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Challenges hindering stakeholders in Telangana's agri-startup ecosystem: A constraint analysis

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Abstract

The escalating global population and increasingly unpredictable weather conditions underscore a critical need for advanced agri-tech startups to ensure long-term food and nutritional security. Consequently, it is imperative to systematically diagnose and resolve the operational bottlenecks experienced by diverse stakeholders within this ecosystem. Since, Telangana promotes agri-tech startups through triple helix model, this state was purposively selected for the study. Further, 64 agri-tech startups, 12 incubators and accelerators, 10 mentors and experts, 8 funding representatives were selected for the study. The respondents were asked to provide their response based on the constraints experienced by them using Henry Garret Ranking technique. The findings revealed that Inadequate incentives and subsidies provided by the government (financial constraint), difficulty in technology commercialization (technological constraint), low level of knowledge about marketing strategies (marketing constraint), complicated registration and legal procedures (establishment related constraint) and difficulty in attracting investors or funds (personal constraint) were the topmost constraints experienced by the agri-tech startup entrepreneurs. While, constraints experienced by incubators and accelerators was limited availability of funds to support startups at ideation and validation stage; mentors and experts was weak business planning and poor documentation by startup entrepreneurs; investors and funding agency representatives was high risk involved in investing in early stage agri-startups. Eventually, stakeholders of agri-startup ecosystem suggested that using standard quality product or service to sustain in the market was the highly recommended strategy to strengthen the agri-tech ventures.

Keywords: Constraints, suggestions, agri-tech startups, agri-startup ecosystem, Telangana

Introduction

A startup is defined as a newly established enterprise, typically in its nascent operational stages, engineered to develop unique, innovative products or services aimed at market disruption and rapid scalability (Startup Indian, 2021) [23]. In the context of India, agriculture serves as the socio-economic bedrock of the nation. It not only contributes approximately 18% to the national Gross Domestic Product (GDP) but also functions as a primary employment generator, accounting for 12.91% of the workforce within the organized manufacturing sector (MoFPI, 2025) [12]. Driven by an ongoing Agri-Tech revolution, the sector is undergoing a profound structural paradigm shift, transforming from traditional subsistence farming into a high-value, market-led business ecosystem. This technological evolution is underscored by the recognition of over 6,000 agricultural startups and 2,800 specialized Agri-Tech ventures by the Department for Promotion of Industry and Internal Trade (DPIIT) (Startup India, 2023) [24].

Globally, India accounts for roughly 7.5% of total agricultural production, positioning it as a critical pillar for global food and nutritional security (FAO, 2023) [6]. Within this matrix, agricultural startups play a pivotal role in mitigating hunger and strengthening food security networks. Through integration with the food processing industry, these ventures optimize value addition, process agricultural surpluses, extend shelf life, and stabilize supply chains to ensure food availability across diverse regions at affordable prices. Beyond processing, agri-based startups have generated substantial economic opportunities, yielding approximately 33,400 direct and 70,700 indirect jobs (Anand *et al.*, 2025) [1], while overall recognized startup frameworks have contributed to the creation of over 12 lakh jobs nationally (Ministry of Finance, 2024) [11]. Furthermore, these enterprises enhance the market bargaining power of smallholder farmers and stimulate downstream economic activity across the secondary and tertiary sectors. At the sub-national level, Telangana has emerged as a pioneer

