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Agricultural startup ecosystem of Chhattisgarh: Growth and incubation challenges in agricultural innovation

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Abstract

The startup ecosystem in India has witnessed remarkable growth, particularly in the agricultural sector. In Chhattisgarh, agricultural startup incubation centers have played a critical role in driving this expansion. This paper explores the development, performance, and challenges of these incubation centers, focusing on their impact on the region's agri-startup ecosystem from 2016 to 2023. Through a mixed-methods approach combining quantitative data from government records and qualitative insights from heads of incubation centers, this study evaluates key performance metrics such as the number of startups incubated, funding received, and satisfaction with government support. Findings reveal that while the number of agricultural startups has grown significantly, challenges such as resistance to technology adoption, market access constraints, and limited financial resources persist. The study concludes with strategic recommendations to enhance the role of incubation centers in fostering innovation and sustainable growth within the agricultural sector of Chhattisgarh.

Keywords: Agricultural startups, incubation centers, entrepreneurship, Chhattisgarh, innovation, startup ecosystem

1. Introduction

The startup ecosystem in India has experienced tremendous growth over the past decade, with agricultural startups playing a crucial role in this expansion. In Chhattisgarh, the establishment of agricultural startup incubation centers has been pivotal in fostering innovation and entrepreneurship in the agricultural sector. This paper aims to analyze the evolution of these incubation centers, their performance, challenges, and overall impact on the region's startup ecosystem.

2. Review of Literature

The growth of agri-startups has led to substantial job creation and economic development in the region (Isher 2024). Startups are increasingly addressing food security and environmental sustainability, contributing to the Sustainable Development Goals (Kumar *et al.* 2024). Startups play a crucial role in entrepreneurship development in the agri-based sector. (Smolynets *et al.*, 2017) ^[5]. They Startups drives innovation, creates jobs, and enhances productivity by introducing new technologies and sustainable practices (Reyani *et al.*, 2018) ^[4]. They also foster collaboration among farmers, researchers, and investors, leading to a more resilient agricultural ecosystem (Vardhan *et al.* 2023). These initiatives not only improve food security but also contribute to economic growth in rural areas, empowering communities and promoting sustainable livelihoods (Vijayan & Shivkumar). Incubation centers are essential in supporting these startups by providing resources, mentorship, and access to funding, which can significantly increase their chances of success.

(Laila *et al.* 2019) ^[2]. Moreover, these centers often facilitate networking opportunities, allowing startups to connect with industry experts and potential partners, further enhancing their growth potential (Yadav *et al.*, 2022) ^[8]. A comprehensive strategy encompassing financial assistance, technological enhancement, market accessibility, capacity development, infrastructure improvement, regulatory simplification, and community engagement is necessary for promoting innovation and sustainable advancement within the agricultural sector (Tiwari & Gauraha, 2024) ^[6].

3. Methodology

This study employs a mixed-methods approach, combining quantitative and qualitative analyses. Data were sourced from the Startup India portal and government records spanning 2016 to 2023. The study evaluates the performance metrics of various incubation centers. Out of 21 incubation centers of Chhattisgarh, 5 incubation centers were selected for the study. A Likert scale analysis was conducted to assess satisfaction levels, challenges, and opportunities as perceived by the heads of agricultural startup incubation centers in Chhattisgarh.

4. Growth Trends in Agricultural Startups (2016-2023)

4.1 National Context

From 2016 to 2023, India witnessed a significant increase in the number of registered startups, with a notable focus on the agricultural sector. The establishment of incubation centers played a vital role in supporting these startups by providing resources, mentorship, and funding opportunities.

4.2 Chhattisgarh Focus

Chhattisgarh saw the establishment of several key incubation centers that specifically supported agricultural startups. The number of agricultural startups in the state grew from 0 in 2016 to 172 in 2023, largely due to the efforts of these incubation centers (Startup India, 2024).

5. Performance of Agricultural Startup Incubation Centers in Chhattisgarh

5.1 Key Incubation Centers

The performance of various agricultural startup incubation centers in Chhattisgarh has been instrumental in the growth of the startup ecosystem.

