



# CONSUMER PERCEPTIONS AND MARKET POTENTIAL OF MILLETS – A COHORT STUDY

**Ms.Sanjeeda Begum**

Post-Graduate Teacher (Economics)

Telangana Model School & Junior College,

Yenkepally Village, Pudur Mandal, Vikarabad District, Telangana State, India

**Abstract:** Millets are ancient grains, which have traditionally been a part of Asian and African diets and are a source of complex carbohydrates, and nutritionally superior compared to white rice. The current study was postulated to understand consumer perceptions, awareness on the market potential of Millets in the Rangareddy district of Telangana State. The sample consists of a corpus of one hundred (100) consumers of Millets. A self-developed structured survey questionnaire was employed to elicit required information. Simple statistical tools like percentages were employed to interpret the results. The results of the study demonstrated that overwhelming majority of the sample possessed *awareness* with regard to millets and its utility. It was also reported that lack of awareness was the chief barrier for market potential of millets. Implications as well as directions for future research were also portrayed.

**Key Words:** Consumer perceptions; Market potential, nutritional values; various types of millets.

## I. INTRODUCTION

Millets are known as nutri-cereals, are high-energy grains that were domesticated and cultivated as early as 10,000 years ago (Paschapur et al., 2021). Millets are a group of small-seeded annual grasses cultivated as grain crops, particularly valued for their nutritional density and role as staple foods for marginalized populations (NASS, 2013). Grains such as sorghum (jowar), pearl millet (bajra), and finger millet (ragi) have historically played a crucial role in India's traditional agricultural systems and diets. These crops are known for their high nutritional value, flexible to harsh climates, and lower input necessities compared to traditional cereals like rice and wheat (Devi et al., 2014). However, with the advent of the Green Revolution, the focus of agriculture shifted towards high-yielding varieties of rice and wheat, resulting in a significant reduction in both cultivation and consumption of millets (Gowda et al., 2023).

In response to growing awareness about food security, health and sustainability, the United Nations General Assembly has declared 2023 as the International Year of Millets (FAO, 2023). In support of this initiative, the Government of India has encouraged millet addition through public distribution systems, mid-day meal schemes, and awareness campaigns. Despite these attempts, millet consumption remains limited especially in semi-urban areas, where modern food habits increasingly dominate.

### 1.1 Significance of the study

Millets were often considered "poor man's food" and were overshadowed by more prevalent grains like rice and wheat. However, millets have recently regained popularity and increased in importance for several reasons. Firstly, the focus has shifted to wholesome and nutrient-dense food options due to rising health and well-being concerns. Millets, with their rich nutritional profile, gluten-free status, and low glycaemic index, have become suitable replacements for individuals with special dietary needs, such as those with diabetes or gluten intolerance. Secondly, there is a growing interest in the sustainability and environmental impact of millet farming. Millets are considered climate-smart crops because they thrive in low-input farming methods, require minimal water, and have positive effects on soil health. As sustainability becomes a top priority, millets are being grown to support environmental stewardship, reduce greenhouse gas emissions, and promote biodiversity. Thirdly, the cultural and culinary heritage associated with millets has sparked a resurgence in their popularity (Hulas Pathak, 2023).

In view of the above perspective, the Government of India has introduced some of the Schemes for Promoting Millets, viz.,

1. National Food Security Mission (NFSM)
2. Rashtriya Krishi Vikas Yojana (RKVY)
3. Pradhan Mantri Krishi Sinchai Yojana (PMKSY)
4. National Mission for Sustainable Agriculture (NMSA)
5. National Mission for Sustainable Agriculture (NMSA)
6. National Food Processing Mission (NFPM)
7. Pradhan Mantri Annadata Aay Sanraksha Abhiyan (PM-AASHA)
8. Millets Promotion and Development Program (MPDP)