in fostering entrepreneurial growth. The state launched its comprehensive 'Innovation Policy' in 2016, designed to leverage its favorable demographic dividend and pool of skilled technology and research professionals (Startup Telangana, 2016). The policy establishes a conducive environment for institutional innovation, risk-taking, and statewide entrepreneurship. Utilizing a highly unique structural model, Telangana has cultivated a robust startup ecosystem to transition toward an innovation-driven economy. Consequently, it is recognized as one of India's top-performing startup states, housing 526 dedicated agri-startups (Startup India, 2021) ^[23]. Several studies identified the constraints experienced by the stakeholders of the agri-startups, such as inadequate training (Sindhu, 2015; Bhaskar, 2018) ^[20, 3], lack of efficient managers (Kumar, 2016) ^[8], non-availability of input materials (Raju, 2017) ^[17], shortage of labor (Shivacharan *et al.*, 2017) ^[19], lack of training about scientific production technology (Pal, 2018) ^[14], less support by Government (Manohar, 2019; Kumar, 2022) ^[4, 9], lack of funds (Swathi, 2019; Bhooshan and Kumar, 2020; Divya, 2023; Devi, 2023) ^[4, 5, 1], non-availability of information regarding technical guidelines (Pal, 2018; Jatav *et al.*, 2023; Priyanka and Gurupandi, 2026) ^[14, 7, 16], inadequate incentives provided by Government (Aneesha, 2021; Reddy, 2023) ^[2, 18], inefficient supply chain (Srishailam *et al.*, 2022; Venu *et al.*, 2025) ^[22, 25], limited access to technology (Nair and Raj, 2024) ^[13], inappropriate marketing (Singh *et al.*, 2025) ^[21].

Statement of the Problem

Agri-startups offer pertinent, original, and scalable solutions to deeply entrenched challenges across the entire agricultural value chain. By bridging critical operational gaps among smallholder farmers, input dealers, wholesalers, retailers, and end consumers, these ventures establish reliable market linkages and deliver high-quality inputs in a timely manner. However, despite their transformative potential, these entrepreneurs navigate a highly volatile and capital-intensive ecosystem (MANAGE, 2021) ^[10]. To devise targeted strategies that can fortify this landscape, it is imperative to empirically investigate and comprehend the multifaceted constraints experienced by the diverse stakeholders within the agri-startup ecosystem.

Methodology

The present study was conducted in Telangana state of India. It was purposively selected for the present study due to its success in agri startup, which is mainly due to their unique 'Triple Helix' model involving Government, Academic and Industry. While, to examine the constraints experienced by the stakeholders of agri-startup ecosystem, 50 agri-startup entrepreneurs, 12 incubators and accelerators, 10 mentors and experts and 8 funding agency representatives were selected for the present study. Various constraints experienced by the stakeholders were identified and studied as financial, technological, marketing, establishment related and personal constraints. The stakeholders were requested to assign rank to the constraints based on their experience and analysis was carried out as per Henry Garret Ranking technique.

In Garret ranking technique, the rank given by the entrepreneurs were converted into percent position by using the formula

$$\text{Percent position} = 100 \times \frac{(R_{ij} - 0.50)}{N_j}$$

Where

R_{ij}= Ranking given to the ith attribute by the jth individual

N_j = Number of attributes ranked by the jth individual

Then for the calculated value using the Garrett ranking conversion table, the Garrett score was found. The Garrett score was multiplied with the ranks given by the entrepreneurs for each factor. The average of each factor was taken and ranking was done. By employing the above methodology, the major findings were given as follows.

Results and Discussion

Constraints faced by incubators and accelerators

As incubators and accelerators act as the central engine for the entire agricultural startup ecosystem, constraints faced by them creates a negative effect on the ecosystem. In this regard, constraints experienced by them were identified and ranks were assigned by incubators and accelerators. The major findings were presented in Table1.

Table 1: Ranking of constraints experienced by incubators and accelerators (n=12)

S. No.	Constraints faced by incubators and accelerators	Garrett Mean Score	Rank
1	Limited availability of funds to support startups at ideation and validation stages	68.08	I
2	Lack of market-ready prototypes among early-stage agri-startups	65.83	II
3	Inadequate laboratory, field-testing and product validation facilities	63.50	III
4	Difficulty in connecting agri-startups with investors and financial institutions	58.17	IV
5	Difficulty in identifying commercially viable agri-startup ideas	56.67	V
6	Weak linkage between agri-startups, research institutions and industry partners	42.92	VI
7	Low readiness of agri-startups for scaling and market expansion	28.83	VII
8	Limited participation of farmers in pilot testing and technology validation	28.58	VIII
9	Difficulty in providing sector-specific mentoring and technical support	22.92	IX
10	Delay in regulatory approvals, certification, patenting and licensing procedures	12.50	X

