Agriculture and its Sustainability- Technology driven Agri-startups in Karnataka.

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***Abstract*—Agriculture remains the backbone of Karnataka's economy, with nearly 65 percent of the state's population dependent on farming for livelihood. However, traditional practices face growing challenges such as declining productivity, fragmented landholdings, climate variability, water scarcity, and volatile market access. Over the last decade, agritech startups have emerged as critical actors in transforming Karnataka's agricultural landscape by integrating technology, entrepreneurship, and sustainability into farming. This study reviews the contribution of agri-tech startups in sustainability of farming in Karnataka by studying the emergence of agri-tech startups in the past decade.**

***Index Terms*—Agri-tech startups, Sustainability, Future farming.**

I. INTRODUCTION

Agriculture remains the backbone of Karnataka's economy, with nearly 65 percent of the state's population dependent on farming for livelihood. However, traditional practices face growing challenges such as declining productivity, fragmented landholdings, climate variability, water scarcity, and volatile market access. Over the last decade, agritech startups have emerged as critical actors in transforming Karnataka's agricultural landscape by integrating technology, entrepreneurship, and sustainability into farming.

The growth of agritech startups in Karnataka has been strongly concentrated in Bengaluru, India's "startup capital," which hosts the largest share of agritech ventures in the country. These startups operate across diverse verticals, including precision farming, farm management software, supply chain digitization, market linkages, agri-fintech, and sustainable inputs. According to recent estimates, Karnataka accounts for over 350 agritech startups, with around 226 concentrated in Bengaluru alone. In addition, schemes such as Rashtriya Krishi Vikas Yojana (RKVY) and the Ministry of Agriculture's Innovation and Agri-Entrepreneurship Development Programme have supported more than 200 startups in Karnataka since 2019, particularly in the ideation and validation stages. This highlights the state's pivotal role in nurturing innovation ecosystems for agriculture.

The contribution of these startups extends beyond simple technological adoption. By offering IoT-enabled solutions, remote sensing, artificial intelligence, and blockchain-based supply chain platforms, agritech startups in Karnataka address inefficiencies in production and distribution. They provide farmers with real-time weather advisories, digital soil testing, precision input recommendations, and direct access to buyers, thereby enhancing income security and reducing dependency on intermediaries. Moreover, agritech ventures in Karnataka have been instrumental in fostering climate-resilient agriculture and promoting sustainability through organic farming solutions, waste-to-resource models, and renewable energy adoption.

Despite these advancements, several challenges constrain the scaling of agritech startups in Karnataka. Limited awareness among smallholder farmers, inadequate rural digital infrastructure, fragmented financing, and regulatory hurdles remain significant barriers. While funding into Indian agritech startups has increased exponentially since 2020, with nearly USD 3 billion flowing into the sector, the proportion of Karnataka-based ventures accessing later-stage funding remains relatively small. This indicates a gap between early-stage innovation and long-term sustainability. Additionally, while Bengaluru thrives as an innovation hub, districts outside the capital show limited penetration of agritech solutions, reflecting regional disparities within the state.

The research methodology includes the sources of secondary databases through government websites, research thesis.

II. OBJECTIVES

1. To assess the contribution of agri-tech startups in sustainability of future farming in Karnataka.
2. To review the emergence of agri-tech startups in Karnataka over the past decade.