## 1.2 Need for the Study

Millets are small-grained multipurpose cereals and impart medicinal value by virtue of the presence of vitamins, minerals, and bioactive compounds that aid in the recovery and well-being of human health. Hulas et al, (2023) observed that Millets are gaining prominence in recent years due to their nutritional value, gluten-free nature, adaptability, water efficiency, support to sustainable farming, economic potential for small-scale farmers, making them essential for health, environment, and livelihoods. There is robust scientific evidence to suggest that consumption of millets reduces the progression of pre-diabetes, results in better glycemic control, reduces body mass index (BMI), and mitigates atherosclerotic cardiovascular disease risk (2). High resistant starch (RS) and slowly digestible starch (SDS) in millets, causes lower postprandial glucose and insulin excursions.

Many studies have focused on the awareness of consumers on Millets but little empirical evidence was found on their market potential. Hence, the following study is taken up to fill this research gap.

## II. REVIEW OF RELATED LITERATURE

Research efforts on millet crops in India have been in progress since the beginning of the 20th century (Venkatesh Bhat, 2018). Umpteen research has been done still much has to be taken place. Some of the recent research that has documented are:

**Alekhyia, P. and Raj Shravanthi, A. (2019)** examined the factors influencing buying behavior of millet products among sample consumers and to assess consumer acceptance of millet products offered by different organization. The sample of the study consists of 100 consumers across the Hyderabad city of Telangana. Results revealed that income of the respondents was not influencing the purchase of millet based products. Among all the channels of information dissemination on health benefits of millet products, social media has more influence as it can reach all the age groups easily. All the millets were frequently available in the market except brown top millet which was rarely available and there was demand from the respondents for brown top millet because of its multiple health benefits. Majority of the respondents ranked flavour as a major attribute for consumer acceptance of the millet based product.

**Asha Devi Sukumaran Sreekala, P. Anbukani Alka Singh, B. Dayakar Rao, Girish K. Jha (2022)** examined if the supply would be sufficient to meet the demands in the near future while also analyzing the trends in the area, production, productivity, and consumption of millets in India at the national and state level. The study indicates that there will be a surplus in the case of Bajra and small millets, while in the case of Jowar and Ragi there will be a net deficit in the coming years which is a matter of concern. It was suggested a scope for augmenting the production in the short run by improving the productivity without increasing the area through popularizing new varieties, expanding certified seed distribution, and improving crop management practices.

**Hulas Pathak, Kothuru Naga Madhu Kiran and A. K. Gaurah (2023)** explores consumer awareness, sources of awareness, reasons for consumption, consumption patterns, and factors influencing the consumption patterns of millets and millet-based products. It was reported that among the 150 respondents, only 31 per cent reported frequent consumption of millets. Further, the study reported a significant association between consumer awareness and the consumption patterns of millets and millet-based products. 57 per cent of respondents are moderately familiar with millets, while 23 per cent are very familiar, and 20 per cent are less familiar. Health benefits (35 per cent), gluten-free options (41 per cent), and cultural preferences (13 per cent) emerged as key drivers of millet consumption among frequent consumers. Furthermore, the study highlights the influence of demographic factors such as age, education level, family income, and occupation on millet consumption patterns.

**MK Vahini et al (2023)** analyzed the various factors that had influenced the consumption of millets among the urban and rural households of 300 households in 9 villages scattered over 3 taluks of Coimbatore district in 2023. The results revealed that per capita consumption of millets is higher in urban household (2.29 kg/month) when compared to rural (1.83 kg/month). Influence of 11 independent variables on the consumption of millets (dependent variable) was studied using binary logistic regression. The analysis reveals significant factors influencing millet consumption: age positively affects consumption, with each additional year increasing the likelihood by 0.53%. Being female enhances the odds of consumption by 8.79% since the selected population comprises most of Females. Greater awareness of millet benefits escalates consumption by 31.69%. Positive taste perception raises the likelihood by 12.44%. Perceived nutritional value amplifies consumption by 14.82%. Education's impact is minor (0.0594). Higher prices decrease consumption (25.77%). Income shows negligible effect. The parameters that influence the purchase of millet products were identified using Garrett Ranking method.

