

Constraints in Production and Marketing of Organic Millets in Rainfed Tribal Tract of Attapady Hills, Kerala

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ABSTRACT: The present study was conducted in Attapady block of Palakkad district of Kerala in March, 2024. Cultivating millets in rainfed region is a promising climate-smart practice in hilly tribal regions, offering a sustainable way to combat malnutrition, climate uncertainties, and poverty, as millets are highly nutritious. Primary data for the study were collected using pre-structured interview schedules from 90 tribal rainfed farmers in the Agali, Pudur, and Sholaiyurpanchayats of Attapady. Millet production in the study area faces significant challenges, including inadequate and untimely rainfall, low profitability, wild animal and bird attacks, labour shortages, and high wage rates. Farmers often rely on traditional millet varieties due to the unavailability of high-yielding varieties, leading to low productivity. Poor soil fertility, limited technical knowledge, and shifting cultivation practices further reduces its output. Addressing these constraints through irrigation projects, improved farming practices, and better market access is essential for sustainable millet production. Millet marketing in tribal regions faces significant challenges, including distress sales due to delayed procurement, high transportation costs, and inadequate on-farm storage. The quality and quantity variations among tribal farmers' produce hinder effective aggregation, while delayed cash payments under existing schemes affect livelihoods. Consumers also face high millet prices, highlighting the need for improved market intelligence and sustained efficient marketing channel.

Keywords: Millet, Rainfed, Tribal farmers, Attapady.

INTRODUCTION

Climate change, dwindling natural resources, and malnutrition pose significant global challenges. The over-reliance on traditional crops such as rice, wheat, and maize is unsustainable, compromising food security (FAO, 2019). Therefore, exploring and cultivating alternative crops such as millets are essential for sustainable food production. Nutritionally, they are rich in fibre, essential amino acids, and micronutrients and have a low glycemic index, making them a healthy diet for combating lifestyle diseases (Anitha *et al.*, 2024). Millets are one of the oldest foods known to humans but were overshadowed by other cereals such as rice and wheat because of the focus given to the later post-green revolution, which caused a reduction in production and consumption of millets in India. Millet production is negligible in Kerala when compared with the total nation's area and production. The productivity of millets in Kerala is 771kg/ha which is less than the nation's average of 1337kg/ha (GOI, 2024). This is due to their vulnerability to changing rainfall patterns, increasing bird and animal attack, and their usage of traditional varieties (Rao *et al.*, 2019). Besides, millet cultivation is mainly constrained by their low-income generating capacity (Fischer *et al.*, 2016).

A total of 39 infant deaths have been reported from Attapady in Palakkad district of Kerala, between April

2012 and May 2013 (Ekbal, 2013). To prevent such infant deaths and to promote millet in tribal people's diet, production and marketing of millet in Attapady, Kerala is promoted under the Millet Village project by the Department of Agriculture Development and Farmer's Welfare and under the Attapady Special project by Kudumbashree (apoveerty eradication and women empowerment programme implemented by the State Poverty Eradication Mission (SPEM) of the Government of Kerala). Studies related to the production and marketing of millets by farmers at the field level are scanty. In this context, a study has been attempted to understand the constraints in production, utilization, and marketing of it.

METHODOLOGY

The present study was conducted in the Attapady block of Palakkad district, Kerala. The study area was purposively selected based on the area and production of millets in Kerala *i.e.*, 70 per cent of finger millet and 100 per cent of small millets was cultivated in Attapady block of Palakkad district. Around 44 per cent of the population in Attapady block belongs to tribals. The primary data was collected from a random sample of 90 tribal rainfed farmers, each 30 from Agali, Pudur and Sholaiyurpanchayats of Attapady block who are cultivating millets were interviewed through a pretested

interview schedule. The data pertaining to the crop season 2023- 24 were collected on different factors related with millet cultivation. Garrett's ranking method was used to examine the challenges encountered by farmers in both production and marketing of millets within the study area, *Attapady*. The sample farmers were asked to rank the constraints in order of their severity. The per cent position of each constraint thus obtained were then converted into scores using a formula referencing Garrett and Woodworth's tables (1969).

$$\text{Per cent position} = \frac{100 (R_{ij} - 0.5)}{N_{ij}}$$

Where R_{ij} = Rank given for i^{th} constraint by j^{th} individual

N_j = Number of constraints ranked by j^{th} individual

The mean scores for each factor were ranked, with the principle being that a higher score indicated a greater significance of the constraint to the farmers and the most limiting factors were identified.

