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Critical Factors Hindering the Millet Entrepreneurial Sector: Strategic Interventions for Enterprise Development

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HIGHLIGHTS

- Inadequate millet processing facilities and insufficient farmer trainings were identified as major barriers, restricting value addition and profitability.
- Low price realization and limited access to credit constrained technology adoption and enterprise expansion due to a weak value chain
- Study highlighted tool-bank models and targeted subsidies as effective measures to reduce capital constraints and improve enterprise viability
- Experts prioritised machinery subsidies, strengthened buyer linkages, and recognition of resilient entrepreneurs as the most impactful strategies.

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Keywords: Entrepreneurial climate, Millet enterprises, Millet entrepreneurs, Constraints, Strategies.

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ABSTRACT

The study was conducted to develop strategies in the context of the entrepreneurial climate of the millet-based enterprises on the basis of identified constraints faced by millet entrepreneurs and in the state of Telangana. The data were collected using a structured interview schedule from 35 millet entrepreneurs, 150 millet growers and 30 research scientists comprising 215 respondents from Telangana during the 2023-24. The constraints and strategies were divided into four categories, i.e., technical, financial, marketing and personal. The major constraints revealed were a lack of millet processing, non-remunerative prices for the produce, farmers getting minimal shares and significant stress due to uncertain returns, respectively. The strategies using analytical hierarchical process like setting up processing centres, advocating subsidies on the purchase of machinery and raw materials, integrating millets into government programmes and recognising and rewarding resilient millet entrepreneurs, respectively emerged. The study identified unique scenarios indicating the valuable perspectives of all stakeholders included in the study.

INTRODUCTION

Millets are a diverse group of small-seeded grasses belonging to the Poaceae family, traditionally cultivated in semi-arid tropical regions. They are valued for their high nutritional content, climate resilience, low input requirements, and short growing period. Major millets include pearl millet, sorghum, finger millet, foxtail millet, kodo millet, little millet, barnyard millet, and proso millet. Most of these crops are indigenous to India and are collectively termed "Nutri-cereals" due to their significant health benefits and adaptability to adverse climatic conditions. India is the world's largest producer of millets, accounting for approximately 38–41%

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of global production. Millets are cultivated over an area of about 12.19 million hectares, with an annual production of nearly 11.5 million tonnes. Their ability to withstand drought, thrive in poor soils, and require minimal external inputs makes them ideal for sustainable, economically viable, and climate-resilient agriculture (Naik and Bhavani, 2022). Millets also provide small and marginal farmers with a stable source of income by diversifying farm revenue and reducing economic risks.

In recent years, there has been a renewed interest in millet-based enterprises in India, driven by increasing awareness of their nutritional benefits and their role in addressing food security, environmental sustainability, and lifestyle-related health concerns. Millet-based entrepreneurship plays a crucial role in enhancing crop value, promoting sustainable business models, and strengthening rural livelihoods. Against this national backdrop, Telangana emerges as a suitable case for examining millet production and the growth of value-added enterprises. Millet cultivation in Telangana is primarily focused on sorghum, pearl millet, and bajra. The state's semi-arid climate and average annual rainfall of 1049.5 mm provide favorable conditions for millet farming (DOA, 2024). Although Telangana is not among the top three millet-producing states in India, it remains an important contributor. The state's emphasis on value addition and supportive institutional environment reinforces the role of millets in food security, rural employment, and inclusive agri-business growth (Banerjee et al., 2024).

Telangana has also witnessed increasing momentum in millet-based entrepreneurship, supported by policy initiatives and institutional backing. Organizations such as the Indian Institute of Millet Research (IIMR), Hyderabad, provide training, incubation, and technical support to millet entrepreneurs producing ready-to-eat and health-oriented products (Gecheo et al., 2023). Government initiatives have encouraged the participation of women-led self-help groups, rural innovators, and youth-led agri-startups across the millet value chain (Gopi, 2025). Millet entrepreneurship contributes to employment generation, promotes agro-processing for value addition, enhances supply chain efficiency, and supports sustainable farming and technological innovation (Gupta et al., 2023; Das et al., 2025; Kiran et al., 2025).

