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Gaining an insight into problems of millet farmers in Assam

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Abstract
Millets, often referred to as "nutri-cereals," are of tremendous importance due to their rich nutritional profile and adaptability to adverse climatic conditions. Despite their ability to thrive in challenging environments such as drought, high temperatures, and infertile soil, millet cultivation faces several obstacles. This research aims to investigate the problems encountered by farmers in millet cultivation. The study, titled “Gaining an Insight into Problems of Millet Farmers in Assam’ adopted a descriptive research design and employed a multi-stage, purposive-cum-random sampling technique to select 120 respondents from eight sampled villages in the Golaghat district of Assam. Data were collected using a pretested, semi-structured research schedule with the personal interview method. The findings revealed that farmers faced several significant challenges which are categorised under nine major areas such as: personal problem, social problem, inputs related problem, managerial problem, production problem, economic problem, market related problems transportation problem and post harvest technology problem. These problems tend to collectively hindered the adoption of improved cultivation practices and affected the overall profitability of millet farming. Problem confrontation index (PCI) was employed as a statistical measure to know the extent of seriousness of problems.

Keywords: Millet, problems, nutrition, adaptability, problem confrontation index

Introduction
Millet is a highly nutritious cereal that is becoming more popular among farmers because of its resilience and ability to withstand changing climates. India is the biggest producer of millets worldwide, with a share of around 40% of the world’s total production and second-largest supplier of millets, generating nine popularly known millets (Gowri and Shivakumar, 2020) [3].The protein content in millets like jowar (10.4%), bajra (11.6%), proso millet (12.5%), foxtail millet (12.3%), and barnyard millet (11.6%) is comparable with wheat (11.8%) and much higher than rice (6.8%) (Anbukkani *et al*., 2017) [1]. Additionally, they are almost free of grain storage pests and have alonger storage life (Saleh *et al*., 2013) [8]. Due to their untapped potential grain yield and nutritional benefits, millets have the potential to become important future food crops, especially in the more challenging rainfed areas (Yang *et al*., 2012) [10]. Millet can be thriven well on low fertility soils and does not depend on the use of chemical fertilizers (Gupta *et al*., 2017) [4] has high drought tolerant capacity, and can be thriven well in adverse environmental conditions, some in acidic soil and saline soil (Habiyaremye *et al*., 2017) [5]. Assam has the potentialities of millet cultivation but it is grown only in a limited scale and that too in a few pockets of Assam with an area of around 6600 hectares and a total production of 4447 tonnes (Das *et al*., 2024) [2]. Although various efforts have been made to popularise this crop, yet it is observed that farmers are not willing to grow millet in a larger scale. This might be due to the fact that farmers have been experiencing some problems associated with millet cultivation. Encouraging millet cultivation can help to create a more sustainable agricultural system by reducing reliance on high-input crops while supporting both the environment and farmers' livelihoods. Therefore, keeping in view of the above facts, present study was focussed to find out the problems faced by the farmers in millet cultivation with the following objective.

Objective

To study the perceived problems faced by millet farmers in millet cultivation along with suggestive measures.

Research Methodology

The research was undertaken during 2024 in the Golaghat district of Assam to investigate the problems faced by millet farmers and identify strategies to address them, providing a comprehensive understanding of the issues. The research covered all eight blocks of the district, selecting purposively one Agricultural Development Officer (ADO) circle from each block. One village was purposively chosen from each ADO circle based on the highest number of millet growers, resulting to the selection of Rupkolia Chuk, Joraguri, Talsibari, Dhulia Gaon, Chutia Gaon, Borahi Gaon, Borpak, and Padumoni villages. And from each of the villages, fifteen millets farmers from each village were selected randomly and thus a total of total 120 respondents were selected. Data were collected through personal interviews and face-to-face interactions using structured research schedule. Statistical analysis was conducted using methods such as percentage, Problem Confrontation Index, weightage mean score and rank order. The PCI and WMS was calculated by using the following formula:

PCI (problem confrontation index)

PCI = (f1×w1) + (f2×w2) + (f3×w3)

Where,

f1, f2, f3: Frequencies of responses for "very serious," "serious," and "not serious" levels of confrontation, respectively.

w1, w2, w3: Weights assigned to for "very serious," "serious," and "not serious" levels, respectively (e.g., 3 for very serious, 2 for serious, 1 for not serious).

