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Untapped Agritech–Startup Opportunities And New Emerging Business Opportunities In Some Indian States.

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Abstract:
The agriculture sector is facing several complex problems and challenges. Lack of information about soil, weather, market, advisories, etc., hinders crop planning and diversification. It also leads to small marketable surplus make it not remunerative for producers. Literature review has recently been conducted based on an identity, family and institutional perspective (Fitz-Koch et al., 2017). This perspective is consistent with the previous literature that used the family business perspective. However, the multiple approaches observed in the agritech-entrepreneurship field suggest that several perspectives are possible and useful to obtain a global and multifaceted view of farmers' 518 R. Condor entrepreneurial problematic. By adopting a focus on entrepreneurship in agriculture, our paper proposes a perspective based on the idea of change management in the agricultural sector.
Today's farmer faces a lot of challenges to sustain their livelihood through farming. Malpractices in the unorganized agricultural markets and the absence of organized marketing systems for production are becoming a major concern for Indian farmers. Moreover, they have to deal with poor transportation and storage services and much more. They have limited access to superior technology to get timely information and agricultural solutions which leaves them vulnerable and all by themselves. Agritech-startups have the potential to address these challenges from the very beginning, and subsequently change the face of Indian agriculture. They are the knights in shining amour for Indian farmers.
According to startup India 2021, there are 1,485 agritech-startups, 474 for organic farming, 1774 for food processing, 48 for horticulture, 130 for animal husbandry and dairying, 22 for fisheries and 74 have combination of such activities.

Keywords: *Amrit Kaal, Atma nirbhar Bhart, Agrit-startup, Post-harvest management, High-quality produce.*

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I. Introduction

In 2016, India's Prime Minister shared his dream of doubling farmers income by the year 2022 in the year when India complete 75 years of Independence and enters **'Amrit Kaal'** .Now that we have entered **'Amrit Kaal'**, it is a good time to revisit that we dream and see if it has been fulfilled and if not, how best it can be done.

India has the second largest cultivable land area of 156.06 million hectares (2019) after United States with a large number of cultivators (146 million) mostly (86%) marginal and small farmers. Our country has an incredible diversity of climate and soil types (15 agro-climatic zones, 8 major soil types) making it suitable for growing a wide range of field crops, fruits, vegetables and so on. India is currently the world largest producer of milk, pulses, millets and jute as well as the second largest producer of rice, wheat and fruits and vegetables. India has recently emerged as a leading exporter of agricultural and live-stock products.

II. Statement of the problem

The agriculture sector is facing several complex problems and challenges. The small size of land holdings due to sub-division, fragmentation increases the transaction costs, making it challenging to adopt several modern technologies for efficient use of inputs and natural resources'. Lack of information about soil, weather, market, advisories, etc., hinders crop planning and diversification. It also leads to small marketable surplus make it not remunerative for producers. The ultimate effect of these is the lowering the agri-household income. The latest Situation Assessment Survey (SAS) conducted by the NSSO in 2019 shows that the income from crops for agri-household is even less than wage earnings. On an average, the agricultural families earn

Rs.816.5 per person per month from farming. Agritech-startups can resolve the problems associated with the problem of low farm incomes.

Farmers in India face a lot of challenges to sustain their livelihood through farming. Malpractices in the unorganized agricultural market**s** and the absence of organized marketing systems for production are becoming a major concern for Indian farmers. Moreover, they have to deal with poor transportation and storage services and much more. They have limited access to superior technology to get timely information and agricultural solutions which leaves them vulnerable and all by themselves. Agritech-startups have the potential to address these challenges from the very beginning, and subsequently change the face of agriculture in Andhra Pradesh.

III. Review of the literature

The literature on agritech-entrepreneurship showed significant growth at the end of the 20th century in a context of change in the agricultural sector. Until this period, control of the production and payment of subsidies were the main pillars of agricultural policy, particularly in Europe. In the mid-90s, a new agricultural paradigm emerged based on liberalization and sustainability. This paradigm broke from the productivity and protectionist paradigm inherited from the 1950s. The literature on agritech-entrepreneurship appeared in this context with the introduction of the idea of change in the agricultural Entrepreneurship in agriculture sector. Agritech-entrepreneurship refers to the capacity of farmers to change, to abandon old models and to enter a new agricultural phase.