Issues like low farm-gate prices, limited consumer awareness, market access barriers, competitive pressures, and empowerment gaps continue to hinder the growth of millet-based enterprises (Harish et al., 2024). In this context, the present study aimed to examine the constraints faced by millet growers and entrepreneurs and suggesting appropriate strategies for promoting and strengthening millet-based enterprises. Addressing and implementing targeted interventions are crucial to ensure the benefits of the millet revolution reach all stakeholders, making millet enterprises both sustainable and economically viable.

METHODOLOGY

The study was conducted purposively in Telangana state in the year 2023-24, as the state constitutes the highest number of millet enterprises according to the secondary data collected from the reports by ICAR-Indian Institute of Millets Research and MANAGE, Hyderabad. The sampling procedure differed across respondent categories. Millet-based entrepreneurs were selected based on enterprise listings and reports published by ICAR–IIMR. Millet growers were selected from districts identified as predominant millet-growing regions namely Mahabubnagar, Ranga Reddy, and Adilabad based on the Directorate of Economics and Statistics, Telangana (2023). Research scientists were selected randomly from among scientists working at ICAR–IIMR, Hyderabad. Accordingly, sample comprised of 35 millet based enterprises, 150 millet growers and 30 research scientists resulting in a total sample size comprising of 215 respondents, were personally interviewed for the study. The constraints were categorised under four categories vis., technical, financial, marketing and personal constraints. The identification of constraint items under each category was based on an extensive review of relevant literature, preliminary interactions with respondents during the pre-testing phase, and expert opinions from scientists and subject matter specialists. Responses were elicited for each identified constraint to assess their relevance and severity as perceived by them. The data collected was recorded and analysed by using the Garett ranking. The percent position estimates were transformed into Garrett scores using Garrett's Table, which was provided by Garret and Woodworth (1969).

Furthermore, strategies to address the identified constraints were formulated through a review of the literature and subsequently validated by experts, including scientists from ICAR-IIMR. The categorization of strategies was aligned with the corresponding classification of constraints and supported by empirical evidence from earlier studies, thereby ensuring conceptual consistency and enabling a systematic analysis of intervention measures across various dimensions affecting millet-based enterprises.

Further, prioritisation of strategies was done using the analytical hierarchical process (AHP) as given by Saaty (1980). AHP is a multi-criterion decision- making tool used for making optimal choices. The selected components and their strategies were prioritised using priority weights, where higher weights indicated greater importance. Global ranks were derived by multiplying the priority of components by their respective strategies. Overall consistency of the preference matrix was assessed using the consistency ratio, which should be less than 0.1. The strategies were also categorised under four categories, namely technical, financial, marketing and personal strategies. With the use of a systematic, pre-tested interview schedule, the data were obtained through personal interaction. The data were then categorised, tabulated, and analysed in accordance with the stated objective and to provide a meaningful interpretation of the findings.

RESULTS

It is indicated in Table 1, that in case of technical constraints, the highest-ranked constraint was the lack of millet processing units, with an average Garrett score of 50.92, followed by inadequate training, demonstrations, and exposure opportunities for farmers, which scored 50.20. In the category of financial constraints, the topmost concern was non-remunerative prices for the produce, with a score a of 52.00, followed by limited access to funding, with a mean score of 50.60. Regarding marketing constraints, the primary issue identified was that despite rising retail prices, millet farmers receive only a small share, leading to financial dissatisfaction, with