The first and foremost constraint experienced by the incubators and accelerators was limited availability of funds to support startups at ideation and validation stages (68.08). Consequently, lack of market ready prototypes among early stage agri-startups (65.83), inadequate laboratory, field testing and product validation facilities (63.50), difficulty in connecting agri-startups with investors and financial institutions (58.17), difficulty in identifying commercially viable agri-startup ideas (56.67), weak linkage between agri-startups, research institutions and industry partners (42.92), low readiness of agri-startups for scaling and market expansion (28.83), limited participation of farmers in pilot testing and technology validation (28.58), difficulty in providing sector specific mentoring and technical support (22.92) and delay in regulatory approvals, certification, patenting and licensing procedures (12.50) were the 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th and 10th important constraints experienced by the incubators and accelerators respectively. These findings highlight the severe institutional gap in the

agri-startup ecosystem. Incubators can easily find funding for mature, revenue-generating startups, but early-stage ideation capital is incredibly scarce. This forces them to operate without the financial runway required to nurture raw agricultural innovations. Meanwhile, lack of funds and state-of-the-art testing infrastructure among the incubators, early-stage agri-startups are unable to scientifically calibrate or validate their innovations, resulting in a deficit of market-ready prototypes. They struggle to bridge the gap between technical founders and risk averse institutional investors due to long gestation period of agri-startups.

Constraints faced by the mentors and experts

As survival of agri-startup depends on specialized mentorship, multi-tier supply chains, understanding the bottlenecks helps to transfer institutional knowledge and market realities. In this regard, constraints experienced by mentor and experts was studied and presented in Table.2.

Table 2: Ranking of constraints faced by the mentors and experts (n=10)

S. No.	Constraints faced by mentors/experts	Garrett Mean Score	Rank
1	Weak business planning and poor documentation by startup entrepreneurs	48.90	I
2	Low receptiveness of some entrepreneurs towards mentor suggestions	47.33	II
3	Lack of reliable data on startup progress, market performance and business outcomes	44.23	III
4	Difficulty in understanding the diverse technical needs of different agri-startup sectors	41.55	IV
5	Limited time availability for continuous mentoring and follow-up support	40.50	V
6	Inadequate coordination among mentors, incubators, investors and government agencies	30.56	VI
7	Difficulty in helping startups access markets, customers and industry networks	24.20	VII

Table.2. reveals the constraints experienced by the mentor and experts. Weak business planning and poor documentation by startup entrepreneurs (48.90) was the first and foremost problem experienced by the mentor and expert. Meanwhile, low receptiveness of some entrepreneurs towards mentor suggestions (47.33), lack of reliable data on startup progress, market performance and business outcomes (44.23), difficulty in understanding the diverse technical needs of different agri-startup sectors (41.55), limited time availability for continuous mentoring and follow-up support (40.50), inadequate co-ordination among mentors, incubators, investors and government agencies (30.56) and difficulty in helping startups access markets, customers and industry networks (24.20) were 2nd, 3rd, 4th, 5th, 6th and 7th important constraints experienced by the mentors and experts respectively.

Most agri-tech founders come from core agronomic, engineering, or technical backgrounds rather than corporate environments. While their technical solutions are innovative, their inability to translate ideas into rigorous business models,

financial sheets, and pitch decks paralyzes the mentorship process from the outset. Technical founders frequently exhibit cognitive inertia, prioritizing product mechanics over essential market pivot suggestions. This friction is compounded by a complete lack of real-time data tracking systems for startup progress, making it impossible for experts to deliver data-driven, strategic advice. Mentors feel perfectly capable of opening doors and introducing startups to large distribution chains; however, their efforts are stalled because the startups are internally unequipped, uncoachable, or lacks the professional documentation required to walk through those doors.