At the turn of the 20th century, several significant contributions were published by scholars in small business and regional studies (Carter, 1996, 1998a, 1998b, 1999; Carter and Rosa, 1998). These approaches strongly contributed to the integration of the farm sector in small business studies and showed that family farms have the same entrepreneurial attributes as other businesses. However, the objectives of these studies were not to understand the changes that were in progress in the agriculture sector or to evaluate the capacity of the agricultural system (farmers and their supporting services) to modernize farms. Although this literature introduced the idea that farmers are entrepreneurs (Carter and Rosa, 1998), its main objective was to understand the farm as a small business and family unit and to expand the frontiers between the farm system and other economic systems (rural and non-rural enterprises). This objective has been largely achieved, as evidenced by the journals in which the papers have been published, the coordination of books (Alsos et al., 2011b) and, more generally, the recognition of the family farm as a unit of analysis in entrepreneurship studies (Fitz-Koch et al., 2017; Rønning and Kolvereid, 2006).

Another stream of literature emerged at the turn of the 20th century (McElwee and Warren, 2001; McElwee and Robson, 2005; McElwee, 2006a, 2006b, 2006c, 2008; McElwee et al., 2006a, 2006b; Pyysiäinen et al., 2006; De Wolf et al., 2007; Vesala et al., 2007) that continues to assimilate the farmer as an owner manager but surpasses this small business view by introducing the idea of entrepreneurship to adapt the farm to new challenges. Agritech-entrepreneurship is viewed as both an attitude and a set of strategies that are suitable to modernize the farm. Although the family nature of the farm, the rural location, the way of life, and the organization of the farm around the farmer remain important, this literature introduces new topics, such as the emergence of external challenges, the difficulties some farmers face in changing their business models or managing in a new administrative context, the recognition of several entrepreneurial strategies, and the need for support services to adapt their services to help farmers in their entrepreneurial transition.

Such a literature review has recently been conducted based on an identity, family and institutional perspective (Fitz-Koch et al., 2017). This perspective is consistent with the previous literature that used the family business perspective. However, the multiple approaches observed in the agritech-entrepreneurship field suggest that several perspectives are possible and useful to obtain a global and multifaceted view of farmers.

My paper proposes a perspective based study on the idea of modern management in the agricultural sector Agritech-startups as an insturmental by observing Untapped Agritech–startup opportunities and New Emerging Business Opportunities in some Indian States.

IV. Objectives of the Study

1. To know the concept of startup and current scenario of agritech-startups.
2. To identify prevalent agriculture and it's sub-sectors in Startup Ecosystem.
3. To get an insight into the compassionate environment for Agritech-statups.
4. To get an insight into opportunities and challenges in Agritech-startups.
5. To examine the startup policy changes and implementation by central and state governments.

The meaning of an Agritech-startup:

Agritech-startup is defined as an individual or segment of companies using technology in the field of agriculture leading to increase in productivity, efficiency and output. Agritech-startup can be applied across the agricultural value chain and can be in the form of a product, a service or an application.

Classification of Agri-startups

The agriculture sector including crops, live-stock and fisheries has witnessed several startups, commonly known as "Agritech-startups." These agritech-startups classified based on their focus areas, such as agritech-tech, animal husbandry, dairy farming, fisheries, food processing, organic agriculture, precision farming, etc. Agritech-startups typically operate at one or more stages of the agricultural value chain and on this basis have been classified into seven broad categories: providing output market linkages; facilitating input supply; enabling mechanization and irrigation; offering a financial solution (credit and insurance); helping quality maintenance and traceability; post-harvest management; logistic services (warehousing and cold chains) and supporting animal husbandry activities.

Present status of Agritech- satartups in India

According to startup India 2021, there are 1,485 agritech-startups, 474 for organic farming, 1774 for food processing, 48 for horticulture, 130 for animal husbandry and dairying, 22 for fisheries and 74 have combination of such activities.