Table 1. Constraints faced by the respondents

I	Technical constraints	AGS	Rank
1	Farmers experience labour shortages during peak seasons, which hampers timely agricultural operations	49.69	IV
2	Inadequate training, demonstrations, and exposure opportunities for farmers	50.20	II
3	Limited use of digital tools for marketing, logistics, and supply chain management hampers competitiveness	49.48	VI
4	Lack of millet processing units hinders value addition, impacting product quality and reducing shelf life	50.92	I
5	Non-availability of quality inputs in the required time and in the required quantities	49.60	V
6	Lack of modern packaging and controlled storage affects product shelf life and marketability	50.08	III
II	Financial Constraints		
1	Non-remunerative prices for the produce make farming financially unviable and discourage farmers	52.00	I
2	High input costs, expenses of machinery & infrastructure are unaffordable for small-scale farmers and startups.	50.30	III
3	Limited government financial support or subsidies for millet-related businesses affects growth potential.	50.05	IV
4	Limited access to funding makes it difficult to expand operations and scale up processing units	50.66	II
5	Demand for millets is still niche and inconsistent, leading to price volatility and uncertain returns	48.03	VI
6	Delayed payments from buyers create cash flow problems for millet entrepreneurs	48.93	V
III	Marketing Constraints		
1	Despite rising retail prices, millet farmers receive only a small share, causing financial dissatisfaction	51.38	I
2	Most startups have very small marketing teams, which limits their ability to reach more customers	49.83	IV
3	Millets often compete with grains like rice/wheat, having greater consumer familiarity and stronger supply chains.	49.49	V
4	Proper connections to buyers and larger markets are often missing	50.91	II
5	Millet Market information is often limited or inaccurate, making it hard to plan sales	50.03	III
6	Many startups struggle to use e-commerce and social media effectively due to lack of skills or resources	48.33	VI
IV	Personal Constraints		
1	Women entrepreneurs face social barriers that restrict their participation and progress	48.88	V
2	Fear of future risks and potential failure discourages bold decision-making	50.18	III
3	Involves significant stress due to uncertain returns and the need to repay loans taken for the enterprise	51.06	I
4	Limited business experience and low confidence hinder entrepreneurial growth	50.86	II
5	Managing both business and family duties is often overwhelming	49.00	IV

*AGS=Average Garret Score

a score of 51.38 followed by the lack of proper connections to buyers and access to larger markets, which scored 50.91. In terms of personal constraints, the most significant challenge was that millet entrepreneurship involves significant stress, with a score of 51.06, followed by limited business experience and low confidence scored 50.86, respectively.

As indicated in Table 2, under technical strategies, the most important strategies suggested by the experts were the setting up of processing centres equipped with modern facilities with a criteria weight of 0.185, followed by the launch of tool banks to make modern machinery more affordable, with a weight of 0.177. In terms of financial strategies, experts highlighted that the top priority was to advocate subsidies for the purchase of raw materials and machinery with a weight of 0.230, followed by the importance of establishing stronger buyer contracts, with a weight 0.207. For marketing strategies, the majority of experts emphasised the need to integrate millets into government programmes, with a weight of 0.191, closely followed by building partnerships to expand market reach, which scored 0.189. Under personal strategies, experts noted that the most significant component was recognising and rewarding resilient millet entrepreneurs with a weight of 0.238, followed by the importance of engaging experienced entrepreneurs for guidance and motivation, which received the highest weight of 0.247.

From the Table 3, it was highlighted that hierarchy of strategies considered effective for advancing millet based enterprises were advocating subsidies on purchasing machinery with global weight (0.068) followed by making strong buyer contacts (0.061), recognizing and rewarding awards (0.059), encouraging farmer groups to pool resources (0.058), connect startups with investors and crowdfunding platforms (0.056), integrating millets into government programmes (0.055), building partnerships with super markets, online platforms to widen market reach (0.054), providing training on budgeting, cost management, and profit maximization for entrepreneurs (0.052) and so on.

DISCUSSION

As revealed by table 1, study of constraints suggests that the technical constraints respondents faced by respondents were due to limited units, high equipment costs and need for specialized machinery for different millet types were making it unaffordable for many small scale operators which lead to forceful selling of unprocessed millet at low prices (Naik and Bhavani, 2022) and unequitable focus in extension services hindered their ability to penetrate and support stakeholders at the grassroots level services. In case of financial constraints, respondents felt that due to a poorly organised value chain, weak policy support (Chapke et al., 2022) and lack of capital and tailored credit products restricting their ability to invest for expanding operations and technological aspects. The marketing constraints, the respondents faced were due to the disparity between farm gate and retail pricing resulting from the existence of several middlemen, their impact on distribution and processing, and the scarcity of options to sell directly to consumers (Vadlapatla, 2023a). The personal constraints the respondents felt were due to inconsistent and poor returns driven by market and