Constraints experienced by investors/ funding agency representatives

Examining the constraints experienced by the investors helps to understand the reason of startup failure or the exit of startup in agricultural ecosystem. In this regard, the rank assigned by investors and funding agency representatives were studied and presented in Table.3

Table 3: Ranking of constraints experienced by investors/ funding agency representatives (n=8)

S. No.	Constraints faced by investors/funding agency representatives	Garrett Mean Score	Rank
1	High risk involved in investing in early-stage agri-startups	70.13	I
2	Long gestation period and delayed return on investment	62.50	II
3	Lack of scalable and revenue-generating business models	59.25	III
4	Inadequate financial records and business documentation maintained by startups	55.88	IV
5	Limited market penetration and uncertain customer adoption of startup products/services	46.50	V
6	Difficulty in assessing the technical and commercial feasibility of agri-startup ideas	37.00	VI
7	Limited availability of investment-ready agri-startups	34.88	VII
8	Low exit opportunities for investors in agri-startup ventures	32.88	VIII

Data in Table.3. indicates the various constraints experienced by the investors and funding agency representatives. The most serious constraint encountered by the investors was high risk involved in investing early-stage agri-startups (70.13). Similarly, long gestation period and delayed return on investment (62.50), lack of scalable and revenue generating business models (59.25), inadequate financial records and business documentation maintained by startups (55.88), limited market penetration and uncertain customers adoption of startup products / services (46.50), difficulty in assessing the technical and commercial feasibility of agri-startups ideas (37.00), limited availability of investment ready agri-startups (34.88) and low exit opportunities for investors in agri-startup ventures (32.88) were the other important constraints experienced by the investors and funding agency representatives respectively.

The above findings reflects the volatility of the agriculture since they are bound by rigid biological timelines, seasonal crop cycles and unpredictable climate patterns. Though investors are willing to take calculated risk, but they cannot invest blind capital. They are fully capable of evaluating tech feasibility and are satisfied with current exit options, they pull back early stage startups that has high risk, long delay horizons and structural operational opacity.

Conclusion

As agricultural enterprises are intrinsically bound to seasonal production cycles and unpredictable weather conditions, coupled with a growing consumer awareness toward environmental sustainability, there is an imperative need to accelerate the development of food processing industries and agri-tech startups. Ultimately, the empirical findings demonstrate that agri-startups do not fail in isolation; rather, they are restricted by an uncoordinated ecosystem where technical innovation is severely decoupled from financial governance, regulatory ease, and strategic market execution. To transition the agricultural landscape from traditional subsistence farming into a resilient, innovation-driven economy, the state of Telangana can implement targeted interventions-such as introducing blended finance alongside patient capital instruments, building localized public-private testing and validation laboratories, establishing a single-window regulatory clearance platform, and facilitating product quality governance paired with digital market linkages-to fundamentally strengthen agri-tech startups within their broader operational ecosystem.

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Conflict of Interest

This is to declare that there is “No conflict of interest” among researchers.

