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Nature of agri-startups in Karnataka

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Abstract

India is rapidly emerging as a global leader in start-up innovation, with nearly 4,300 Agri-startups contributing to the transformation of its agricultural sector. These enterprises are enhancing farmer incomes, advancing technology adoption, and diversifying agricultural activities across various domains, including Agri-tech, food processing, organic farming, and dairy. Karnataka, with its vibrant entrepreneurial ecosystem, was purposively selected for the present study conducted during 2023-24. A total of 45 Agri-startup entrepreneurs were selected through purposive sampling, with an equal distribution across the Agri-tech, food technology, and sustainable agriculture sectors. Data were collected through personal interviews using a structured schedule and analyzed using frequency and percentage. Findings revealed that most Agri-startups were located in urban areas (51.11 per cent), with private limited companies forming the predominant ownership structure (46.66 per cent). Farmers (62.22 per cent) and consumers (57.77 per cent) emerged as the primary target groups. Product innovation was the most common form of innovation (51.11 per cent). All startups adopted direct marketing, while 71.11 per cent utilized online platforms to reach wider markets. Incubator engagement was most prominent at the ideation stage (68.88 per cent), and mentorship constituted the key support service (75.55 per cent). Enterprise activities were diverse, encompassing processed foods, organic products, agricultural inputs, and services such as farm automation and farmer training. The study highlights the growing significance of Agri-startups in bridging technological and market gaps in agriculture. The findings provide insights for policymakers, incubators, and support institutions to strengthen the startup ecosystem and promote sustainable agricultural entrepreneurship in Karnataka and beyond.

Keywords: Agri-Startups, innovation, Karnataka

Introduction

In light of global challenges such as climate change, resource scarcity, and the urgent need to enhance food security, innovation in agriculture has gained critical importance. Over recent years, India has experienced a significant transformation in its agricultural landscape, largely driven by the rise of Agri-tech startups. These enterprises are equipping farmers with tools to make data-driven decisions, access real-time information, and adopt modern, efficient practices. Through digital platforms, they provide services including crop advisory, market linkages, access to quality inputs, and financial solutions such as credit and insurance. Collectively, these innovations contribute to higher productivity, reduced post-harvest losses, and fairer price realization for farmers.

Emerging technologies such as artificial intelligence (AI), the Internet of Things (IoT), and blockchain are further accelerating this transformation by enhancing farm efficiency, improving supply chain transparency, and fostering environmental sustainability. Research demonstrates their impact: IoT can increase yields by up to 30 per cent (Smith and Brown, 2020) [14], blockchain adoption improves transparency by 40 per cent (Gupta and Sharma, 2021) [10], and AI-driven solutions can reduce pesticide use by 50 per cent (Patel and Mehta, 2022) [12]. These figures underscore the growing role of technology in shaping the future of Indian agriculture.

The growth of this sector is also reflected in investment trends. According to Praxis Global Alliance (2022), India's Agri-tech sector attracted investments of nearly USD 958 million between 2017 and 2022, recording a compound annual growth rate (CAGR) of 51 per cent. At the ecosystem level, India has emerged as the world's third-largest startup hub, with more than 1.73 lakh startups recognized by the Department for Promotion of Industry and Internal Trade (DPIIT) as of 2025. Among them, 6,985 (about 4 per cent) are agri-startups, classified into agritech (2,967; 42 per cent), foodtech (1,197; 17 per cent), and organic-based ventures (1,046; 15 per cent) (Anonymous, 2024a) [5].

This surge in entrepreneurial activity is being driven by a confluence of factors, including favourable government policies, improved access to digital infrastructure, and growing consumer demand for sustainable and high-quality produce. Against this backdrop, it becomes essential to explore how Agri-startups are reshaping India's agricultural sector, particularly in terms of innovation, sustainability, and their role in empowering farmers.

Materials and Methods: The present study was conducted in Karnataka state. Considering the developing startup ecosystem in Karnataka, the state was selected. A purposive sampling method was adopted for the study, where a total of 45 Agri-startup entrepreneurs were selected. The sample was equally distributed across three key sectors, with 15 entrepreneurs, each representing Agri tech, Food Technology and Sustainable Agriculture. The respondents were personally interviewed with an interview schedule. The data were tabulated and analyzed by using statistical tools like Frequency and Percentage.