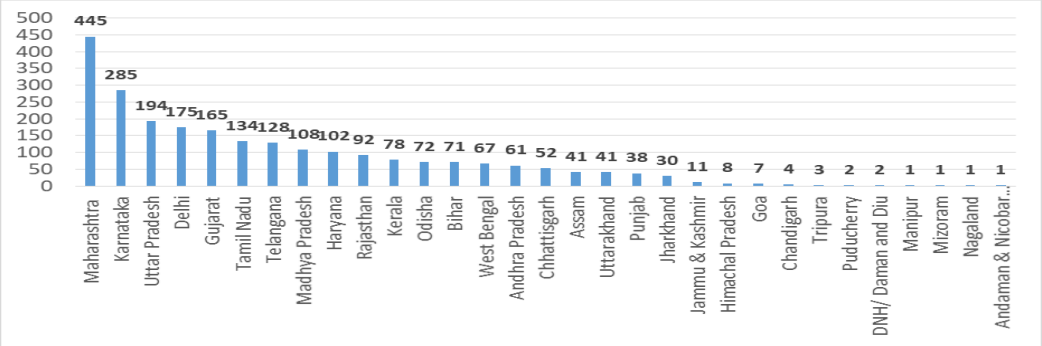

Fig:1. State-wise number of DPIIT-recognized agri-startups in India (as of Nov 10, 2021)

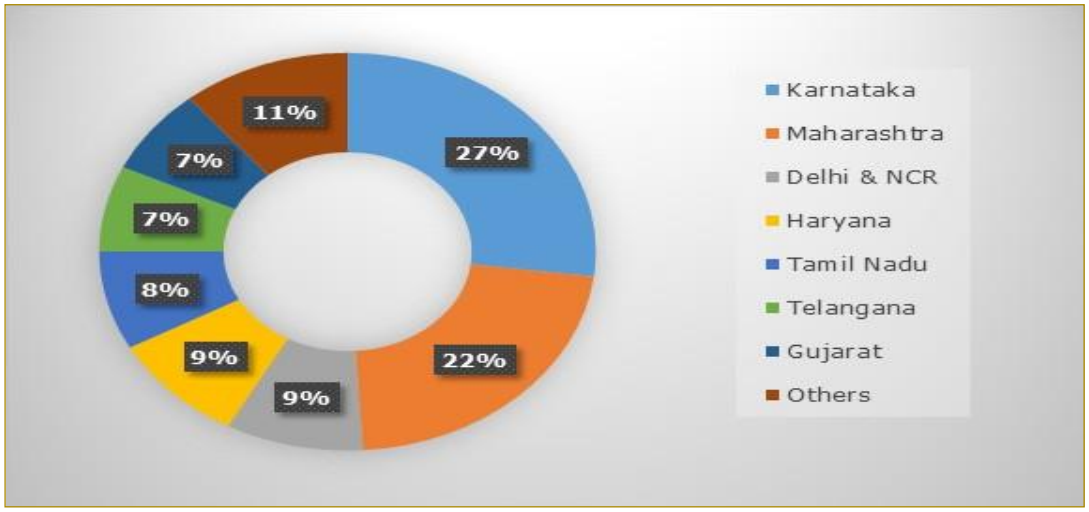

Fig.2 : Key Indian States Focusing on Agritech- Startups (NASSCOM, 2018b)

The above Fig.1&Fig.2 reveals that most of the Indian states are not equipped with well-developed Agritech-startups in order to give support to the development of agriculture sector even though they are agrarian economies like Andhra Pradesh. This will show that some states in India are not in the position to tap the Agritech–Startup Opportunities and New Emerging Business Opportunities.

V. Untapped Agritech-startup opportunities by some states in India.

Employment rationalization

Agriculture sector employs 50% of India's workforce but contributes only 18% of the GDP. Therefore, farm automation and aggregation will rationalize and gainfully redistribute the workforce among different sectors in a constructive growth manner.

Stakeholder empowerment

Mandi's and Farmer Produce Organizations (FPOs) need digitization to bring more transparency in their transactions. Farmers need more venues to sale their produce at remunerative prices. Data and market connects can empower each stakeholder.

Streamlining supply chain

The losses in postharvest sector are estimated to be from 10 to 25 per cent in durables, semi-perishables and products like milk, meat, fish and eggs. The estimated losses in fruits and vegetables are higher and reached from 30 to 40 per cent. Demand driven cold chains, warehouse monitoring solutions and market linkage can significantly increase farmer incomes.

Processing and Exports

India's food processing industry is expected to reach a staggering $ 535 billion. India ranks among top 5 countries in food processing. By 2024, the sector will employ 9mn. Streamlining and traceability can improve farmer income and exports.