RESULTS AND DISCUSSION

Socio economic profile of sample millet farmers. The average age of the sample tribal farmers in the study area was 50 years, approximately 45 per cent of the sample farmers in *Attapady* were aged between 41 and 60 years. The average experience of tribal farmers in millet farming was 36 years. Annual household income of average family size of 4 among the sample farmers was around between Rs. 1 to 2 lakhs. Around 67 per cent of the sample farmers are illiterate. Most sample respondents are marginal farmers (51 per cent) whose land holding is less than one hectare. This clearly indicated that millets are primarily cultivated by small and marginal farmers who are well-experienced in millet farming (Table 1).

Table 1: General characteristics of the sample farmers.

	Particulars	Per cent
1.	<i>Age group (years)</i>	
a.	21-40	29
b.	41-60	45
c.	>60	26
	Total	100
	Average age	50
2.	<i>Educational level</i>	
a.	Illiterate	67
b.	Primary	23
c.	High school/Secondary	10
	Total	100
3.	<i>Average family size</i>	4
4.	<i>Size group</i>	
a.	Small farmers	38
b.	Marginal farmers	51
c.	Semi-medium farmers	11
	Total	100
	Particulars	Value
	Average experience of farmers in millet farming (in years)	36
	Average land holding (ha)	1.61

Constraints in production of millets. The primary constraints faced by millet farmers in all millet production were almost similar, and those constraints had been identified and were detailed in Table 2. The major constraints identified were inadequate and untimely rainfall, low profitability in cultivation, attack of wild animals and birds, shortage of labour during peak season, high labour charges, lack of availability of high yielding varieties (HYV) seeds, problem due to poor fertility of soils, lack of technical knowledge, incidence of pests and diseases. The highest and lowest Garret scores were 81 and 23.07, respectively.

The table shows inadequate and untimely rainfall, the most severe abiotic constraint in cultivating millets. Despite millets being able to withstand harsh climates, untimely rainfall significantly affected the yield. The second most significant constraint was the low profitability. This low profitability of millets led farmers to follow subsistence agricultural practices, including using low-yielding indigenous local millet varieties and a reluctance to adopt new technologies to boost production. The primary reason for low profitability is the uncertainty in millet yields, which makes it challenging for farmers to view millet farming as a dependable income source. Without a guaranteed return on their investment, they preferred more stable options, such as working in *Attapady* Cooperative Farm societies or participating in MNREGA (Mahatma Gandhi National Rural Employment Guarantee Act) schemes as wage labourers. The situation created a vicious cycle where uncertainty in yield led to poor management, resulting in lower yields.

The third most significant constraint reported by the sample farmers was crop damage caused by wild animals and birds. During the seeding stage, birds often carried away the seeds, while rabbits fed on the young plants at the seedling stage. At the panicle formation stage, peacocks and sparrows consumed grains. Finally, wild boars and elephants raided the fields during the mature crop stage, causing extensive destruction. To mitigate these challenges, farmers have employed traditional methods like beehive fences to deter wild animals. While these measures provide relief to a certain extent, they have limitations and are ineffective in preventing crop damage. Inspired by a farmer named Chindi, some farmers have started cultivating lab lab, a pulse crop namely *Attukombha Amara* in local parlance. This pulse variety is believed to emit a highly unpleasant scent to wild animals, serving as a natural deterrent and offering a promising alternative to conventional methods.

Among the constraints, labour shortage during peak weeding and harvesting season, led to high labour charges and severely limited crucial cultivation operations. The labour shortage and high wage rate are very common in Kerala. The prevailing high wage rate compared to the neighbouring states often led to a high cost of cultivation for all crops in the state.

Farmers continue to rely on traditional millet varieties, which is reflected in their low productivity. A significant challenge reported by the sampled tribal farmers is the unavailability of high-yielding millet varieties. Poor soil fertility, ranked as the seventh major

constraint, may result from practices like shifting cultivation that deplete soil nutrients. Limited technical knowledge among tribal farmers was identified as the

eighth constraint. On the other hand, pest and disease issues in millet production were reported as relatively less severe challenges by the farmers.