III. REVIEW OF LITERATURE

1. Monteiro, A. et al. — *Precision Agriculture for Crop and Livestock Farming: A review* 2021provides excellent overview of precision agriculture technologies like sensors, IOT, drones and their impact and affect on efficiency and productivity of farming moving towards sustainability
2. Bahmutsky, S. — *A review of life cycle impacts and costs of precision 2024* a review paper with environmental life-cycle and environment tade-offs, farming tools and its impact on farming.
3. Rock, K. — *Agricultural startups' visions of a sustainable agri-food future* (2025) A study examining the sustainability gains and startup visions.
4. Roy, M. — *Transforming smart farming for sustainability through agri-tech* (2025). Review of agritech startups tackle climate risks, labour gaps, and supply chain resilience.
7. World Bank — *AgTech Innovation Challenge / Agri-tech related reports* (World Bank materials on digital age & startups provide Policy and program-level insights, including impact evaluations and design of ag-tech challenges — useful for policy recommendations and evidence on scale.
8. World Economic Forum — *How AI and other agritech can help ensure food security* (WEF explainer on agritech & adaptation). Frames agritech within climate adaptation and global food security, with accessible examples and projections.
9. FSG (report: *What's next for Indian agri-tech?*) — sector analysis and investment trends for India. Good for market trends, investment data, and the evolution from market-linkage startups to full-stack agritech firms.
10. RAWE / seminar report — *Agritech startups (India/Karnataka stats & ecosystem notes).* Local ecosystem stats (Karnataka concentration of startups/funding) — useful if you plan a regional case or contextual paragraph.
11. INC42 / industry roundup — *Profiles & examples of agritech startups in India (2025 list).* The paper provides up-to-date examples and short case summaries you can cite when naming representative startups or business models.
12. Reuters / news on India using space data for farming —practical case of scale & government policy shifts. Real-world example of a tech (satellite data) being used at scale with measurable farmer benefits — good for empirical illustration

Table-1: The table shows the total Agritech Startups in India (2025)

Rank	State	No of Agritech startups
1	Karnataka	350
2	Maharashtra	300
3	Tamil Nadu	200
4	Uttar Pradesh	180
5	Telangana	150
6	Delhi	100
7	Gujarat	90
8	Haryana	70
9	Rajasthan	65
10	Kerala	60
11	West Bengal	55
12	Punjab	50
13	Madhya pradesh	45
14	Bihar	40

15	Odisha	25
16	Assam	15
17	Jharkhand	12
18	Chhattisgarh	10
19	Uttarakhand	8
20	Himachal Pradesh	5
21	Chandigarh	5
22	Puducherry	4
23	Jammu and Kashmir	3
24	Goa	2

Source: India Data Map.

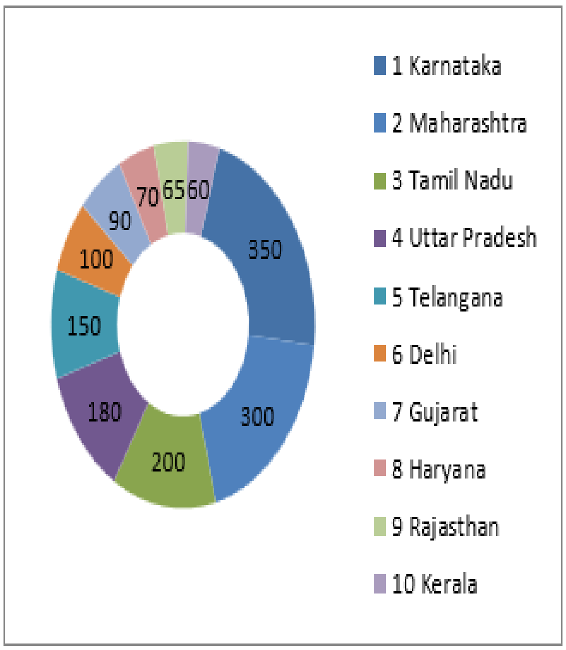

Figure-1: The above pie chart represents the data of total agri-tech startups in India for the year 2025. Karnataka has the highest number of startups with 350 registrations followed by Maharashtra with 300, Tamil Nadu with 180 startups.

Table-2: Table showing the total Agri-tech startups in Karnataka from past 10 years along with cumulative investment into Agri-tech startups in Karnataka

Year	Estimated Agri-tech startups in Karnataka	Cumulative investment into Karnataka agritech (₹ crore)
2015	30	40
2016	45	70
2017	80	250
2018	120	450
2019	160	700
2020	190	2000
2021	226	2400
2022	260	3000
2023	300	4200
2024	211	5500

Source: India Data Map.

Fiigure-2: The above graph represents the growth of total Agri- tech startups in Karnataka from the year 2015-2024. The graph shows the fastest growth of agri-tech startups in Karnataka.