**HariHaran M (2023)** investigated consumer perceptions towards the selling of millet products. The results of the survey show that although the majority of the respondents were aware of millet, only a small percentage had consumed millet-based products. The reasons for this were the limited availability of millet products, lack of variety, and high prices. The respondents who had tried millet products had a positive perception towards them, citing health benefits, taste, and nutritional value as their primary reasons for purchase.

**Gomanth Kumar K et al (2023)** appraised the awareness, analyzing the consumption pattern and the factors influencing the consumption of millet products among 120 college students in the YSR (Kadapa) district, Andhra Pradesh. The study revealed that most respondents (94.17 per cent) were aware of millet based products, and 80.83 per cent respondents were aware through word of mouth from family and friends. Products made with Ragi millet were the most consumed millet products. The health and nutritional benefits was the key factor influencing millet product consumption.

**Ambati Mounika et al (2023)** explored the awareness of millet based FMCG food products among urban and rural consumers and to compare and analyze the consumption pattern of urban and rural consumers towards millet based FMCG food products. In order to meet objectives, the data was collected from 120 urban and 120 rural consumers in Telangana state. The data was analysed using Z test. The results revealed that the majority of urban consumers were aware and consume RTC and RTE millet based products during breakfast, lunch and dinner time and majority of the rural consumers were not aware about the RTC and RTE millet based products, they only know and consume millets in grain form and consume by making traditional recepies like ragi jawa, jonna gatka, roti etc mostly during lunch, breakfast, dinner. Frequency of consumption among urban consumers is mostly weekly twice followed by daily and among rural consumers is mostly daily followed by weekly twice. The quantity of purchase of millet based products per month among urban consumers is mostly 1-2.5 kg and among rural consumers is mostly 2.5-5 kg. By application of Z test to consumption pattern data of urban and rural consumers, it was revealed that there is significant difference in the consumption pattern of urban and rural consumers in Telangana.

**Lakshmy Priya et al (2024)** assessed the consumption pattern of Millets among one hundred South Indian adult consumers in Chennai. Equal percent of participants (41%) consumed millets 1-3 times a week and 1-3 times / month. Respondents considered millets nutritious and healthy as the main reason for consumption. Monthly income and family size significantly influenced frequency of consumption of millets. With reference to income groups, respondents belonging to income group >Rs. 50,000/month showed the highest percentage of frequency of consumption of millets, when compared to other income groups. Most consumers felt millets were affordable. Kali (stiff porridge/balls, kanji (porridge), pongal, upma, and biscuits were the most sought-after choices. Majority of the consumers combined other grains especially pulses in millet preparations such as pongal and kichidi. Finger millet preparations were the most commonly consumed millet-based preparation among all income groups.

**Jaison Sagayanathan.G , Sudhagar.D.P (2024)** studied millet purchase and consumption behaviour in the Southern Indian context. It was reported that purchase decision makers of millets, purchase outlet of millets, frequency of purchase, money spent on millets purchase, most preferred millet types, frequency of cooking millets at home, preferred meal period to consume millets, cuisine preference to cook millets and the main reason for consuming or purchase millets was documented.

**Nishad M and Pathak H (2025)** investigated consumer awareness and consumption patterns of millet-based products at the Millet Café in Raigarh, Chhattisgarh. Millets, ancient grains with high nutritional value and climate resilience. The findings reveal a significant association between the level of awareness and consumption frequency of millet-based products ( $p = 0.029$ ), indicating that consumers with higher awareness are more likely to consume millets regularly. However, no significant association was found between the source of awareness and consumption pattern ( $p = 0.986$ ), suggesting that how consumers learn about millets does not significantly impact their consumption behavior. Popular products included millet chila and pakora, while lesser-known items like millet pizza and laddu had lower awareness and usage. Word of mouth (44%) and social media (32%) emerged as the most influential sources of awareness. Consumers showed price sensitivity, with preferences for products priced between ₹50-₹100 and in quantities of 500g-1kg. Key challenges identified were high product cost and limited consumer knowledge, while demands included better taste, variety, and packaging.

