economic, environmental, social, and cultural factors. In that, employee status, business ownership and scale, income and saving, reforming laws, access to information, awareness and understanding of risk are among the factors play the system's sustainability.

Strengthening science, technology, and innovation

Several developing countries have recently renewed the emphasis on enabling Strengthening science, technology, and innovation (STI) -based startups for Strengthening and implementing SDGs. In India, the important role of science, technology and innovation-based incubators for strengthening start-ups incubated in metro- and tier one cities. It is highlighted the importance of incubation services to the incubates such as capacity building practices, expertise and networking avenues for the key success of effective incubation facilities. The "Start-up Brazil" and "Start-up Chile" launched incubator programs aimed to attract local and international entrepreneurs. China supports large incubator program to push and enable STI-based entrepreneurship from universities to skill-based incubation systems. In India also, the policymakers in developing countries increasingly see science, technology, and innovation (STI) as an avenue for meeting sustainable development goals (SDGs), with STI-based startups as a key part of these efforts.

Social entrepreneurship led social start-ups for development goals

The social entrepreneurship and the process mechanism of solving the rural poverty problem based on the identification and development of social opportunities. Social start-ups based Social entrepreneurship, with its innovative way to become a new solution to solve social problems to solve rural poverty and sustainable development perspectives. The social Enterprises integrate farmers into their value chain to develop and realize social opportunities, which is a sustainable means of poverty alleviation and the poverty reduction in rural areas is an important development goal concerned by the international community, but the traditional poverty-reduction methods have certain drawbacks and it can be solved by the social entrepreneurship process values social opportunities for sustainable development goals in rural areas.

Gender empowerment through Agri-startups

The women entrepreneurship and innovations can be fostered with the assistance of stakeholders' involvement and engagement. The proactive, institutionally supportive and interactive two-way stakeholder connect between women enterprises and stakeholders build competitive advantage for collaborate works to pursue mutually-beneficial, multitudinous goals, encourage innovative women entrepreneurial initiatives. It is also highlighted that the women start-ups have made a mark in the Indian start-up ecosystem both in terms of achievement of faster growth and creation of unicorn in industrial and service sectors

Digital Technologies assisted agri-startups

The technology led start-up business models utilizing artificial intelligence can help to meet rising global demand for food and support a more inclusive and sustainable food system by:

- (1) Enhancing the resilience of farming methods
- (2) Reducing the cost of quality inputs and services to underserved farmers
- (3) Improving market access to facilitate smallholder farmer integration into regional and global supply chains.

Although in emerging economies, applications for artificial intelligence in agribusiness will flourish as farmers' access to the Internet and adoption of smart devices increases across low-income countries. Agribusinesses are leveraging AI to create new cost-effective business models and to provide the information needs of small farmers in emerging markets. Ag-tech firms using AI—for now mostly with large-scale farmers to demonstrate the viability and upscale innovations. However, governments, investors, and industry will need to

collaborate in addressing data, infrastructure, and human capital gaps before commercial AI integration is feasible at a larger scale. Further, several start-ups concerned about regulatory challenges to innovation; particularly transaction cost economics and innovation in technology which can aid start-up finance. Regulatory challenges in raising fund and issuing IPOs have been a concern for the growth-stage start-ups. Market has its limitation in channelling resources where there are externalities.

In the Indian context, regulatory uncertainty may limit the adoption of innovative financing options such as block chain technology for start-up financing purposes. Several start-ups have moved abroad in search of better opportunities of fundraising and collaboration opportunities. Hence, in framing the guidelines, regulators will need to keep an eye on social good and level playing field for all stakeholders. The agribusiness sector has experienced a significant pace of technological evolution. Particularly; use of drones, the internet of things, and satellite communication-based Ag-Techs companies for its development in agribusiness. The digital technologies in Agriculture and rural areas, reported the significant challenges for digital agricultural transformation is a lack of systematic, official data on the levels of e-literacy for urban and rural areas, quality and affordability of information coverage services, lack of information about government support, regulatory frameworks for digital transformation and data protection. Further, it also reported that significant disparities in the adoption of digital agriculture technologies between developed and developing countries including allocation of financial resources and education levels influence the adoption of modern agricultural technologies. Also, Small farmers in rural areas are disproportionately disadvantaged as well as facing problems of limited access to infrastructure, networks and technology.

Transformative digital innovations, digital technologies and digitalisation at the regional and population level about urban and rural areas; Creation of sustainable business models that provide viable digital solutions for inclusion of small-scale farmers in the digital agriculture transformation process. Creation of an index to consider the development of digital agriculture in the context of cultural, educational and institutional dimensions of a given country, both in terms of the availability of basic conditions and enablers for digitalization and the potential economic, social and environmental impacts of the process.

