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Challenges hindering the growth of agri-startups in Telangana: 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-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.

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) ^[6, 8], 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, 64 agri-startup entrepreneurs 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 experienced by the agri-startup entrepreneurs

The constraints experienced by the agri-startup entrepreneurs under five dimensions such as financial, personal, physical, technological and establishment related constraints were studied and presented as follows.

Financial constraints

Financial constraints helps to identify financial pressures experienced by the startups. The various financial constraints experienced by the agri-startup entrepreneurs were presented in Table.1

Table 1: Ranking of financial constraints experienced by the agri-startup entrepreneurs (n=64)

S. No.	Financial constraints	Garrett Mean Score	Rank
1	Inadequate incentives and subsidies provided by the government	72.63	I
2	Difficulty in obtaining collateral-free credit or seed funding	59.25	II
3	Inadequate financial support from investors	55.75	III
4	Insufficient working capital for regular business operations	50.88	IV
5	Delay in sanctioning and release of loans/grants	50.75	V
6	High rate of interest on loans	49.88	VI
7	High tax burden and financial compliance costs	31.00	VII
8	Difficulty in maintaining product/service quality at low cost	28.88	VIII

From Table.1, it could be understood that inadequate incentives and subsidies provided by the Government was the first and foremost financial constraint experienced by the agri-startup entrepreneurs with a Garret score of 72.63. Subsequently, it was observed that difficulty in obtaining collateral free credit or seed funding (59.25), inadequate financial support from investors (55.75), insufficient working capital for regular business operations (50.88), delay in sanctioning and release of loans /

grants (50.75), high rate of interest on loans (49.88), high tax burden and financial compliance costs (31.00%) and difficulty in maintaining product / service quality at low cost (28.88) were the 2nd, 3rd, 4th, 5th, 6th, 7th and 8th important financial constraints experienced by the agri-startup entrepreneurs respectively.

It is a well-known fact that, Government programmes and subsidies have complex application protocols, bureaucratic inertia and late disbursement of subsidies indicates the

seriousness of the constraint that ‘inadequate incentives and subsidies provided by the Government’ and ‘delay in sanctioning and release of loans/grants. While, strict rules and regulations imposed by the commercial banks due to high agricultural risk profiles justifies the constraints in obtaining collateral free credit. Eventually, long gestation period and seasonal production cycle of the sector impose threats and justifies the financial constraints experienced by the startup entrepreneurs.

Table 2: Ranking of technological constraints experienced by the agri-startup entrepreneurs

S. No.	Technological constraints	Garrett Mean Score	Rank
1	Difficulty in technology commercialization	60.42	I
2	High cost of technologies, machinery and equipment	58.45	II
3	Inadequate access to latest technologies	55.25	III
4	Lack of testing facilities for product validation and standardization	50.69	IV
5	Lack of technical know-how among entrepreneurs	45.81	V
6	Inadequate consultancy and technical mentoring services	43.36	VI
7	Difficulty in updating and upgrading technology	32.05	VII

The first and foremost technological constraint experienced by the agri-startup entrepreneurs (Table.2.) indicates that difficulty in technology commercialization (60.42) followed by high cost of technologies, machinery and equipment (58.45), inadequate access to latest technologies (55.25), lack of testing facilities for product validation and configuration (50.69), lack of technical know-how among entrepreneurs (45.81), inadequate consultancy and technical mentoring services (43.36) and difficulty in updating and upgrading technology (32.05) were the other important technological constraints experienced by the agri-startup entrepreneurs.

The empirical findings emphasize the critical systemic gap where high-potential research innovations struggle to scale into market-viable products. This commercialization bottleneck is closely linked with the high cost of advanced technologies,

Technological constraints

Since technological constraints emphasizes the applications of agri-startup rather than theoretical aspects, understanding technological constraints helps to prevent high technology abandonment rate, promote infrastructural and operational realities. In this regard, the technological constraints experienced by the agri-startup entrepreneurs were studied and presented in Table 2.

machinery, and equipment and inadequate access to the latest technological innovations. This problem is further compounded by a severe deficit in the supporting institutional framework, highlighted by the lack of testing facilities for product validation and configuration. Without localized incubators or state-backed testing laboratories, early-stage ventures struggle to scientifically prove and calibrate their prototypes, severely delaying customer acquisition and market entry.

Marketing constraints

Understanding marketing constraints helps identify the specific barriers experienced by entrepreneurs in reaching their end-users. Consequently, the marketing constraints experienced by them was studied and presented in Table.3.