Weightage mean score

The WMS was determined using the following formula.

$$WMS = \frac{\text{Sum of product of frequency and score assigned}}{\text{Total no. of respondents}}$$

Results and Discussion

A perusal of data in table 1 depicts a comprehensive overview of the problems faced by farmers towards millets cultivation, categorized into nine sub-divided areas: Personal problems, Socio problems, Availability of inputs problems, Managerial problems, Production problems, Economic problems, Market problems, Transportation problems and Post harvested technology problems. The problems expressed by millets growers in different aspects will shed light on key areas where improvements are needed to enhance the cultivation of millets.

Table 1: Problems faced by farmers towards millet cultivation n=120

Sl. No.	Problems	Extent of problem			PCI	WMS	RANK
		Very serious	Serious	Not serious			
A.	**Personal Problems**						
1	Limited prior experience and knowledge of millet cultivation.	47 (39.17%)	62 (51.67%)	11 (9.16%)	276	2.300	I
2	Poor communication with fellow farmers.	9 (7.50%)	46 (38.33%)	65 (54.17%)	184	1.533	IV
3	Resistance to adopt new farming practices.	17 (14.17%)	47 (39.17%)	56 (46.66%)	201	1.675	II
4	Lack of self-confidence and unable to bear risk.	13 (10.83%)	50 (41.67%)	57 (47.50%)	196	1.633	III
B.	**Social Problems**						
5	Lack of community awareness and support for millet farming.	26 (21.67%)	81 (67.50%)	13 (10.83%)	253	2.108	II
6	Social stigma associated with millet as a "poor man's crop."	3 (2.50%)	31 (25.83%)	86 (71.67%)	157	1.308	IV
7	Low interest among younger generations in millet farming.	35 (29.17%)	70 (58.33%)	15 (12.50%)	260	2.167	I
8	Lack of appreciation from other farmers in the locality	14 (11.67%)	57 (47.50%)	49 (40.83%)	205	1.708	III
C.	**Availability of inputs problems**						
9	Limited availability of high-quality seeds for millet cultivation.	26 (21.66%)	44 (36.68%)	50 (41.66%)	216	1.800	III
10	Shortage of affordable fertilizers and pesticides for millet crops.	4 (3.33%)	40 (33.33%)	76 (63.34%)	168	1.400	V
11	Difficulty in accessing modern farming tools and machinery.	100 (83.33%)	20 (16.67%)	0 (0.00%)	340	2.833	I
12	Insufficient supply of organic inputs for sustainable millet farming.	7 (5.83%)	44 (36.67%)	69 (57.50%)	178	1.483	IV
13	Delays in receiving government-provided inputs and subsidies.	28 (23.33%)	68 (56.67%)	24 (20.00%)	244	2.033	II
D.	**Managerial Problems**						
14	Inadequate extension services providing technical guidance.	53 (44.17%)	61 (50.83%)	6 (5.00%)	287	2.392	II
15	Difficulty in adopting new technologies due to lack of technical support	55 (45.83%)	51 (42.50%)	14 (11.67%)	281	2.342	III
16	Less exposure to training programmes	64 (53.33%)	44 (36.67%)	12 (10.00%)	292	2.433	I
17	Poor record-keeping and farm management practices.	6 (5.00%)	42 (35.00%)	72 (60.00%)	174	1.450	V
18	Challenges in labour management and allocation.	52 (43.33%)	47 (39.17%)	21 (17.50%)	271	2.258	IV
E.	**Production Problems**						
19	Millet farming is more complex	17 (14.17%)	88 (73.33%)	15 (12.50%)	242	2.017	I
20	Problems related to crop rotation and intercropping with millets	19 (15.83%)	81 (67.50%)	20 (16.67%)	239	1.992	II
21	Impact of changing weather patterns on millet cultivation	35 (29.17%)	46 (38.33%)	39 (32.50%)	236	1.967	III
F.	**Economic Problems**						
22	Insufficient financial support and subsidies for millet cultivation.	28 (23.33%)	71 (59.17%)	21 (17.50%)	247	2.058	I
23	Lack of own capital	6 (5.00%)	50 (41.67%)	64 (53.33%)	182	1.517	IV
24	High cost of inputs compared to returns.	11 (9.17%)	88 (73.33%)	21 (17.50%)	230	1.917	II
25	Limited access to credit and financing options.	24 (20.00%)	56 (46.67%)	40 (33.33%)	224	1.867	III
G.	**Market Problems**						
26	Limited market access and poor price realization for millets.	98 (81.67%)	12 (10.00%)	10 (8.33%)	328	2.733	I
27	Lack of proper marketing channels for millet distribution.	90 (75.00%)	21 (17.50%)	9 (7.50%)	321	2.675	II
28	Inadequate market information and support for farmers.	80 (66.67%)	31 (25.83%)	9 (7.50%)	311	2.592	IV
29	Price volatility affects farmers' income from millet sales	78 (65.00%)	42 (35.00%)	0 (0.00%)	318	2.65	III
30	Lack of export opportunities	49 (40.83%)	46 (38.33%)	25 (20.84%)	264	2.2	V

