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Consumption pattern of millets among rural households across socio-cultural regions of Punjab

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Abstract

The present study was conducted to assess the awareness regarding millets and examine their consumption patterns among rural households in Punjab. The study covered the three socio-cultural regions of Punjab, namely *Majha*, *Malwa*, and *Doaba*. Using the Probability Proportionate to Size (PPS) sampling technique, 40 per cent of the districts from each region were selected, resulting in the selection of ten districts: One random block from each district and a random village from each block was selected for the study. Thirty rural women from each village were randomly selected, thus, a total of 300 rural women were selected as respondents. Data were collected through a self-structured interview schedule. The findings revealed that only 27.67 per cent of the respondents were consuming millets, indicating their limited inclusion in the daily diet of rural households. Pearl millet (*Bajra*) was the most commonly consumed millet (69.87%), followed by finger millet (*Ragi*) (39.75%) and sorghum (*Jowar*) (27.71%). The study highlights the need for focused awareness campaigns, improved availability, and policy interventions to encourage millet cultivation and consumption in rural Punjab.

Keywords: Millets, consumption pattern, rural women, Punjab, nutrition

Introduction

Millets are widely recognized as nutri-cereals because of their exceptional nutritional composition and health-promoting properties. India is the largest producer of millets, and many millet species are indigenous to the country. These grains are rich sources of dietary fiber, protein, essential minerals such as calcium, iron, magnesium, and phosphorus, vitamins, antioxidants, and phytochemicals. Regular consumption of millets has been associated with the prevention and management of several lifestyle diseases, including diabetes, cardiovascular diseases, obesity, certain cancers, and gluten intolerance (IIMR, 2018) ^[2].

Besides their nutritional significance, millets are climate-resilient crops requiring comparatively less water, fertilizers, and external inputs. They thrive well under adverse climatic conditions and marginal soils, making them environmentally sustainable crops. Their cultivation contributes to agricultural diversification, biodiversity conservation, and climate change mitigation (Reddy, 2024) ^[6].

Despite these advantages, millet cultivation and consumption declined sharply following the Green Revolution. The emphasis on rice and wheat production through government procurement, subsidies, and public distribution systems led to a gradual displacement of traditional coarse cereals from both farms and household diets (FAO, 2019; Smith *et al.*, 2019; John & Babu, 2021) ^[1, 7, 3]. Consequently, dietary diversity decreased, contributing to nutritional deficiencies among the population.

Recognizing the nutritional and environmental importance of millets, the Government of India declared 2018 as the

National Year of Millets and successfully proposed 2023 as the International Year of Millets, endorsed by the United Nations. Various initiatives under the Poshan Abhiyaan and other nutrition programmes have further promoted millet consumption among households.

Although awareness regarding millets has increased in recent years, their actual consumption in Punjab remains relatively low because of changing food preferences, limited availability, higher market prices, and inadequate knowledge regarding their preparation and health benefits. Therefore, the present study was undertaken to examine the consumption pattern of millets among rural households across the three socio-cultural regions of Punjab.

Methodology

The study was conducted during 2024 in the three socio-cultural regions of Punjab, namely *Majha*, *Malwa*, and *Doaba*. A multistage sampling technique was adopted. Forty per cent of the districts from each region were selected using the Probability Proportionate to Size (PPS) sampling method. Accordingly, ten districts were selected, comprising Pathankot and Gurdaspur from *Majha*; Patiala, Ludhiana, Fatehgarh Sahib, Barnala, Ropar, and Muktsar from *Malwa*; and Hoshiarpur and Kapurthala from *Doaba*.

One random block from each district and a random village from each block was selected for the study. Thirty rural women from each village were randomly selected, thus, a total sample of 300 rural women was selected using appropriate sampling procedures. Data were collected through a pre-tested self-structured interview schedule. The

collected data were analyzed using frequency, percentage, and multiple response analysis.

Results and Discussion

Consumption of millets among respondents

The findings presented in Table 1 indicate that millet consumption among rural households of Punjab remains considerably low. Overall, only 27.67 per cent of the respondents reported consuming millets, whereas 72.33 per cent did not include millets in their regular diet.

Table 1: Distribution of respondents according to the consumption of millets n=300

Response	Majha n ₁ = 60		Malwa n ₂ = 180		Doaba n ₃ = 60		Total n=300	
	f	%	f	%	f	%	f	%
Yes	17	28.33	57	31.67	9	15.00	83	27.67
No	43	71.67	123	68.33	51	85.00	217	72.33

Region-wise analysis showed that millet consumption was comparatively higher in *Malwa* (31.67%), followed by *Majha* (28.33%), while *Doaba* (15.00%) recorded the lowest level of consumption. The comparatively poor consumption in *Doaba* may be attributed to greater dependence on wheat and rice-based diets and lower awareness regarding the nutritional benefits of millets.