### III. RESEARCH METHODOLOGY

#### 3.0 Objectives of the Study

The chief objective of this cohort investigation is to appraise the perceptions of consumers on the awareness and market potential of Millets in the Rangareddy district of Telangana State.

#### 3.2 Hypothesis of the Study

There was no significant difference between awareness on Millets and their market potential among the consumers in the Rangareddy district of Telangana State.

#### 3.2 Sample

A cohort study is a type of longitudinal study where a group of individuals often sharing a common characteristic or experience, is followed over an extended period of time to study and track outcomes, typically related to specific exposures or interventions.

The sample consists of a corpus of one hundred (100) consumers from Rangareddy District of Telangana State. A self-developed structured survey instrument was used to elicit information from the respondents. Simple statistical tools like percentages were employed to interpret the results.



## IV. RESULTS AND DISCUSSION

Table No 1. Showing Demographic profile of the sample

Course			Frequ (N=)	Percent	Valid Percent	Cumulative %
Valid	Gender	Female	52	52.0	52.0	52.0
		Male	48	48.0	48.0	100
	Total		100	100.0	100.0	
	Age	18-25	15	15.0	15.0	15.0
		26-35	18	18.0	18.0	33.0
		36-45	39	39.0	39.0	72.0
		46+ above	28	28.0	28.0	100
	Total		100.0	100.0	100.0	
	Qualifi- cations	Up to SSC	14	14.0	14.0	14.0
		Intermediate	16	16.0	16.0	30.0
		Graduation	38	38.0	38.0	68.0
		PG+	32	32.0	32.0	100.0
	Total		100	100.0	100.0	
	Occupat ion	Pvt. Employees	31	31.0	31.0	31.0
		Govt. Employees	34	34.0	34.0	65.0
		Self- employed	27	27.0	27.0	92.0
		Others	8	8.0	8.0	100
	Total		100	100.0	100.0	
	Income	Upto 1 lakh	22	22.0	22.0	22.0
		1-2 lakhs	36	36.0	36.0	58.0
		3-4 lakhs	23	23.0	23.0	81.0
		4+ above	19	19.0	19.0	100.0
	Total		100	100.0	100.0	

It can be inferred from the table that a majority of the sample (52.0%) were female, while, the residual sample (48.0%) were male responded to the present investigation.

With regard to the age of the respondents, a good majority (39.0%) were between 36-45 years of age; followed by (28.0%) were above 46 years of age; another (18.0%) 26-35 years and the meager number (15.0%) were between 18-25 years of age.

As per the qualifications of the sample is concerned, a good majority of the respondents (38.0%) were graduates, another (32.0%) were Post-graduates and above, conversely, (16.0%) studied up to Intermediate and (14.0%) studied up to SSC.

In respect of Occupation of the sample, a good majority (34%) was Government employees; another (31.0%) were private employees. (27.0%) were self-employed and the residual sample (8.0%) belongs to other categories.

With regard to income, a good majority of the sample (36.0%) confessed they earn 1-2 lakhs per annum, whereas, another (23.0%) 3-4 lakhs; followed by (22.0%) up to 1 lakh. Interestingly, (19%) of the sample earn 4 and above lakhs per annum.