Resource maximization

80% of India's fresh water is used in agriculture. Similar figures for China are 65% and 70% globally. Reduction in usage of water and pesticides is a significant business opportunity

The digital infrastructure

There is an acute lack of data and insights at ground and farmer level. Along with laying the digital work, solutions that build a layer of data will transform DBT schemes, insurance and loan disbursal

VI. New emerging business opportunities in Agritech-startups in India.

Better Access to Inputs

Providing farmers better access to agricultural inputs at their doorsteps; it helps farmers to understand the best input product to increase the yield and productivity. Mobile apps, Analytics, ecommerce are some of the technological interventions under this sector.

Farming as a Service (Faas): Making services affordable to small and marginal farmers

Farming as a Service offers affordable technology solutions to farmers for efficient farming by converting fixed cost to variable cost. App based platforms are used for providing services to farmers.

Digital Agriculture: Driving transparency, traceability and real time access to information

Digital / Precision Agriculture based businesses offers innovative technology solutions for increasing crop productivity and farming process efficiency. Drones, Internet of Things (IoT) Sensors, block chain, image sensing, analytics; machine learning is some of the technological interventions under this sector.

Market linkage: improving supply chain

Market Linkage provides a digital platform which connects farm output with the customer; it is one of the easiest ways to take farmers products directly to the end customer. App based platform, image sensing for quality grading, IoT based storage monitoring are some of the technological interventions under this sector.

Financing: Innovations taking roots in farmer financing

Farmers in India struggle to get finance but agritech based financing startups help such underserved community of farmers to get loans quickly. App based platforms, analytics, data science are some of the technological interventions under this sector.

VII. Government Initiatives

The entrepreneurship culture has been changing in the recent times. The transformation happened from controlled, license-regulated and public company-oriented economies to knowledge-based ones have encouraged individuals to start businesses. Startups are emerging as vehicle for realizing social purposes. Startups are considered to be the next growth engines to take the Indian economy to the size of US $5 trillion and to realize the dream of 'Atma Nirbhar Bhart". In January, 2016 the government of India launched a 19-point'Startup India Action Plan' which resulted in the implementation of several policy/promotion initiatives aimed at creating a robust eco-system for nurturing startups and innovations. This resulted in a massive increase in the creation of startups across almost every industry including agriculture.

GOI announced a four point strategy to support agriculture in India i.e., reducing cultivation costs, ensuring profitable prices, creating non-farm source, processing farm wastes. Through this initiative, the government aims to empower start-ups to grow through innovation and design. The Startup India initiative is based on the following three pillars: Simplification and handholding.

Funding support and incentives.

Industry-academia partnership and incubation.

Incentive schemes to support start-ups in agriculture and technology

A Scheme for Promotion of Innovation, Rural Industries and Entrepreneurship (ASPIRE)

A Scheme for Promotion of Innovation, Rural Industries and Entrepreneurship (ASPIRE) is an initiative of Government of India and promoted by the Ministry of Micro, Small and Medium Enterprises (MSME) to set up a network of technology centers, incubation centers and also to promote start-ups for innovation and entrepreneurship in rural and agriculture-based industry.

New Gen Innovation and Entrepreneurship Development Centre (newgen IEDC)

New Generation Innovation and Entrepreneurship Development Centre (NewGen IEDC) is the programme launched by National Science and Technology Entrepreneurship Development Board (NSTEDB), Department of Science & Technology (DST), Government of India will provide a limited, one-time, non-recurring financial assistance, up to a maximum of INR 25 Lakhs.

Small farmers' agri-business consortium

It is a Society promoted by Department of Agriculture and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Govt. of India" The quantum of SFAC Venture Capital Assistance will depend on the project cost and will be the lowest of the following more than 26% of the promoter's equity and more than Rs. 50Lakhs.

Science and Engineering Research Board

India There is no upper limit (or even lower limit) for a project grant. The budget is decided based on the requirement for its successful implementation.

Atal Innovation Mission (AIM) including Self-Employment and Talent Utilization (SETU)

is the Government of India's Endeavour to promote a culture of innovation and entrepreneurship. Its objective is to serve as a platform for the promotion of world class innovation hubs, grand challenges, start-up businesses and other self-employment activities, particularly in technology driven areas.