Table 3: Ranking of marketing constraints experienced by the agri-startup entrepreneurs (n=64)

S. No.	Marketing constraints	Garrett Mean Score	Rank
1	Low level of knowledge about marketing strategies	65.75	I
2	Lack of branding, promotion and market linkage support	62.11	II
3	Difficulty in identifying and reaching target customers	61.64	III
4	Lack of market intelligence and reliable market information	55.50	IV
5	Competition from established companies and local market players	47.00	V
6	Difficulty in customer acquisition and retention	42.58	VI
7	Non-remunerative price for the product/service offered	34.11	VII
8	Low customer trust in new brands and startup products	30.31	VIII

Among the marketing constraints, low level of knowledge about marketing strategies (65.75) was the most severe constraint experienced by the entrepreneurs followed by lack of branding, promotion and market linkage support (62.11), difficulty in identifying and reaching target customers (61.64), lack of market intelligence and reliable market information (55.50), competition from established companies and local market players (47.00), difficulty in customer acquisition and retention (42.58), non-remunerative price for the product / service offered (34.11) and low customer trust in new brands and startup products (30.31) were the 2nd, 3rd, 4th, 5th, 6th, 7th and 8th important constraints experienced by the agri-startup entrepreneurs respectively.

By examining the marketing constraints, it was revealed that founders excel at technical innovation, they lack formal training in commercial scaling and go-to-market design indicates the low

level of knowledge about marketing strategies. In addition, it was observed that lack of real-time market intelligence and reliable information databases forces ventures to operate blindly across highly fragmented, unpredictable rural distribution networks. Eventually, the low prioritization of non-remunerative pricing and initial low consumer trust underscores that target farmers and end-consumers are willing to adopt new startup offerings, provided the entrepreneur possesses the strategic capacity to navigate the supply chain and reach them

Establishment related constraints

Examining establishment-related constraints provides critical insights into the foundational, institutional, regulatory, and licensing bottlenecks encountered by early-stage agri-startups. To evaluate these dynamics, the empirical data was systematically analysed and is presented in Table 4.

Table 4: Ranking of establishment related constraints experienced by the agri-startup entrepreneurs (n=64)

S. No.	Establishment-related constraints	Garrett Mean Score	Rank
1	Complicated registration and legal procedures	62.25	I
2	Difficulty in obtaining licenses, certifications and approvals	61.25	II
3	Bureaucratic regulations and procedural delays	56.00	III
4	Lack of infrastructure facilities such as workspace, laboratories and field-testing facilities	45.50	IV
5	Difficulty in developing prototype or minimum viable product	38.63	V
6	Inadequate research and development support	34.38	VI

The findings in Table 4. reveals the establishment related constraints experienced by the agri-startup entrepreneurs. Complicated registration and legal procedures (62.25) was the topmost constraint experienced by the agri-startup entrepreneurs. Further, difficulty in obtaining licenses, certifications and approvals (61.25), bureaucratic regulations and procedural delays (56.00), lack of infrastructure facilities such as workspace, laboratories and field-testing facilities (45.50), difficulty in developing prototype or minimum viable product (38.63) and inadequate research and development support (34.38) were the 2nd, 3rd, 4th, 5th, 6th important establishment related constraints experienced by the agri-startup entrepreneurs respectively.

The empirical data reveals that early-stage founders are immediately met with formidable institutional hurdles.

Institutional red tape operates as the gatekeeper to agricultural entrepreneurship; the regulatory friction generated by multi-tiered state approvals and fragmented department mandates effectively exhausts a startup's limited seed capital well before commercial launch; which explains the constraints in complicated registration, difficulty in obtaining license and procedural delays.

Personal constraints

Studying personal constraints helps to identify the psychological, social and capability related problems experienced by the agri-startup entrepreneurs that influences their strategic decision making and business survival. In this regard, personal constraints of the agri-startup entrepreneurs were studied and presented in Table.5.

Table 5: Ranking of personal constraints experienced by the agri-startup entrepreneurs (n=64)

S. No.	Personal constraints	Garrett Mean Score	Rank
1	Difficulty in attracting investors or funds	60.75	I
2	Lack of entrepreneurial education and training	59.38	II
3	Low level of innovation capability	49.41	III
4	Lack of risk-bearing ability among entrepreneurs	43.94	IV
5	Difficulty in managing and retaining employees	42.41	V
6	Difficulty in balancing startup responsibilities with personal and family responsibilities	42.13	VI

The findings in Table.5. reveals the personal constraints experienced by the agri-startup entrepreneurs. Difficulty in attracting investors or funds was the most serious constraint experienced by the agri-startup entrepreneurs (60.75). Consequently, lack of entrepreneurial education and training (59.38), low level of innovation capacity (49.41), lack of risk bearing ability among entrepreneurs (43.94), difficulty in managing and retaining employees (42.41) and difficulty in balancing startup responsibilities with personal and family responsibility (42.13) were the other important personal constraints experienced by the agri-startup entrepreneurs.

It could be understood that personal constraints among agri-startup entrepreneurs are dominated by perceived fund-raising vulnerabilities and human capital deficits rather than family friction or team dynamics. Since agriculture is a high-risk, weather-dependent, and long- gestation sector, entrepreneurs experience heightened anxiety regarding their personal capacity to secure capital from traditionally risk-averse investment networks. In addition, founders often possess strong technical agronomic knowledge, they suffer from a self-perceived deficit in business negotiation, pitch-deck creation, and strategic management skills. This educational gap naturally suppresses their confidence, leading to a moderately high concern over low innovation capacity and a limited risk-bearing ability due to the fear of compounding financial liability in an unpredictable market.

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.

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