Table 1: Startup Registration in Chhattisgarh (2016-2023)

Year	Registered Startups in CG	Agricultural Startups in CG
2016	11	0
2017	44	6
2018	111	5
2019	152	31
2020	143	16
2021	158	24
2022	233	39
2023	359	51
Total	1211	172

Source: www.startupindia.gov.in

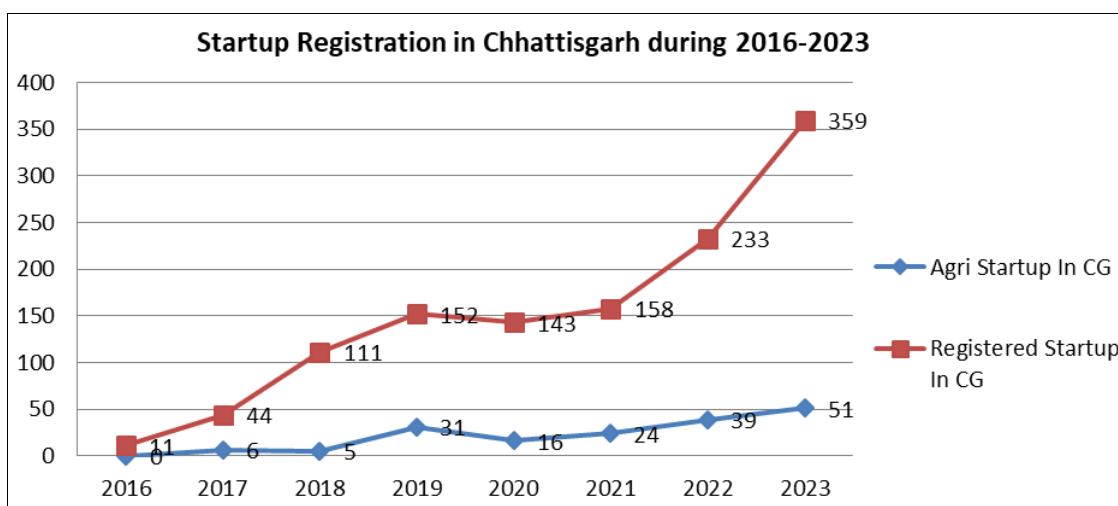


Fig 1: Startup Registration in Chhattisgarh (2016-2023)

Indira Gandhi Krishi Vishwavidyalaya RKVY RAFTAR Agri Business Incubator: Established in 2019, this center has supported 300 startups with a total funding of ₹10.84 crore, despite having only 2 employees. Its efficiency and impact highlight its crucial role in the ecosystem.

Other Incubation Centers: Other notable centers include the Rungta College Technology Business Incubator (RuBI) and Amity Innovation Incubator, each varying in startup support and funding received.

Table 2: Performance of Agricultural Startup Incubation Centers in Chhattisgarh (2016-2023)

Sr. No.	Incubation Center Name	Establishment Year	Number of Employees	Number of Startups Incubated	Funding Received By startups (₹ Cr)
1	Indira Gandhi Krishi Vishwavidyalaya RKVY RAFTAR Agri Business Incubator, Raipur	2019	2	300	10.84
2	Kalinga Incubation Foundation (KIF) Raipur	2023	1	4	0
3	Rungta College Technology Business Incubator (RuBI) Bhilai	2017	5	37	5
4	Amity Innovation Incubator Raipur	2017	3	8	0
5	Subhash Chandra Bose Biotechnology Incubation Centre Raipur	2021	7	16	0

6. Analysis of Incubation Center Heads' Perceptions regarding startup ecosystem of Chhattisgarh: To understand the perspectives of incubation center heads regarding the support provided to agricultural

startups, a pre-structured interview was conducted. This analysis captures their satisfaction with government support, perceived opportunities, challenges, and resource utilization within their centers.

Table 3: Satisfaction with Government Support and Agri-Startup Ecosystem in Chhattisgarh

Statement	Mean Score	Standard Deviation	Rank
I am optimistic about the growth prospects of agricultural startups in Chhattisgarh.	3.8	0.84	1
I feel that the geographical presence of our incubation center in Chhattisgarh is extensive.	3.4	1.14	2
I consider the scale of operations of our incubation center to be large.	3.4	1.14	3
From my perspective, the current state of the agri startup ecosystem in Chhattisgarh is excellent.	3.0	1.58	4
I am satisfied with the government's support for agricultural startups in Chhattisgarh.	2.6	1.67	5

The Table 3 indicates a moderate level of satisfaction with the government's support for agricultural startups in Chhattisgarh, with a mean score of 2.6, suggesting that there is room for improvement in this area. The perception of the current state of the agri-startup ecosystem is slightly better,

with a mean score of 3.0. Respondents rated the scale of operations and geographical presence of incubation centers as relatively large, both with a mean score of 3.4. The highest score, 3.8, reflects optimism about the growth prospects of agricultural startups in the state.