H.	Transportation Problems						
31	Poor road infrastructure hinders access to markets.	17 (14.17%)	33 (27.50%)	70 (58.33%)	187	1.558	II
32	High transportation costs reduce farmers' profits.	3 (2.50%)	94 (78.33%)	23 (19.17%)	220	1.833	I
33	Limited availability of vehicles for transporting millet.	5 (4.17%)	50 (41.67%)	65 (54.16%)	180	1.5	III
I.	**Post harvested technology problems**						
34	High post-harvest losses due to poor handling.	70 (58.33%)	46 (38.33%)	4 (3.34%)	306	2.55	II
35	Threshing and harvesting of millet are done without using machinery	94 (78.33%)	26 (21.67%)	0 (0.00%)	334	2.783	I
36	Inefficient post-harvest processing and storage facilities for millets.	57 (47.50%)	63 (52.50%)	0 (0.00%)	297	2.475	IV
37	Inadequate packaging and branding for millet products.	61 (50.83%)	59 (49.17%)	0 (0.00%)	301	2.508	III

(Figures in parenthesis indicate percentage)

Personal problems

The data presented in above table reveals that the major personal problems faced by farmers, was 'Limited prior experience and knowledge of millet cultivation' (ranked I) with a mean score value of 2.300. This indicates that majority of farmers struggle due to lack of expertise in millet farming, making it difficult for them to adopt and sustain cultivation practices. The above constraints conform to the findings of Pushpa and Arun (2023) [7]. Similarly, 'Resistance to adopt new farming practices' emerged as the second major constraint with a mean score of 1.675, followed by 'Lack of self-confidence and inability to bear risk' ranked III with a mean score of 1.633. These findings align with previous studies highlighting the hesitancy among farmers in transitioning to new agricultural techniques.

Socio problems

Furthermore, social constraints also significantly impact millet farming. The most pressing social issue ranked I was 'Low interest among younger generations in millet farming,' with a mean score of 2.167, suggesting a generational gap in agricultural engagement. 'Lack of community awareness and support for millet farming' was ranked II with a mean score of 2.108, indicating that millet farming lacks social encouragement and widespread support. Another major constraint was 'Lack of appreciation from other farmers in the locality,' ranked III with a mean score of 1.708, reflecting the need for better community-driven initiatives to foster millet farming. The above constraints conform to the findings of Prasanth and Murugan (2021) [6].

Availability of inputs problems

When examining availability of inputs, 'Difficulty in accessing modern farming tools and machinery' emerged as the primary issue, ranked I with a mean score of 2.833. This indicates that majority of farmers face technological barriers that hinder productivity. The above constraints conforms to the findings of Pushpa, J., and Arun, K. G. (2023) [7]. The second major constraint was 'Delays in receiving government-provided inputs and subsidies,' with a mean score of 2.033, showing how administrative inefficiencies negatively impact farming. 'Limited availability of high-quality seeds for millet cultivation' ranked III with a mean score of 1.800, emphasizing the need for improved seed distribution and accessibility. The above constraints conform to the findings of Venkatesa *et al.* (2024) [9].