Results and Discussion

Table 1: Distribution of Agri-startups based on their nature (n=45)

Sl. No.	Variables	Agri-tech		Food-tech		Sustainable Agriculture		Overall	
		F	%	F	%	F	%	F	%
1. Stage of development									
1.	Ideation	0	0.00	0	0.00	0	0.00	0	0.00
2.	Validation	3	6.67	4	8.89	5	11.11	12	26.66
3.	Early traction	3	6.67	5	11.11	6	13.33	14	31.11
4.	Scaling	9	20.00	6	13.33	4	8.89	19	42.22
2. Year of establishment									
1.	2015-2017	2	4.44	1	2.22	2	4.44	5	11.11
2.	2018-2020	5	11.11	5	11.11	4	8.89	14	31.11
3.	2021-2023	8	17.78	9	20.00	9	20.00	26	57.77
3. Location of the Agri-startup									
1.	Rural	3	6.67	7	15.55	9	20.00	19	42.22
2.	Semi-urban	1	2.22	1	2.22	1	2.22	3	6.67
3.	Urban	11	24.44	7	15.55	5	11.11	23	51.11
4. Ownership status									
1.	Sole proprietorship	1	2.22	4	8.89	0	0.00	5	11.11
2.	Partnership	2	4.44	2	4.44	4	8.89	8	17.78
3.	Limited liability partnership	5	11.11	4	8.89	2	4.44	11	24.44
4.	Private limited company	7	15.55	5	11.11	9	20.00	21	46.66
5. Customer segmentation									
1.	Farmers	13	28.89	6	13.33	9	20.00	28	62.22
2.	Consumers	6	13.33	13	28.89	7	15.55	26	57.77
3.	Wholesalers	5	11.11	4	8.89	1	2.22	10	22.22
*Multiple responses were recorded									
6. Type of innovation									
1.	Product	10	22.22	4	8.89	9	20.00	23	51.11
2.	Process	3	6.67	8	17.78	4	8.89	15	33.33
3.	Services	7	15.56	6	13.33	2	4.44	15	33.33
*Multiple responses were recorded									
7. Marketing strategy									
1.	Direct marketing	15	33.33	15	33.33	15	33.33	45	100
2.	Online marketing	12	26.67	8	17.78	12	26.67	32	71.11
*Multiple responses were recorded									
8. Incubator support									
8.1 Stage of startups' acquaintance with the incubator									
1.	Ideation	9	20.00	10	22.22	12	26.67	31	68.88
2.	Validation	3	6.67	3	6.67	3	6.67	9	20.00
3.	Early traction	1	2.22	1	2.22	0	0.00	2	4.44
4.	Scaling	2	4.44	1	2.22	0	0.00	3	6.67
8.2 Nature of incubator support									
1.	Access to capital services	5	11.11	7	17.07	3	6.67	15	33.33
2.	Mentorship and advisory services	15	33.33	10	24.39	9	20.00	34	75.55
3.	Training	8	17.78	5	12.20	8	17.78	21	46.66
4.	Marketing & accounting	4	8.89	2	4.44	4	8.89	10	22.22
5.	Networking	7	15.56	2	4.44	4	8.89	13	28.88
6.	Technology commercialization	4	8.89	2	4.44	3	6.67	9	20.00
*Multiple responses were recorded									

9. Financial sources									
9.1 Institutional sources									
1.	Incubators	14	31.11	14	31.11	13	28.89	41	91.11
2.	Banking institutions	5	11.11	9	20	4	8.89	18	40.00
3.	Venture capitalists	0	0.00	1	2.22	1	2.22	2	4.44
4.	Accelerators	1	2.22	0	0.00	1	2.22	2	4.44
9.2 Non-Institutional sources									
5.	Bootstrapping	9	20.00	9	20.00	7	15.56	25	55.56
6.	Family & Friends	4	8.89	5	11.11	5	11.11	14	31.11
7.	Private money lenders	1	2.22	0	0.00	2	4.44	3	6.67
8.	Angel investors	1	2.22	1	2.22	0	0.00	2	4.44
*Multiple responses were recorded									