Table No 2. Showing perceptions of the sample

Awareness		Frequ	Percent	Valid Percent	Cumulative Percent
Valid	Yes	94.	94.0	94.0	94.0
	No	6	6.0	6.0	100
	Total	100	100.0	100.0	

It is evident from the descriptive statistics in the table that an overwhelming majority (94.0%) of the sample possessed awareness with regard to millets and its utility, whereas, a meager number (6.0%) of respondents voiced in a negative tone. The same findings were reported in the works of Das et al. (2021); (Kaur & Kaur, 2023); Hulas Pathak et al (2023)

**Table No 3. Showing perceptions of the sample**

Consumption-preference		Frequ	Percent	Valid Percent	Cumulative Percent
Valid	Daily	1	1.0	1.0	1.0
	Frequently	6	6.0	6.0	7.0
	Occasionally	49	49.0	49.0	56.0
	Rarely	39	39.0	39.0	95.0
	Never	5	5.0	5.0	100
Total		100.0	100.0	100.0	

The table mirrors the perceptions of consumers on their preferences of taking millets. Nearly half of the sample (49.0%) confessed that they occasionally consume millets. At the same time, a good majority (39.0%) opined they consume millets 'rarely', while, a meager number of respondents (6.0%), (5.0%) and (1.0%) ticked for 'frequently', 'never' and daily.

**Table No 4. Showing perceptions of the sample**

Awareness-various types		Frequ	Percent	Valid Percent	Cumulative Percent
Valid	Very much aware	39	39.0	39.0	39.0
	Moderately aware	29	29.0	29.0	68.0
	Slightly aware	21	21.0	21.0	89.0
	Unaware	11	11.0	11.0	100
Total		100.0	100.0	100.0	

It can be deduced from the given table a good majority (39.0%) have expressed that they were aware of the various types of Millets. On the other hand, another simple majority (29.0%) agreed for knowing various types of millets moderately. Followed by, another (21.0%) slightly aware of various types of Millets. Just a meager number (11.0%) openly confessed that they were unaware of various related Millets.

**Table No 5. Showing perceptions of the sample**

More nutritious-Rice & wheat		Frequ	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	12	12.0	12.0	12.0
	Agree	59	59.0	59.0	71.0
	Neutral	2	6.0	6.0	77.0
	Disagree	6	2.0	2.0	79.0
	Strongly Disagree	21	21.0	21.0	100
Total		100.0	100.0	100.0	

For a query on Millets are more nutritious than that of rice and wheat was agreed by a large majority of (59.0%) followed by another (12.0%) as 'strongly agreed'. In the same manner, a simple majority (21.0%) strongly agreed and another (6.0%) joined them in saying 'disagreed'. Surprisingly, (2.0%) preferred to be 'neutral'.

**Table No 6. Showing perceptions of the sample**

Millet based products-consumption		Frequ	Percent	Valid Percent	Cumulative Percent
Valid	Millet Flour	42	42.0	42.0	42.0
	Puffed/Flaked Millets	24	24.0	24.0	66.0
	Millet-Based Snacks	18	18.0	18.0	84.0
	Ready-to-Eat Products	13	13.0	13.0	97.0

	Others	3	3.0	3.0	100
	Total	100.0	100.0	100.0	

As per the statement, perceptions of consumers on Millet based products, (42.0%) voted for Millet flour; followed by (24.0%) choosing ‘puffed/flaked millets; another (18%) ticked for millet-based snacks; (13.0%) for ‘ready-to-eat products and just (3.0%) preferred ‘others’. The same was documented by Sharma et al. (2024) in his research.

**Table No 7. Showing perceptions of the sample**

Barriers to consumption		Frequ	Percent	Valid Percent	Cumulative Percent
Valid	Lack of Awareness	23	23.0	23.0	23.0
	Preference for Taste of Wheat/Rice	14	14.0	14.0	37.0
	Limited Availability	16	16.0	16.0	53.0
	Difficulty in Cooking	12	12.0	12.0	65.0
	Very costly	10	10.0	10.0	75.0
	Lack of Variety	21	21.0	21.0	96.0
	Others	4	4.0	4.0	100
	Total	100.0	100.0	100.0	

With reference to the statement ‘barriers to consumption of Millets, a good majority (23.0%) preferred ‘lack of awareness’ followed by (21.0%) expressed lack of variety; (16.0%) limited availability; another (14.0%) ‘Preference for taste of wheat and rice; (12.0%) difficulty in cooking millets; (10.0%) voted as very costly and just (4.0%) opted for others. Such findings were supported by the works of Pardeshi et al., (2024) and Bandyopadhyay et al. , (2023).