Table 2: Constraints in production of millets.

Sr. No.	Constraints	Garret score	Rank
1.	Inadequate and untimely rainfall	81	1
2.	Low profitability	66.04	2
3.	Attack of wild animal and birds	64.95	3
4.	Shortage of labour during peak season	52.66	4
5.	High labour charges	48.54	5
6.	Lack of availability of HYV seeds	47.53	6
7.	Problem due to poor fertility of soils	38.75	7
8.	Lack of technical knowledge	27.36	8
9.	Incidence of pests and diseases	23.07	9

Constraints in marketing of millets. The main marketing constraints faced by millet farmers and stakeholders such as processors, wholesaler, retailer and consumer, those who are involved in marketing channel were identified and ranked in order of importance and listed in Table 3.

The primary goal of tribal farmers in cultivating millet is subsistence, with most of the produce being retained for personal consumption. Consequently, only a limited surplus reaches the market. To address immediate cash requirements, these farmers often engage in distress sales, driven by delays in procurement by agencies like the Department of Agriculture and Farmers Welfare. As a result, they are compelled to sell their produce at lower prices to nearby wholesale outlets, making this one of the most significant challenges in millet marketing. Furthermore, inconsistencies in the quality and quantity of millet produced by different farmers create difficulties for market intermediaries in aggregating the produce. From the consumer's perspective, the high price of millet products remains a significant barrier to broad adoption. However, most

tribal farmers are unaware of this issue due to a lack of access to effective market intelligence, further exacerbating the disconnect between producers and consumers.

An effective market channel existed through the Department of Agriculture Development and Farmers' Welfare, which procured organic millet under the Millet Village Scheme (2017-2020) and the Rebuild Kerala Initiative (RKI) 2020-2023. Although this marketing channel is efficient in procurement, farmers face challenges with delayed cash payments, impacting both their livelihoods and preparations for the next cropping season. This underscores the need for a robust, sustainable marketing system to support millet cultivation in tribal hamlets, to avoid shifting to non-farm activities. The scattered tribal hamlets in the hilly terrain coupled with low volume of product per farm magnify the transportation cost. The lack of adequate on-farm storage facilities aggravates the situation and may lead to distress sales. The efficient aggregation at the panchayath or block level can minimise these challenges to a great extent.

Table 3: Constraints in marketing of millets.

Sr. No.	Constraints	Garret score	Rank
1.	Distress sales induced by delayed procurement	81	1
2.	Delay in cash payment	66.04	2
3.	High cost of transportation	64.95	3
4.	Lack of transportation	52.66	4
5.	Difficulty in processing of millets	48.54	5
6.	Lack of market intelligence	47.53	6
7.	Lack of proper storage facilities at the farm level	38.75	7

CONCLUSIONS

A significant constraint in millet production in the rainfed tribal zones of the *Attapady* hills is the inadequate and untimely rainfall, emphasising the urgent need to complete the ongoing Attapady Valley Irrigation Project. Enhancing productivity and profitability in millet cultivation can be achieved by adopting high-yielding varieties, implementing efficient water conservation techniques, and optimising input use rather than increasing input quantities alone. Wild animal attacks are persistent in hilly regions, causing considerable crop damage. Policymakers must prioritise developing and implementing effective strategies to protect fields from such attacks.

Addressing human-wildlife conflicts is essential to safeguarding the livelihoods and security of farmers in these complex-terrain.

It is equally important to raise awareness among tribal farmers about the advantages of using high-yielding varieties and adopting improved cultivation practices. Timely procurement of millet and prompt cash payments can help farmers avoid distress sales. Furthermore, establishing common storage facilities at the hamlet level and improving transportation infrastructure are critical steps toward creating a sustainable and efficient millet marketing system.

FUTURE SCOPE

This study stresses the future research on developing drought-resistant millet varieties, efficient water conservation technologies in tribal hilly areas, and effective wildlife deterrents. Improving the market linkages, and technical knowledge dissemination can address productivity and profitability challenges.

Conflict of Interest. None.

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