Stage of Development

As presented in Table 1, most Agri-startups (42.22%) were in the scaling stage, indicating that a considerable proportion had progressed beyond the initial phases and were focusing on expanding operations and consolidating their market position. The next highest proportion (31.11%) was in the early traction stage, where startups typically begin acquiring customers and validating revenue streams, suggesting that a significant share was in the process of strengthening their commercial engagement. Sector-wise, the Agri-tech segment had the highest proportion (20.00%) in the scaling stage, highlighting its relatively mature position within the ecosystem and the presence of ventures actively expanding their operations.

Year of Establishment

According to Table 1, most Agri-startups (57.77%) were established during the years 2021 to 2023. This indicates a strong rise in startup activity in recent years, which can be attributed to multiple enabling factors. The post-2020 period saw an accelerated push toward innovation and entrepreneurship in agriculture, driven by increasing awareness of technology-based solutions, evolving consumer demands and greater access to support mechanisms. Favourable government initiatives such as the Rashtriya Krishi Vikas Yojana Remunerative Approaches for Agriculture and Allied sector Rejuvenation (RKVY-RAFTAAR) have played a crucial role by providing financial support, incubation and mentorship to agripreneurs through agri-business incubators across India. The findings were consistent with the findings of Aneesha (2021) and Reddy (2023) [3, 13] who found that majority of the Agri-startups were found in 2019 and after.

Location of the Agri-startup

According to Table 1, Agri-startups were fairly distributed between urban areas (51.11%) and rural areas (42.22%), indicating that the growth of agricultural entrepreneurship is not confined to cities alone but is also taking strong roots in rural landscapes. This reflects both the infrastructural and financial advantages of urban centres and the operational necessity of being close to agricultural activities in rural regions. Sector-wise, Agri-tech startups (24.44%) were primarily situated in urban areas, possibly due to their reliance on advanced technology and access to incubators and research facilities. Sustainable agriculture startups (20.00%), on the other hand, were predominantly based in rural areas, aligning with their close association with farming communities. Food-tech startups (15.55%) had an equal presence in both rural and urban settings, indicating flexibility in location depending on supply chain and consumer familiarity. The findings were in tune with the results of Aneesha (2021), Kumar (2022) and Reddy (2023) who found that majority of the Agri-startups located in urban areas [3, 11, 13].

Ownership Status

As shown in Table 1, most Agri-startups (46.66 per cent) operate as private limited companies, highlighting a strong preference for structured and legally recognized business forms that facilitate external funding, scalability and regulatory compliance. This was followed by limited liability partnerships (24.44 per cent), which offer flexibility in management and limited personal liability. Partnerships (17.78 per cent) and sole proprietorships (11.11 per cent) were less common, possibly due to limitations in attracting investors and managing operational risks. The results are contradictory with the results of Stephen *et al*. (2012), Agbenyegah (2013) and Deepthi (2016) [1, 9, 15] who reported that significant percentage of agripreneurs established their enterprises as sole proprietorship.

Customer Segmentation

According to Table 1, most Agri-startups (62.22 per cent) mainly focused on farmers as their target group. In terms of sectoral distribution, Agri-tech startups had the highest share targeting farmers (28.89 per cent), aligning with their focus on technology-driven solutions for farming operations. In the Food-tech sector, the primary focus was on consumers (28.89 per cent), highlighting market-oriented innovations such as food delivery, processing and branding. Sustainable agriculture startups were also largely farmer-focused (20.00 per cent), followed by those targeting consumers (15.55 per cent). The findings were in line with those of Singh (2016), Vijayan and Shivkumar (2020) and Aneesha (2021) [11, 16] who noted that majority of the Agri-Startups were having farmers and consumers as their target customers [3].