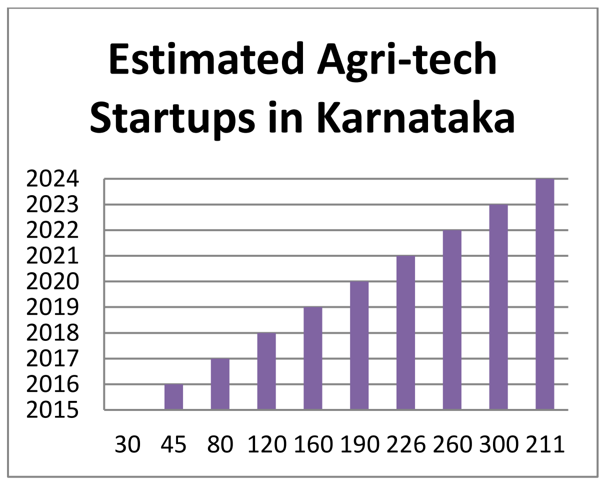

Table-3: Table showing highlights of Agritech startups in Karnataka.

Metric/ Indicator	Value/ Finding	What it suggests
Number of agritech startups in Karnataka (2020 approx.)	~ ₹ 2,000 crore investments over “three-four years” into Karnataka agritech startups.	Shows sizable funding inflows, implying interest &

		capacity for innovation and scaling in agritech in the state.
Adoption of modern agricultural technologies in Belagavi & Vijayapura districts	Contribution to total farm income: Protected cultivation: ~ 58.02% (Belagavi) / ~ 55.04% (Vijayapura); Integrated Farming Systems (IFS): ~ 47.17% / ~ 55.04% respectively; Micro-irrigation: ~ 55.47% / ~ 26.47%; Farm mechanization also significant.	Suggests that modern tech contributes materially to incomes among farmers in those districts. Useful proxy for farm productivity & income enhancement.
Adoption determinants in rural Bangalore	~226 agritech startups in Bangalore as of mid-2021; survey among 100 farmers in rural Bangalore (Byrasandra & Byadarahalli) finds factors like age, education level, economic status, and farmer category significantly influence adoption of agritech services.	Indicates that agritech startup presence is high in/around Bangalore; adoption is uneven and influenced by socio-economic variables. Shows contribution in terms of spread & awareness but also highlights who is left behind.
Input cost / resource savings from specific agritech startup technologies	Example: The startup *AgWise* in Karnataka offers AI-based drip irrigation. Claimed reductions: water use by up to 60%; fertilizer use by ~ 50%.	Shows direct environmental & economic contributions: lower input usage implies cost savings & reduced environmental impact — important for sustainability.
Karnataka agritech investment quantum	~ ₹ 2,000 crore over three-four years (as of 2020) into agritech startups in Karnataka.	Reflects strong investor confidence; indicates scale & potential capacity of agritech startups to contribute if supported.

IV. CONCLUSION

Karnataka is a hub for agritech innovation—home to the highest number of startups nationally (~350), with a strong urban concentration in Bengaluru (~226 in 2021).

The RKVY programme has played a crucial role: funding and support led to 211 Karnataka-based startups backed under this scheme by 2023–24.

Despite high numbers, only a small fraction of startups (11%) scale successfully; Karnataka accounts for the majority of those that do—a sign of concentrated growth and deeper ecosystem support.

The cumulative ₹2,000 crore in investments (2017–2020) underscores early-stage growth, though more recent funding data is needed to understand post-2020 trends.

Table-4: Table showing overall conclusion of Agritech startups in Karnataka.

Time Period / Program / Metric	Karnataka Figures	Notes / Context
2025 (Statewide)	~350 agritech startups	Largest in India (43%

		share)
2023–24 (RKVY Support)	211 startups supported (₹122.5 cr disbursed)	National total: 1,708 startups
Mid-2021 (Bengaluru only)	226 startups	Represents 32% of India's agritech firms
Scaling Stage (All-India)	16 startups (11 in Bengaluru)	Among 705 total agritech firms, only 78 scaled
Investment (2017–2020)	₹2,000 crore (in Karnataka)	Reflects early growth phase

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