The decline in millet consumption can largely be explained by the post-Green Revolution shift towards rice and wheat cultivation. Government procurement policies, higher productivity, easier processing, and better market support encouraged farmers to replace traditional millets with wheat and rice. Consequently, millet production, availability, and household consumption gradually declined (FAO, 2019; Kumar *et al.*, 2022) ^[1, 4]. These findings suggest an urgent need to revive millet consumption through awareness programmes, nutrition education, and policy support.

Consumption of different types of millets

The consumption pattern of different millet species is presented in Table 2. Among millet consumers, pearl millet (bajra) was the most preferred millet, consumed by 69.87 per cent of respondents, followed by finger millet (ragi) (39.75%) and sorghum (jowar) (27.71%).

Region-wise, Malwa exhibited the highest consumption of pearl millet (80.70%), while finger millet was more commonly consumed in Majha (64.70%). In contrast, the Doaba region showed relatively limited diversity in millet consumption, with only one-third of respondents consuming pearl millet, finger millet, and barnyard millet. None of the respondents from Doaba reported consuming foxtail millet, kodo millet, or little millet.

Table 2: Distribution of respondents according to the consumption of different types of millets n=83

Different types of millets	Majha n ₁ =17		Malwa n ₂ =57		Doaba n ₃ =9		Total n=83	
	f	%	f	%	f	%	f	%
Barnyard (<i>Swank</i>)	1	5.88	13	22.80	3	33.33	12	14.45
Finger (<i>Ragi</i>)	11	64.70	19	33.33	3	33.33	33	39.75
Foxtail (<i>Kangni</i>)	0	0.00	2	3.50	0	0.00	2	2.40
Kodo (<i>Kodra</i>)	5	29.41	8	14.03	0	0.00	13	15.67
Little (<i>Kutki</i>)	1	5.88	1	1.75	0	0.00	2	2.40
Pearl (<i>Bajra</i>)	9	52.94	46	80.70	3	33.33	58	69.87
Sorghum (<i>Jowar</i>)	4	23.52	18	31.57	1	11.11	23	27.71

*Multiple responses

The consumption of foxtail millet (2.40%) and little millet (2.40%) was negligible across all regions, indicating limited awareness, poor market availability, and unfamiliarity with their culinary uses. The predominance of pearl millet may be attributed to its traditional cultivation in Punjab and its familiarity among rural households, whereas other minor millets have yet to gain widespread acceptance.

Time span of millet consumption

The duration of millet consumption among respondents is presented in Table 3. Overall, the largest proportion of respondents (38.55%) had been consuming millets for 1–5 years, followed by 28.92 per cent who had consumed millets for more than ten years. Only 16.86 per cent had started consuming millets within the past year.

Region-wise, nearly half of the respondents in *Majha* (47.05%) and over one-third in *Malwa* (38.59%) reported consuming millets for one to five years. In *Doaba*, one-third of the respondents had consumed millets for more than ten years, suggesting that millet consumption in this region is largely confined to a small group of traditional consumers rather than new adopters.

Table 3: Distribution of respondents according to time span of consuming millets n=83

Time span	Majha n ₁ =17		Malwa n ₂ =57		Doaba n ₃ =9		Total n=83	
	f	%	f	%	f	%	f	%
<1 year	4	23.52	8	14.03	2	22.22	14	16.86
1-5 years	8	47.05	22	38.59	2	22.22	32	38.55
5-10 years	1	5.88	10	17.54	2	22.22	13	15.67
>10 years	4	23.52	17	29.82	3	33.33	24	28.92

The increasing adoption of millets during the last five years may be associated with growing awareness regarding their nutritional and therapeutic benefits, increased media promotion, government initiatives under the Poshan Abhiyaan, and the declaration of 2018 as the National Year of Millets and 2023 as the International Year of Millets. These initiatives have significantly contributed to improving public awareness regarding the health benefits of millets and have encouraged their gradual inclusion in household diets. The data in table 4 highlighted the preference of respondents for procuring millets for consumption. The highest proportion of respondents across all regions preferred purchasing millets (69.88%) of the total sample. In the *Majha*

region, where 76.47 per cent preferred purchasing, 17.65 per cent relied on cultivation, and the lowest (5.88%) showed both cultivation and purchase of millets. In the *Malwa* region, the majority of respondents (71.92%) preferred to purchase millets, followed by (17.54%) who cultivated them, while only (10.53%) used both methods. While in *Doaba* region nearly half of the respondents (44.44%) preferred to both purchase and cultivation.