Table 2. Strategies to promote millet-based enterprises

S.No.	Strategies	Criteria weights	Rank
I	Technical (CI=0.041; CR=0.033)		
1	Setting up processing centres equipped with modern facilities for cleaning, milling, and packaging	0.185	I
2	Partnering with agriculture influencers to create and spread content in local languages.	0.142	VI
3	Use mobile apps to give farmers updates on weather, pests, and prices.	0.165	IV
4	Exposure visits to successful millet farms, FPOs, and processing enterprises for enhanced learning	0.154	V
5	Organising workshops to teach millet processing, quality checks, and new tech	0.174	III
6	Launch tool banks to make modern machines affordable and accessible	0.177	II
II	Financial (CI=0.084; CR=0.075)		
1	Encourage farmer groups to pool resources for primary processing units	0.195	III
2	Make buyer contracts stronger with clear payment rules and penalties.	0.207	II
3	Provide training on budgeting, cost management, and profit maximisation for entrepreneurs	0.175	V
4	Advocate subsidies on the purchase of machinery, raw materials, and transportation	0.230	I
5	Connect startups with investors and crowdfunding platforms	0.190	IV
III	Marketing (CI=0.069; CR=0.056)		
1	Integrate millets into government programmes to normalise consumption	0.191	I
2	Collaborate with KVKs and NGOs to provide updates on market demand/price trends	0.121	VI
3	Build partnerships with retail chains, supermarkets, and online platforms to widen market reach	0.189	II
4	Awareness campaigns to educate people about millet's health benefits.	0.150	V
5	Promoting direct-to-consumer (D2C) models through local markets and websites	0.175	III
6	Developing unified brand identity, like "Telangana Millets," to support collective marketing and visibility	0.171	IV
IV	Personal (CI=0.024; CR=0.027)		
1	Provide training on fundamental risk analysis, contingency planning and budgeting to strengthen confidence in decision-making	0.238	III
2	Recognising & rewarding resilient millet Entrepreneurs particularly women, youth, and FPO leaders	0.286	I
3	Organising community exhibitions/sales events to provide women with opportunities to display and promote their products.	0.227	IV
4	Reaching out to experienced entrepreneurs for mentorship & engaging with peer support groups for advice and encouragement.	0.247	II

*CI= Consistency Index; CR= Consistency Ratio

Table 3. Overall weights for the strategies to promote millet-based entrepreneurs

S.No.	Strategies	Global Weight	Global rank
1	Setting up processing centres equipped with modern facilities for cleaning, milling, and packaging	0.038	XV
2	Partnering with agriculture influencers to create and spread content in local languages.	0.029	XXI
3	Use mobile apps to give farmers updates on weather, pests, and prices.	0.034	XVIII
4	Exposure visits to successful millet farms, FPOs, and processing enterprises for enhanced learning	0.032	XX
5	Organising workshops to teach millet processing, quality checks, and new tech	0.036	XVII
6	Launch tool banks to make modern machines affordable and accessible	0.036	XVI
7	Encourage farmer groups to pool resources for primary processing units	0.058	IV
8	Make buyer contracts stronger with clear payment rules and penalties.	0.061	II
9	Provide training on budgeting, cost management, and profit maximisation for entrepreneurs	0.052	VIII
10	Advocate subsidies on the purchase of machinery, raw materials, and transportation	0.068	I
11	Connect startups with investors and crowdfunding platforms	0.056	V
12	Integrate millets into government programmes to normalise consumption	0.055	VI
13	Collaborate with KVKs and NGOs to provide updates on market demand/price trends	0.034	XIX
14	Build partnerships with retail chains, supermarkets, and online platforms to widen market reach	0.054	VII
15	Awareness campaigns to educate people about millet's health benefits.	0.043	XIV
16	Promoting direct-to-consumer (D2C) models through local markets and websites	0.050	X
17	Developing a unified brand identity, like "Telangana Millets," to support collective marketing and visibility	0.049	XI
18	Provide training on fundamental risk analysis, contingency planning and budgeting to strengthen confidence in decision-making	0.049	XII
19	Recognising & rewarding resilient millet entrepreneurs particularly women, youth, and FPO leaders	0.059	III
20	Organising community exhibitions/sales events to provide women with opportunities to display and promote their products.	0.047	XIII
21	Reaching out to experienced entrepreneurs for mentorship & engaging with peer support groups for advice and encouragement.	0.051	IX

weather risks, insufficient business experience (Yadav et al., 2023) and weak ecosystem support hampering entrepreneurial growth.