**Table No 8. Showing perceptions of the sample**

Affordability		Frequ	Percent	Valid Percent	Cumulative Percent
Valid	More affordable	12	12.0	12.0	12.0
	Less affordable	32	32.0	32.0	44.0
	Not at all affordable	56	56.0	56.0	100.0
	Total	100.0	100.0	100.0	

As per the affordability of millets is concerned, the table depicts that a good majority of the sample (56.0%) opted for ‘not at all affordable’; another (32.0%) for less affordable, while, a meager number of respondents (12.0%) preferred ‘ more affordable’. The work of Kumar and Sharma (2024) was in consonance with this finding.

**Table No 9. Showing perceptions of the sample**

Motivational factors		Frequ	Percent	Valid Percent	Cumulative Percent
Valid	Health Benefits	76	76.0	76.0	76.0
	Taste	12	12.0	12.0	88.0
	Availability	8	8.0	8.0	96.0
	Affordability	4	4.0	4.0	100
	Total	100.0	100.0	100.0	

With regard to perceptions of consumers on motivational factors towards millets, the table vividly presents an overwhelming majority (76.0%) candidly confessed health benefits; followed by millet’s taste ;( 8.0%) availability and the least number of

respondents (4.0%) have chosen affordability. The same was corroborated in research findings of Shah et al., (2024) and Arora and Singh (2024).

### V. Major Findings of the Study

1. The results of the study demonstrated that that an overwhelming majority (94.0%) of the sample possessed *awareness* with regard to millets and its utility.
2. It was revealed that nearly half of the sample (49.0%) confessed that they occasionally consume millets.
3. The findings mirrored that a good majority (39.0%) have expressed that they were aware of the various types of Millets.
4. It was also reported that Millets are more nutritious than that of rice and wheat was agreed by a large majority of (59.0%).
5. The findings of the study on perceptions of consumers on Millet based products, (42.0%) voted for Millet flour.
6. It was also found that barriers to consumption of Millets as 'lack of awareness'.
7. As per the affordability of millets is concerned; it was found that a good majority of the sample (56.0%) opted for 'not at all affordable'.
8. It was also found that an overwhelming majority (76.0%) candidly confessed health benefits as the chief motivational factor..

### VI. Implications of the Study

The findings of the present study reveals that *consumers* at various levels need to develop a robust awareness on the *utility of Millets and its related products* using proper promoting techniques and campaigns so that it can create a better image among the consumers.

The Government as well as Non-Governmental Organizations should come forward and offer timely assistance to consumers on the *market potential of Millets* and related products towards a healthy immunity world. The Government should provide incentives and subsidies to new start-ups to promote millet based value-added food production.

The findings also demonstrate that there is a need for the policy makers to implement consumer-oriented policies for a sustainable food for future.

### VII. Future Research

This cohort study could not represent the entire population of consumers. However, a more extensive sampling might help future research to ensure an in-depth knowledge on the awareness and the perceptions of consumers on Millets and their market potentials. Further, an empirical study is suggested for a better research inputs.

### VIII. Conclusion

The study underlined that the consumers occasionally consume millets; millets are more nutritious than that of rice and wheat. On the other hand, consumers also confessed that Millets are 'not at all affordable'. But one thing is certain; millets are the marvel grains of the future.

### Conflict of Interest:

The author declares that she has no conflicts of interest.

### Use of artificial intelligence (AI)-assisted technology for manuscript preparation:

The author confirms that there was no use of AI-assisted technology for assisting in the writing of the manuscript and no images were manipulated using AI.

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