Table 4: Opportunities for Agricultural Startups as Perceived by Incubation Center Heads in Chhattisgarh

Statement	Mean Score	Standard Deviation	Rank
In my view, there are significant untapped opportunities for agricultural startups in Chhattisgarh.	4.6	0.55	1
There are niche markets that agricultural startups can explore in Chhattisgarh.	4.0	0.71	2
I feel that the market growth for agricultural startups in Chhattisgarh is very fast.	3.2	1.10	3
Consumer preferences in Chhattisgarh strongly favor locally produced agricultural products.	2.8	0.84	4
The market in Chhattisgarh is very receptive to innovative agricultural products and services.	2.8	0.84	5

The above Table 4 show that the most significant opportunity lies in the untapped markets for agricultural startups, with a high mean score of 4.6. Niche markets also present considerable potential, as indicated by a mean score of 4.0. However, the market's receptiveness to innovative

agricultural products and services, as well as consumer preference for locally produced goods, received lower mean scores of 2.8, suggesting a need for further market development.

Table 5: Challenges Faced by Agricultural Startups as Perceived by Incubation Center Heads in Chhattisgarh

Statement	Mean Score	Standard Deviation	Rank
I am convinced that there is significant resistance to technology adoption among farmers.	4.2	0.45	1
I feel that market access constraints are a significant challenge for agricultural startups.	3.8	0.45	2
Competition from traditional agricultural practices is highly challenging for startups.	3.4	1.14	3
Financial resources are adequate for agricultural startups in Chhattisgarh.	2.8	0.45	4
I feel that the availability of a skilled workforce is abundant for agricultural startups.	2.8	0.84	5

The results highlight that resistance to technology adoption among farmers is the most significant challenge, with a mean score of 4.2. Market access constraints are also a notable challenge, with a score of 3.8. Competition from

traditional agricultural practices poses moderate difficulties, as reflected by a score of 3.4. The availability of a skilled workforce and financial resources were seen as less challenging, both with a mean score of 2.8.

Table 6: Resource Utilization Faced by Agricultural Startups as Perceived by Incubation Center Heads in Chhattisgarh

Statement	Mean Score	Standard Deviation	Rank
I am convinced that our startup efficiently utilizes its financial resources.	3.2	0.84	1
From my perspective, the financial management practices in our startup are excellent.	3.2	1.10	2
In my view, the allocation of funds in our startup is highly efficient.	3.0	0.89	3
I am convinced that there are sufficient funding opportunities for agricultural startups.	3.0	1.22	4
The financial resources available to agricultural startups in Chhattisgarh are highly adequate.	2.8	0.45	5

The table 6 suggests that financial resources are perceived as only moderately adequate, with a mean score of 2.8. Funding opportunities and the efficiency of fund allocation scored slightly higher at 3.0, while financial management

practices and the efficient utilization of resources also received moderate scores of 3.2. These findings indicate that while there is some satisfaction with resource utilization, there is significant room for improvement.

Table 7: Future Strategies required by Agricultural Startups as Perceived by Incubation Center Heads in Chhattisgarh

Statement	Mean Score	Standard Deviation	Rank
Agricultural startups of Chhattisgarh's growth strategy are well-defined and achievable.	3.4	0.55	1
I am convinced that there is a strong plan for diversification into new products/services.	3.4	0.55	2
It seems that the expansion plans of our startup are very ambitious.	3.2	1.10	3
In my view, our startup is well-prepared for future growth.	3.0	1.58	4
From my perspective, our startup has extensive plans for geographic expansion in Chhattisgarh.	2.8	0.45	5

The Table 7 shows that agricultural startups have moderate plans for geographic expansion, with a mean score of 2.8, and are reasonably well-prepared for future growth, scoring 3.0. The expansion plans are perceived as ambitious, with a score of 3.2, and there is a moderate level of confidence in the diversification of products and services (3.4). The overall growth strategy is seen as well-defined and achievable, also with a mean score of 3.4. These results suggest a cautious optimism about the future strategies of agricultural startups in Chhattisgarh.

7. Strategic Recommendations

To enhance the impact of agricultural startup incubation centers in Chhattisgarh, the following strategies are recommended:

- **Enhancing Government Support:** Tailored interventions should be implemented to address specific concerns of incubation centres and agricultural startups.
- **Improving Market Receptivity:** Initiatives should be launched to improve market readiness and the adoption of innovative agricultural products.
- **Fostering Technology Adoption:** Education and incentives should be provided to overcome resistance to technology adoption among farmers.
- **Resource Allocation and Management:** Financial management practices should be standardized to ensure the efficient use of resources across incubation centers.

8. Conclusion

The agricultural startup ecosystem in Chhattisgarh has shown significant growth from 2016 to 2023, largely due to the efforts of various incubation centers. However, challenges such as technology adoption and market access constraints need to be addressed to fully realize the potential of agricultural startups. By focusing on strategic planning and improving support mechanisms, the region can unlock substantial opportunities for growth and innovation.

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