From the Table 2, as far as strategies are concerned, it can be inferred that under technical strategies emphasis was made by addressing infrastructure gaps and lowering capital barriers by taking up the tool bank approach which makes them feasible for small and marginal farmers, leading to boosting income through value addition. Regarding financial measures, the focus was on providing subsidies to make millet-based enterprises more affordable for small farmers and emerging entrepreneurs. Additionally, emphasis was placed on ensuring better price realisation by establishing direct connections between producers and buyers (Lahiri et al., 2024). In the context of marketing strategies, focus was primarily on incorporating millets into government initiatives that assist shift in consumer perceptions and support public health. On the other hand, collaborations were highlighted for their role in increased brand exposure and market access (Pravallika et al., 2020). Regarding personal strategies, the prominence was on acknowledging and rewarding resilient entrepreneurs as it helps in a greater sense of confidence, motivates them to persevere in the face of difficulties and validates their efforts (Vadlapatla, 2023b). Furthermore, it was believed that offering mentorship was essential to assist them with business planning and scaling up their enterprises.

Findings from Table 3 further indicate that the overall global ranking emphasises the critical role of financial support in addressing core constraints and in strengthening networks necessary for enterprise growth (Tashi et al., 2022). This highlights the need to prioritise financial inclusion, targeted subsidies, and enterprise-level credit mechanisms that can effectively support emerging entrepreneurs in the millet sector. Strong buyer contacts and partnerships with supermarkets and online platforms underline the significance of reliable market access for improving sales and price realization. Additionally, recognising and encouraging entrepreneurial innovation and perseverance, as well as the value of resource pooling helps in enhancing economies of scale (Shah et al., 2023). This highlights the significance of collective action, as encouraging farmer groups to pool resources can reduce operational costs and improve bargaining power. Connecting startups with investors and crowdfunding platforms also reflects the necessity of improving access to finance tailored to enterprise needs. In this context, policy and institutional frameworks that promote innovation grants, incubation services, and structured mentorship programs become essential for fostering a culture of creativity and sustained entrepreneurial engagement. Furthermore, integrating millets into government programmes and providing training on budgeting, cost management, and profit maximization are crucial for improving institutional support and managerial capabilities. Overall, the coordinated application of financial, market, and collective strategies is vital for strengthening millet-based entrepreneurship. Such a holistic approach is necessary for fostering an enabling environment that supports sustainable enterprise development both locally and globally (Tinsley, 2018).

CONCLUSION

The study concluded that millet entrepreneurs and growers in Telangana encountered a complex array of constraints ranging from technical hurdles to personal. Addressing these constraints in the millet sector needs a coordinated, comprehensive and multi-dimensional approach that combines infrastructural enhancement, financial support, market linkage and capacity building. The study recommends adopting integrated strategies, including machinery subsidies, strengthened market linkages, collective action among farmer groups, improved access to finance, integration of millets into government programmes, and financial management trainings, effectively harness the potential of millet-based entrepreneurship. Furthermore, fostering collaboration among stakeholders and encouraging innovation within the millet ecosystem are essential for strengthening enterprise sustainability. Encouraging and empowering local stakeholders can boost entrepreneurship at grassroots and ensures inclusive participation of women, youth and small scale farmers across the millet value chain. Sustained policy support, awareness initiatives, training programs and capacity development will be crucial for achieving long term impacts.

DECLARATIONS

Ethics approval and informed consent: Informed consent was sought from the entrepreneurs, farmers and scientists respondents during the course of the research.

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The authors declare that during the preparation of the work, they thoroughly reviewed, revised and edited the content as needed. The authors take full responsibility for the final content of this publication.

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