Managerial problems

Managerial constraints also posed significant challenges. 'Less exposure to training programs' ranked I with a mean score of 2.433, indicating that farmers lack adequate knowledge to optimize their farming methods. 'Inadequate extension services providing technical guidance' was ranked II, with a mean score of 2.392, reinforcing the necessity of enhanced agricultural extension services. 'Difficulty in adopting new technologies due to lack of technical support' ranked III with a mean score of 2.342, suggesting that technical assistance is crucial for improving millet farming efficiency. The findings are similar with Prasanth and Murugan (2021) [6].

Production problems

Production-related problems were led by 'Millet farming is more complex,' which ranked I with a mean score of 2.017, reflecting farmers' perception of millet farming as a labor-intensive and challenging activity. 'Problems related to crop rotation and intercropping with millets' ranked II with a mean score of 1.992, highlighting difficulties in integrating millet cultivation into existing farming systems. 'Impact of changing weather patterns on millet cultivation' was ranked III with a mean score of 1.967, pointing to climate variability as a key challenge. The above problems conform to the findings of Venkatesa *et al.* (2024) [9] and Prasanth and Murugan (2021) [6].

Economic problems

Economic constraints also significantly affected millet farmers. The most pressing issue was 'Insufficient financial support and subsidies for millet cultivation,' ranked I with a mean score of 2.058, illustrating the need for stronger financial interventions. 'High cost of inputs compared to returns' was ranked II with a mean score of 1.917, reflecting concerns regarding the profitability of millet farming. 'Limited access to credit and financing options' ranked III with a mean score of 1.867, underscoring financial barriers as a critical constraint. The above problems relates to the findings of Prasanth and Murugan, (2021) [6].

Market problems

Market-related problems were led by 'Limited market access and poor price realization for millets,' ranked I with a mean score of 2.733, indicating that market limitations significantly affect farmers' profitability. 'Lack of proper marketing channels for millet distribution' ranked II with a mean score of 2.675, while 'Price volatility affects farmers' income from millet sales' ranked III with a mean score of 2.650, showing how unstable pricing further complicates market participation. The above constraints conform to the findings of Pushpa and Arun (2023) [7].

Transportation problems

Transportation issues further constrained millet farming, with 'High transportation costs reducing farmers' profits' ranked I with a mean score of 1.833. 'Poor road infrastructure hinders access to markets' was ranked II with a mean score of 1.558, followed by 'Limited availability of vehicles for transporting millet' at rank III with a mean score of 1.500. These findings highlight the need for better transportation infrastructure and cost-efficient logistics.

Post harvested technology problems

Post-harvest technology problems also emerged as significant

barriers. 'Threshing and harvesting of millet are done without using machinery' was ranked I with a mean score of 2.783, demonstrating the reliance on manual labor. 'High post-harvest losses due to poor handling' ranked II with a mean score of 2.550, emphasizing the need for better storage and processing facilities. 'Inadequate packaging and branding for millet products' ranked III with a mean score of 2.508, suggesting that better branding strategies could enhance marketability. The above constraints conform to the findings of Prasanth and Murugan (2021) [6].

The above data indicates that millet farming faces multiple constraints across various dimensions. The most critical issues include technological barriers, limited financial support, inadequate market access, and post-harvest inefficiencies. Addressing these challenges requires a multifaceted approach that includes policy interventions, better infrastructure, and increased farmer support programs.

Conclusion

Millet farmers are faced with various problems related to millet cultivation. The study highlighted that the most pressing challenges for millet farmers were limited market access and poor post-harvest technology, significantly impacting profitability. The lack of financing schemes and inadequate input availability moderately affected farmers, while constraints like high transportation costs and climate variability were less severe. Technically, the most critical issue was poor marketing channels, followed by inadequate storage and processing facilities. Overall, these constraints shape the challenges in millet farming. If these existing problems persist, then the day is not too far that the farmers will leave growing millet. Therefore, it is imperative on the part of concerned departments to take initiatives to get rid of these problems

Policy Implications

With the added advantages of millet, it is necessary to popularise the crop among the farmers. The findings of the research study suggest enhancing market infrastructure, improving post-harvest technologies, expanding financial support, and strengthening extension services as key areas for intervention.

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Conflict of Interest

All the authors of the paper declare no conflicts of interest.

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