Type of Innovation

As shown in Table 1, most Agri-startups (51.11 per cent) were engaged in product innovation, focused on creating new or improved agricultural products, tools, or technologies. This shows that many startups are trying to solve problems by offering better products that increase efficiency, productivity, or sustainability in farming. Within sectors, Agri-tech startups were primarily focused on product innovation (22.22 per cent). Process innovation and service innovation were each reported by 33.33 per cent of the startups. Process innovation refers to the development of

processed food products and organic value-added products, aiming to enhance product quality and shelf life while reducing wastage and costs. Food-tech startups showed a higher inclination toward process innovation (17.78 per cent), likely due to innovations in food processing, packaging and supply chain efficiency. Similar results were reported by Kumar (2022) [11] who noted that majority of Agri-Startups provided product innovation.

Marketing Strategy: As indicated in Table 1, all Agri-startups (100.00 per cent) adopted direct marketing strategies, showing a strong preference for personally engaging with their target customers, mainly farmers and end consumers. This approach allows startups to build trust, gather feedback and better understand customer needs. Additionally, a significant proportion (71.11 per cent) of startups also used online marketing methods such as social media, websites, e-commerce platforms and digital advertisements. This reflects the increasing importance of digital tools in reaching wider audiences, creating brand awareness and acquiring customers efficiently. The results are in agreement with the results of Chandiok (2016) [8] who found that majority of the Agri-startups were directly engaging sales with their customers.

Incubator Support

As shown in Table 1, regarding the stage of engagement with incubators, a majority of Agri-startups (68.88 per cent) established contact during the ideation stage, underlining the strong demand for early guidance, idea validation and capacity building at the inception of their entrepreneurial journey. The finding was in conformity with the findings of Aneesha (2021) [3] who reported that majority of Agri-startups who reported that majority of the Agri-startups received the incubation support at ideation stage.

As presented in Table 1, the most widely received form of incubator support was mentorship and advisory services, reported by 75.55 per cent of Agri-startups. This demonstrates a strong reliance on expert guidance, particularly evident among Agri-tech startups (33.33 per cent). Training support was accessed by 46.66 per cent of Agri-startups, reflecting the emphasis on skill development and enterprise preparedness across sectors. Networking opportunities were reported by 28.88 per cent of Agri-startups, while marketing and accounting services were received by 22.22 per cent, suggesting that knowledge-sharing and operational support were available, but not as widely as mentorship and training. Access to capital services was received by 33.33 per cent of Agri-startups, most notably in the Food-tech sector (17.07 per cent), pointing that startups get direct funding but limited assistance in connecting with external sources such as venture capitalists and angel investors. Technology commercialization support was reported by only 20.00 per cent of startups, mostly from Agri-tech and Sustainable agriculture, reflecting that incubators offered relatively less assistance in facilitating advanced market linkages and innovation scaling. These findings indicate that incubator support for Agri-startups is largely centred on foundational services like mentorship and training, while more advanced forms of support such as investment readiness, commercialization and scaling remain underrepresented. Similar results were reported by Aneesha (2021) and Kumar (2022) [3, 11] who indicated that majority of the Agri-startups received training and mentoring support from the incubators.

Financial Sources

As presented in Table 1, the majority of Agri-startups (91.11 per cent) received financial support from incubators, indicating their critical role not just in mentoring but also in providing early-stage financial assistance. Banking institutions supported 40.00 per cent of Agri-startups, showing a moderate level of engagement from the formal financial sector. Access to venture capitalists (4.44 per cent) and accelerators (4.44) support was very limited, reflecting gaps in financial inclusion and investor reach.

In terms of non-institutional funding, bootstrapping was the most prevalent, reported by 55.56 per cent of startups. This highlights a strong culture of self-financing and personal risk-taking, especially in the early stages of enterprise development. Additionally, support from family and friends (31.11 per cent) played a notable role in providing initial capital. However, participation from private money lenders (6.67 per cent) and angel investors (4.44 per cent) remained very limited, suggesting restricted access to more diversified or risk-oriented financial networks. The results align with the findings of Aneesha (2021) and Kumar (2022) [11] who reported that most Agri-startups relied on incubators and bootstrapping [3].