Innovative ICT applications in Agriculture

The agriculture sector in developing countries suffers from lack of resources, low productivity, poor technology usage, income inequalities, and increasing population

pressure. Innovative ICT applications include: farmers combining sensors and software for practical information on crops; using artificial intelligence to inform strategic decision-making; utilizing mobile platforms to track farm assets; and making use of Internet of Things and sensors to guide decisions on crops relating to weather. Integrating information and communication technologies (ICTs) in agriculture is vital and is at the core of many governmental objectives for enhancing and securing the future of their agricultural sectors. Forecasts show that digitalisation in agriculture could increase the gross value of agricultural production and the technological innovations in agriculture will help reduce poverty in developing countries

- Knowledge-Network Enablement
- Decision Support Information
- Market Access Enablers
- Infrastructural Services
- Finance Provision

Agricultural finance and market entry importance IN Agricultural innovation

The global investment patterns for research and innovation in agriculture systems for the Global South related to innovation funding was about \$60 billion of funding for each year from 2010 to 2019 period (just 4.5% of Global South agricultural output). The funds mostly mobilized from governments in the Global South, development partners, private companies, and private equity and venture capital funds. Among all 60-70% of funds coming from the countries' own governments (and the government of China accounting for as much as all others combined). Furthermore, less than 7% of the total funding was found to have measurable environmental intensions & less than 5% had both social and environmental intensions

The world in 2050 will have 10 billion people; hence, adequately feeding these 10 billion with nutritious food while protecting and restoring the natural environment and tackling climate change, as well as ensuring equitable socio-economic outcomes is maybe the biggest development challenge facing us. So, Research and innovation is very important; though the innovation funding has been increasing, but the rate of growth has slowed down from 7 % to 3% in second half of the last decade. Among that also, 30-40% of the innovation funding is focused on traditional science & technology or product development and the rest is focused institutional, infrastructural, extension and marketing activities that enable adoption of new technologies and agricultural practices.

The Private companies may contribute ~USD 2-3 billion a year towards innovation in Sustainable Agricultural Intensification (SAI), with ~9% of their innovation funds having clearly stated SAI objectives; Private Equities /Venture Capital funding in startups are a small but growing proportion of the total funding for SAI. the digital agri-food technologies promoted financial investments in agricultural and food technology startups have grown in several dimensions. Hence, the financial component of the emerging agri-food technology sector is the heart of the agri-food system and venture capital is key to adequately assess the food tech innovation adoption in various to construct, incentivize, and legitimize this new agri-food tech space for financial investments. More number of agri-food tech startups that promise to solve critical issues in the agri-food system through technological innovation are increasingly perceived as an attractive new investment opportunity for venture capitalists and investors. Universities and academic institutions have started playing a dynamic role in the Indian start-up ecosystem. Many successful founders have incubated their startups in the academic institution-based incubators.

The policy of promoting incubators in academic institutions have started yielding results as entrepreneurs in the ideation and validation stages-based incubation support. the foreign market entry and Internationalisation of start-ups have made their presence in the international markets through acquisition or collaboration with foreign partners. However, the success is limited in overseas operations of the market entry platforms, products and scale of their produce vary from local to regional to international markets. Hence, the Start-ups aiming to internationalize the early need to understand various internal and external factors to achieve success. The drivers and success factors behind internationalization market entry challenges needed to provide managerial and policy implications with respect to internationalization of Indian start-ups At present, there are 7,241 agri-startups registered; in that the DPIIT recognizes only 2800 only; hence considering India's largest cultivated area, with a large number of cultivators (146 million), information technology penetration can create a scope to make 1.46 lakh small agri-startups (1000 farmers/ startup)- 52-fold size opportunities are there as compare to present level. Also, to attract more foreign direct investment (FDI) for further growth in agriculture, development of agri-startups in to Unicorns status is needed.

Addressing India's SDGs through Agri Startups

- Agri-start-ups plays important role for both economy and sustainable development of the country
- Hence, the following suggestions raised were,

- 1. Creation of the digital infrastructure for rural information
- 2. Provision of market access to agri-startups
- 3. Provision of growth capital for agri-startups
- 4. Creation of Agricultural Unicorns to attract FDI, Venture Capital, Angel, Crowd Funding,
- 5. Promotion of Women Startups for inclusiveness
- 6. State-specific Startup Programmes
- 7. Focus on foreign Market Entry and Internationalisation of goods and services particularly in the high-income countries
- 8. Intellectual property protection, regulations and ethics
- 9. Promotion of Social entrepreneurship based social enterprises

Conclusion

The Government of India is targeting 30 trillion US Dollar economy in 2047 to get inclusive developed status of the country. As compare to China, India is having efficient service sector growth in ICT and soft technologies; so connecting the service sector opportunities in to production sector (Global standard agriculture and industry) is needed to capture the international markets to mobilize more economy and inclusiveness. It is possible with the support of globalized startup ecosystems. The Agricultural Startup ecosystem has 52-fold growth in development in this area with the support of emerging Indian startup hubs in New Delhi, Bangalore and Mumbai lead the national and region's activities. It also Strengthen the science, technology, and innovation (STI) -based startups for Strengthening and implementing SDGs. Also, The Social entrepreneurship led social start-ups supports for development goals. It also supports Gender empowerment, inclusive Digital Technologies utility and Agricultural finance and market entry importance in Agricultural innovation and address India's SDGs through Agri Startups

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