References

1. Anand R, Kumar S, Prasad J. Start-ups in Indian agriculture and their participation in global value chains: effects on income and employment-an economic analysis. *International Journal of Agronomy and Agricultural Studies*. 2025;8(10):185-194.
2. Aneesha K. Agri-startups in Andhra Pradesh state: an exploratory study [MSc thesis]. Karnal: ICAR-National Dairy Research Institute; 2021.
3. Bhaskar D. A study on agri-preneurship development in Begusarai district of Bihar [doctoral dissertation]. Pusa (Samastipur): Dr Rajendra Prasad Central Agricultural University; 2018.
4. Bhooshan N, Kumar A. How did agri-start-ups fare during the COVID-19 pandemic? *Economic and Political Weekly*. 2020;55(50). <https://www.epw.in/journal/2020/50/commentary/how-did-agri-start-ups-fare-during-covid-19.html>
5. Divya B. Entrepreneurial ecosystem analysis of agri-startups in Telangana state [dissertation]. 2023.
6. Food and Agriculture Organization. World food and agriculture: statistical yearbook 2023. Rome: Food and Agriculture Organization of the United Nations; 2023.
7. Jatav DK, Gupta S, Jatav H. Awareness about agri-enterprise establishment by rural youth for enhancing income. *Gujarat Journal of Extension Education*. 2023;35(1):64-70.
8. Kumar T. Factors affecting development of agri entrepreneurship in Bhagalpur district of Bihar [doctoral dissertation]. Sabour: Department of Extension Education, Bihar Agricultural University; 2016.
9. Kumar V. Agri-startups in National Capital Region [doctoral dissertation]. Karnal: National Dairy Research Institute; 2022.
10. MANAGE. Agritech startups: the ray of hope in Indian agriculture. MANAGE Discussion Paper Series. Hyderabad: National Institute of Agricultural Extension Management, Ministry of Agriculture and Farmers Welfare, Government of India; 2021.
11. Ministry of Finance. The Indian economy: a review. New Delhi: Department of Economic Affairs, Government of India; 2024.
12. Ministry of Food Processing Industries. Annual report 2024-25: economic contribution and employment shares in the organized food and agricultural processing sector. New Delhi: Government of India; 2025.
13. Nair NB, Raj S. Nurturing agri startups to transform agricultural extension for sustainable agriculture. In: *Proceedings of the 1st International Conference on Emerging Innovations for Sustainable Agriculture*. 2024. p. 209.
14. Pal A. A study on entrepreneurial behaviour of Safed Musli growers in Tikamgarh district (MP) [master's dissertation]. Jabalpur: Jawaharlal Nehru Krishi Vishwa Vidyalaya; 2018.
15. Press Information Bureau. A decade of Startup India: scaling innovation, shaping India's growth story. New Delhi: Government of India; 2026. Press Information Bureau release
16. Priyanka K, Gurupandi M. Challenges and determinants of growth in agri-startups in Tamil Nadu. *Humanities and Social Sciences Communications*. 2026. doi:10.1057/s41599-025-06303-8.
17. Raju Parashuram N. Entrepreneurial behaviour of agripreneurs of KAU technology [doctoral dissertation]. Vellanikkara, Kerala: Department of Agricultural Extension, College of Horticulture; 2017.

18. Reddy GS, Subash S, Pavithra V, Jeevapriya A, Gurusri B, Reddy SMK. Agri-startups in Telangana State: profile characteristics of agri-startup entrepreneurs. *International Journal of Statistics and Applied Mathematics*. 2023;8(6):1214-1221.
19. Shivacharan G, Rani VS, Vasantha R. Rural young agri entrepreneurs: problems, suggestions and strategy for successful running of their enterprise. *International Journal of Current Microbiology and Applied Sciences*. 2017;6(11):259-264.
20. Sindhu K. A study on entrepreneurial behaviour of agripreneurs in Visakhapatnam district of Andhra Pradesh. Guntur: Acharya N G Ranga Agricultural University; 2015.
21. Singh AK, Jyoti B, Ashraf SN. A theoretical review for assessing the determinants and challenges of agri-startups with reference to appropriate technology in India. In: *Navigating strategic partnerships for sustainable startup growth*. 2025. p. 159-190.
22. Srishailam B, Sailaja V, Nikhitha A, Kiran PK. Promoting start-ups in agriculture: an innovative approach for transforming agriculture to agri-business. *Vigyan Varta*. 2022;3(4):73-81.
23. Startup India. Startup definitions and eligibility criteria under the Startup India initiative. New Delhi: Department for Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, Government of India; 2021.
24. Startup India. Innovators for agriculture and animal husbandry. New Delhi: Department for Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, Government of India; 2023. Startup India
25. Venu BN, Reddy V, Ashif S, Babu S. Start-ups in Indian agriculture and their participation in global value chains: effects on income and employment: an economic analysis. 2025.