It has two core components: 1.Entrepreneurship promotion through Self-Employment and Talent Utilization (SETU) and 2.Innovation promotion: to provide a platform where innovative ideas are generated

AIM will provide a grant-in-aid of INR 10Cr to each Atal Incubation Centre for a maximum of five years to cover the capital and operational expenditure cost in running the centre

Pradhan mantri mudra yojana

Pradhan Mantri MUDRA Yojana (PMMY) is a scheme launched by the Hon'ble Prime Minister on April 8, 2015 for providing loans up to 10 lakh to the non-corporate, non-farm small/micro enterprises. These loans are classified as MUDRA loans under PMMY. These loans are given by Commercial Banks, RRBs, Small Finance Banks, MFIs and NBFCs.

Under the aegis of Pradhan Mantri Mudra Yojana (PMMY), MUDRA has created products/ schemes. The interventions have been named Shishu (loan up to Rs. 50,000) Kishore' (loan above Rs. 50,000 and up to Rs. 5lakh) and Tarun (loan above Rs. 5lakh and up to Rs. 10lakh).

VIII. Problems of Indian Agritech-startups

Selling products and technologies to farmers is a big challenge and because of this reason many start-ups are not able to succed.

Small size of Landholding

Small size land holdings are not suitable to adopt mechanization and they are not cost effective. Development of machinery which suited to small size of land holdings resolve this problem and make the agriculture cost effective.

Return for the Investors

Agritech-startup is a long term business which requires patience from investors before generating the return, but most of the investors come forward to put investment in the projects in which they enjoy benefits in a short period.

Talent retention

Agritech-startups and enterprises are finding it hard to retain technical talent working in this sector.

Long gestation period

Farmers will take time to develop full trust in agritech technologies which might affect investors‟ interest.

Technology affordability

Farmers‟ income stills a concern in major parts of India making hard for them to afford the agriculture technology.

Skill adaptability

Making farmer adaptive of the required skills for working on these technologies requires lot of effort.

Acquisition of Agritech Companies

In India we see very less of agritech-startups being acquired by large businesses which are hindering them in scaling up their levels.

Regulatory and policy issues

Regulations are favorable, but are complex in nature. Facilitating adoption of proven technologies through subsidy is yet to gain momentum.

IX. Recommendations

Lack/Ignorance of farmers‟ usage about smart phones leads to marginal utilization of the startup services mainly provided on mobile based platform/application. Therefore, there is a strong need to develop mobile training programmes to educate farmers and make them capable to adapt new technological advancements especially in using smart phones.

The startups face a lot of problems regarding the awareness and outreach of their and services to farmers. In order to make startups successful, it is crucial to enable seamless hybridization of relevant technology by building a promising „new-age distribution model‟. It is the need-of-hour to develop a new way for the farmer to buy products and get information as well as credit on one unified platform.

There is a need for the government to help set up agritech-focused incubators and grants which are currently less in number. Also, academia should encourage more entrepreneurs to focus on this growing sector.

Accelerators, incubators and mentors identified for the agritech-startup ecosystem, along with the pronounced policy and schemes, need to work in tandem with the startups to provide the best technical support and reduce their gestation period.

Banks and financial organizations also need to step up to the challenge and offer more creative models of financing for farmers, entrepreneurs, incubators, and accelerators.

Governments should provide better incentives to startups that are coming up effective post-harvest management infrastructure such as storage, preservation, cold chain and refrigerated transportation.

States with the presence of emerging and growing startup hubs viz. Telangana, Tamil Nadu, Maharashtra, Kerala, etc. have to come up with favorable policies and implement them soon enough to attract startups and investors similar to Karnataka which is home to majority of Agritech- startups.

Being profit based organization, startups lay their major focus on large and medium farmers. But in order to alter the scenario of the Indian agriculture it will be required of them to emphasize more on small and marginal farmer who form the majority in Indian agriculture.

X. Conclusion

In spite of many problems faced by Agri-startups in India, the visualization that “Agritech-startups changing the face of Indian Agriculture “comes true when both the union and state governments can create eco-system for startups sustainability, facilitate the research for innovation and entrepreneurship, by strengthening of incubation centers, by transforming agricultural education system for innovation ecosystem and finally by encouraging investments in agritech-startups through proper monetary and fiscal policies.

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