Table 4: Distribution of respondents according to the preference of procuring millets for consumption n=83

Preference	<i>Majha</i> n ₁ =17		<i>Malwa</i> n ₂ =57		<i>Doaba</i> n ₃ =9		Total n=83	
	f	%	f	%	f	%	f	%
Cultivate	3	17.65	10	17.54	4	44.44	17	20.48
Purchase	13	76.47	41	71.92	4	44.44	58	69.88
Both	1	5.88	6	10.53	1	11.12	8	9.64

Overall, purchasing was the most preferred mode of millet procurement across all regions, while both cultivation and purchase lowest in all regions. Although millets are lower rainfed crop. Also, carbon and water impact of millets is incredibly low when compared to other cereals like rice and wheat and also require less water to thrive, and their growing season is shorter. Millets are therefore crops that can

withstand climate change. Their negligible environmental impact makes them an environmentally friendly grain (Reddy 2024) [6] but with green revolution, weak supply chain and market linkage cause difficulties in procuring millets. India's millet production area has shrunk mostly as a result of labour-intensive processing and poor yields. Also, the difficulties in processing, storage and emphasis on rice and wheat cultivation have further worsen the millet cultivation in all the regions of Punjab.

The table 5 revealed that millets in the form of flour was most preferred among the respondents, followed by whole millet (27.71%) and biscuits (22.89%), while popcorn, and millet milk were the least preferred, each reported by only (1.20%) of respondents. In the *Majha* region, millet flour was most preferred form, consumed by majority of respondents (82.35%), followed by biscuits (47.05%) and noodles (35.29%), whereas other forms such as dosa batter, flakes, and millet milk were lowest only 5.88% each. In the *Malwa* region, flour was preferred by more than half of the respondents (63.15%), followed by whole millet (33.33%) and biscuits (15.78%), while products such as noodles, pasta, breads, and daliya were consumed by less than 2 per cent each.

Table 5: Distribution of respondents according to consumption of millets in different forms n=83

Different forms	Form of millets							
	<i>Majha</i> n ₁ =17		<i>Malwa</i> n ₂ =57		<i>Doaba</i> n ₃ =9		Total n=83	
	f	%	f	%	f	%	f	%
Whole Millet	2	11.76	19	33.33	2	22.22	23	27.71
Dosa batter	1	5.88	0	0.00	0	0.00	1	1.20
Flour	14	82.35	36	63.15	5	55.55	55	66.26
Flakes	1	5.88	0	0.00	0	0.00	1	1.20
Daliya	1	5.88	1	1.75	0	0.00	2	2.40
Noodles	6	35.29	1	1.75	0	0.00	7	8.43
Pasta	3	17.64	1	1.75	0	0.00	4	4.81
Biscuits	8	47.05	9	15.78	2	22.22	19	22.89
Breads	2	11.76	1	1.75	0	0.00	3	3.61
Laddoo	2	11.76	1	1.75	0	0.00	3	3.61
Popcorn	1	5.88	0	0.00	0	0.00	1	1.20
Millet milk	1	5.88	1	1.75	0	0.00	2	2.40

*Multiple responses

In the *Doaba* region, flour (55.55%) was the most common form, followed by whole millet (22.22%) and biscuits (22.22%), while no respondents reported consumption of noodles, pasta, or other value-added products. Millet flour was most used method of consumption but still storage related challenges such as pest infestation in flour makes it difficult to manage moisture, temperature and leads to short shelf life. These difficulties were made worse by inadequate storage expertise, which can result in poor preservation and possible spoilage of millet flour at home.

Table 6: Distribution of respondents according to the overall consumption of millets n=300

	Consumption	f	%
1	Low	244	81.33
2	Medium	44	14.67
3	High	12	4

The data in table 6 reveal that the majority of respondents that is more than four-fifths (81.33%) were at low consumption

category. Around (14.67%) consumers were at medium consumption category, while lowest consumption (4.00%) shown was high consumption category of millet.

Further it was found that the millet intake among the respondents remains largely low because harder to process millets since rice is simpler to cook and clean also purchasing millets was costly because rice was available through the Public Distribution System at little or no cost. Further millet was usually eaten with milk or buttermilk, but its use was further limited by the high price or unavailability of milk (Patil and Sankangoudar 2019) [5]. With being expensive millets are also difficult to process and procure which increases the low consumption of millets.

Conclusion

The study concludes that millet consumption among rural households in Punjab remains relatively low, with less than one-third of respondents incorporating millets into their diets. Pearl millet (*Bajra*) and finger millet (*Ragi*) were the most commonly consumed millet varieties, whereas the

consumption of minor millets remained negligible. Most respondents had adopted millet consumption only within the last five years, indicating a gradual resurgence driven by increased health consciousness and government promotional efforts. Nevertheless, low awareness, limited availability, declining cultivation, and changing dietary preferences continue to hinder wider adoption. Strengthening extension programmes, nutrition education, value addition, market accessibility, and policy support for millet cultivation can substantially improve millet consumption and contribute to better nutritional security in Punjab.

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