Table 2: Distribution of Agri-startups based on product portfolio (n=45)

Sl. No.	Product portfolio	Frequency	Percentage
1.	Agri machinery and equipment	5	11.11
2.	Agricultural inputs	9	20.00
3.	Processed food products	12	26.67
4.	Organic value-added products	11	24.44
5.	Mobile applications	3	6.67

*Multiple responses were recorded

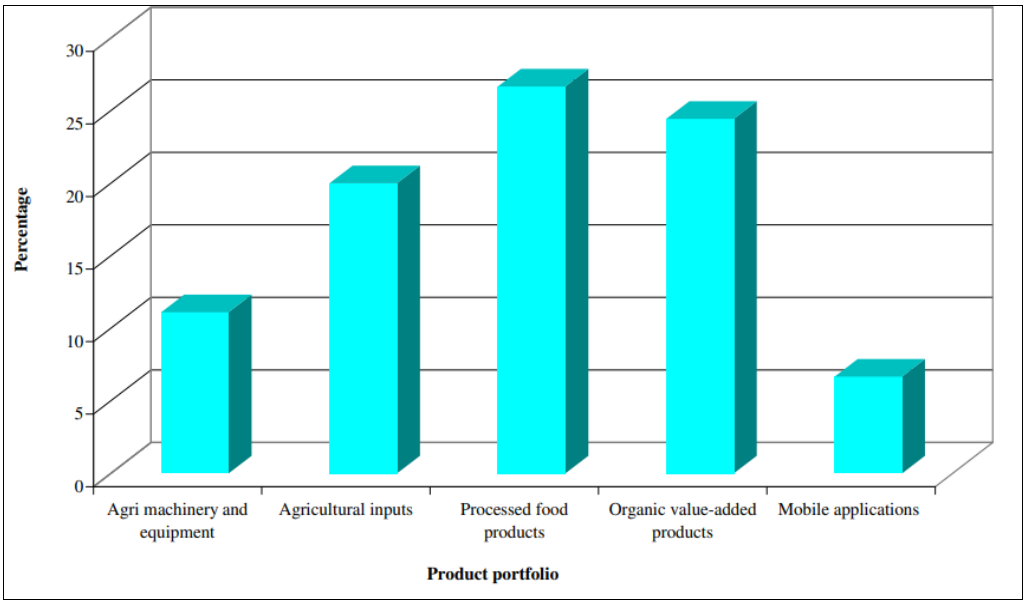

Fig 1: Distribution of Agri-startups based on product portfolio

Product Portfolio

As shown in Table 2 and Fig.1, the largest proportion of Agri-startups (26.67 per cent) were engaged in the development of processed food products, indicating a strong emphasis on value addition and consumer-ready offerings. This reflects the growing market demand for convenience, quality and branding in the agri-food sector. Startups focusing on organic value-added products formed the second largest group (24.44 per cent), highlighting the sector's increasing orientation toward sustainability and health-conscious consumer segments. A considerable share (20.00 per cent) also provided agricultural input supplies, such as seeds, fertilizers, or bioproducts, supporting farm productivity and resource efficiency. The findings were in tune with results of Aneesha (2021) [3] who noted that 25.00% of Agri-startups are providing processed food products.

Table 3: Distribution of Agri-startups based on services portfolio (n=45)

Sl. No.	Services portfolio	Frequency	Percentage
1.	e-commerce platform	5	11.11
2.	Advisory services	6	13.33
3.	Real-time information system	5	11.11
4.	Training and capacity-building services	8	17.78
5.	Farm automation services	9	20.00

*Multiple responses were recorded

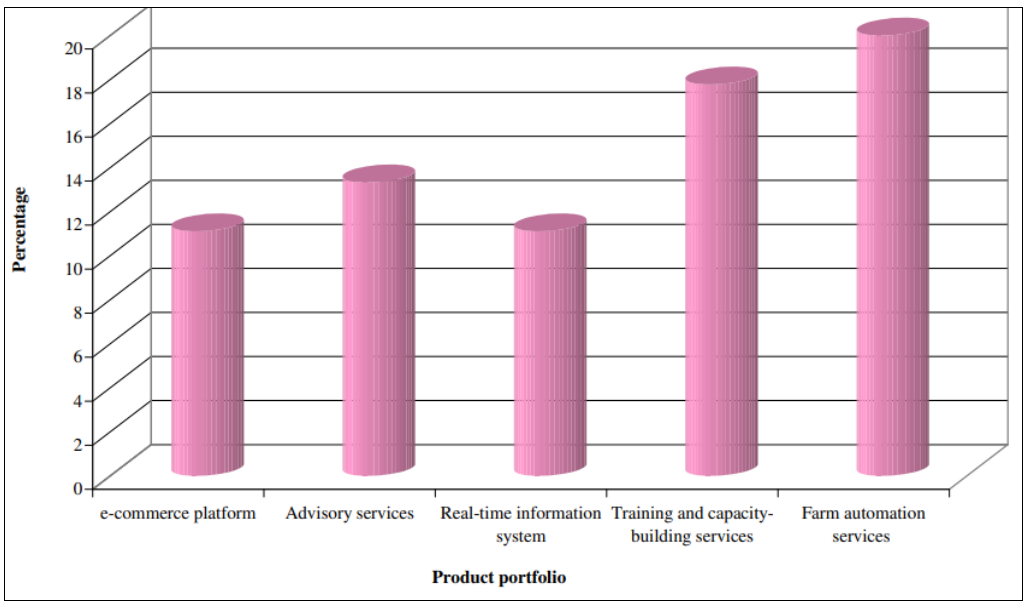

Fig 2: Distribution of Agri-startups based on services portfolio,

Services Portfolio

As indicated in Table 3 and Fig.2, the largest share of Agri-startups (20.00 per cent) offered farm automation such as remote monitoring, reflecting the sector's increasing shift toward precision agriculture and data-driven solutions. These innovations aim to improve farm efficiency, reduce resource use and enhance productivity. Training and capacity-building services were provided by 17.78 per cent of startups, highlighting their role in knowledge dissemination and stakeholder empowerment, particularly among farmers. Advisory services were offered by 13.33 per cent of startups, indicating continued demand for expert guidance on agricultural practices, input use and business management. The findings were in conformity with the findings of Anonymous (2018a), Anand and Raj (2019) and Anonymous (2019b) [2, 4] who reported that most Agri-startups were providing farm automation and digitalized services.

Conclusion

This study set out to examine the profile of Agri-startups in Karnataka, with particular focus on their stage of development, sectoral presence, ownership forms, target groups, innovation practices, marketing strategies, incubation support, financial mechanisms, and enterprise activities. The research addressed the growing importance of Agri-startups as engines of innovation and transformation in Indian agriculture, while also identifying the structural and institutional factors shaping their growth.

The findings reveal that a significant proportion of Agri-startups have progressed into the scaling stage, suggesting a maturing ecosystem supported by policy interventions, incubator services, and expanding digital infrastructure. Startups are distributed across Agri-tech, Food-tech, and Sustainable agriculture, with strong representation in both urban and rural areas. Private limited companies dominate as the preferred ownership form, while farmers and consumers remain the primary target groups. Innovation is predominantly product-driven, complemented by process and service innovations in sector-specific contexts. Direct and online marketing emerged as the dominant strategies, reinforcing the dual importance of personal engagement and digital outreach.

Incubators were found to play a pivotal role, providing financial, mentorship, and training support, though advanced commercialization services and investor networks remain underutilized. The heavy reliance on incubators and self-financing points to persistent gaps in formal financial inclusion. Enterprise activities highlight a strong orientation toward processed and organic value-added products, while services are increasingly shaped by farm automation, training, and digitalization.

Taken together, the study underscores that Agri-startups are transitioning from a nascent to a more structured and growth-oriented phase, positioning themselves as key actors in reshaping Indian agriculture. The key takeaway is that while enabling policies, incubation, and digitalization have created a favourable ecosystem, greater emphasis must now be placed on expanding access to venture funding, strengthening commercialization pathways, and diversifying innovations beyond food and organic products. Addressing these areas will be critical for sustaining the momentum of Agri-startups and ensuring their transformative role in achieving agricultural modernization and rural development.

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