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REVIEW ARTICLE

Consumption patterns and utilization trends of minor millets: A comprehensive review

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Abstract

Millets are the staple food for millions in Asian and several African countries. They are rich in dietary fiber, micronutrients and beneficial phytochemicals. Minor millets—comprising of grains like kodo, little, barnyard, foxtail and proso millet are historic, nutrition-rich cereals that are extremely suited to India's rainfed agriculture. Despite being rich in nutrition and ecologically robust, consumption of these grains has fallen dramatically over the past few decades. This review analyses present-day consumption patterns of small millets in India, noting regional trends, frequency and mode of consumption, socio-demographic determinants, awareness levels and changing dietary trends. The study finds consumption to be predominantly infrequent and regional in character, with higher use in tribal and rural populations and growing interest in urban well-being markets. Barriers such as inadequate market access, high prices of packaged foods, unfamiliarity with cooking and perceptions of taste continue to restrict large-scale acceptance. Nevertheless, changing trends such as greater millet inclusion in health-focused diets, social media promotion and institutional support through ICDS and school meal schemes indicate positive momentum toward millet renaissance. This paper emphasizes the need for integrated action toward awareness generation, value chain development and cultural revalorization in mainstreaming small millets in modern Indian diets.

Keywords: minor millets; nutritional awareness; traditional grains; millet consumption pattern

Introduction

Minor millets are tiny seeds that are planted all over the world for food and fodder in dry locations. These were essential staple foods before fine cereals were introduced in India. Minor millets in India-such as kodo, little, foxtail, barnyard and proso millets are cultivated on approximately 5.5 lakh ha, with an annual production of around 4.4 lakh tonnes as of 2017-18. This is a small fraction of India's total millet production. The cultivation of minor millets has been declining steadily over the past few decades, with the area under cultivation shrinking at a compound annual growth rate (CAGR) of -4.64 % and production decreasing at -3.60 % between 1990 and 2020. However, yield has shown a modest increase with a positive CAGR of 1.09 %, indicating some productivity improvements despite the falling area. The major producing states are Madhya Pradesh and Uttarakhand, together contributing nearly 50 % of India's minor millet output—34.3 % and 14.0 % respectively (1). While minor millets are known for their nutritional value and climate resilience, they remain underutilized and regionally concentrated. The declining trend raises concerns about biodiversity, food security and nutrition, especially as policy focus and market incentives continue to favour major cereals like rice and wheat. Addressing these challenges requires renewed support for minor millets through improved extension services, value chain development and public awareness campaigns (2, 3). Millets are very healthy dietary grains. They are high in fibre, vitamins and minerals, including calcium, iron, zinc and potassium. Millets are beneficial to diabetics since they have a low glycaemic index. However, throughout time, both consumption and cultivation of small millets have fallen dramatically (4). Minor millets cultivation in India has declined due to a variety of issues, including economic, agronomic and societal. During the Green Revolution, the government encouraged high-yielding hybrids of minor millets that were in decline and conventional processing methods, which were often carried out by women, were extremely labour-intensive.

Empirical evidence shows while rural awareness of small millets is high, intake is irregular—typically just a few times a month and daily intake is rare, even among farmers of millets. South Indian urban adults' evidence greater activity, but just about 41 % reported 1—3 times a week's intake. The cost, taste preference and limited access to ready-to-cook (RTC) products strongly influence take-up (5). A recent multi-state WFP-IIMR survey, conducted at the Millets 2025 Summit, found 90 % of consumers had "only occasionally" consumed millets, mainly because of low awareness (75 %), taste expectation (91 %) and prevalence of myths about cooking limitations or seasonality.

These trends express an urgent disconnect between the nutritional potential of minor millets and prevailing consumption—a disconnect maintained by limited availability, sub-standard quality, public outreach and market forces favouring staple cereals. This review syntheses quantitative and qualitative evidence to survey current consumption patterns, barriers and opportunities and seeks to inform policy and programming to restore the role of minor millets in India's food and nutrition landscape (6). Nutritional profile of minor millets is represented in Table 1 (7).

Methodology

This review relies on secondary data analysis from peer-reviewed journals, government reports and institutional databases. Some of the key sources include the National Sample Survey Office (NSSO), ICAR-IIMR reports, Agricultural and Processed Food Products Export Development Authority (APEDA), IndiaStat and complementary academic research studies published during 2010—2025. The literature was chosen according to its applicability to consumption habits, awareness levels and determinants of small millets in India. A thematic approach was adopted for categorizing and synthesizing the data, revolving around regional trends, demographic determinants and policy effects. The review is constrained by the unavailability of primary data and inconsistencies in the availability of region-wise data.

Procedure of analysis

This review followed a systematic secondary research approach aimed at synthesising contemporary insights on the consumption patterns, utilisation trends and socio-economic factors influencing small millets in India. The analysis was performed in the subsequent phases:

Identify and select literature:

Databases and Sources: Peer-reviewed journals, institutional publications (ICAR-IIMR, FAO, APEDA, NSSO, IndiaStat, WFP) and grey literature (government documents, policy briefings and NGO publications).

Time Frame: Research published between 2010 and 2025 was prioritised to illustrate contemporary consumption trends, although foundational earlier works were included for historical context.

Search Terms: "minor millets", "small millets", "consumption patterns", "utilisation", "dietary awareness", "regional trends", "India", "barriers to millet consumption", "millet nutrition" and related terms.

Eligibility Criteria: Investigation employing primary and secondary data concerning consumption frequency, socio-demographic variables and levels of awareness.

Investigation focused solely on minor millets (foxtail, kodo, barnyard, little millet, proso, browntop). Documents pertaining to policy and programmes that link millet promotion to its consumption patterns.

Exclusion Criteria: Studies focusing exclusively on primary millets (pearl millet, sorghum, finger millet) unless they include comparative analysis.

Thematic categorisation and data extraction: The retrieved information included agriculture data, consumption frequency, regional variation, demographic characteristics (age, gender, income, education), obstacles and emerging trends. We employed a matrix-based approach to categorise the data thematically focussing on the following—Consumption patterns in households and regions, frequency and format [conventional versus ready-to-cook (RTC)/ready-to-eat (RTE) products], socio-demographic variables (age, income, education, cultural norms), degrees of awareness and perception, factors that hinder acceptance (cost, accessibility, taste and gastronomic experience) and emerging drivers (trends in urban well-being, social media and institutional initiatives)

Integration of Quantitative and Qualitative Data:

Quantitative Evidence: Data from the NSSO, APEDA and survey-based studies (e.g. WFP-IIMR, urban/rural household surveys) were consolidated to analyse per capita consumption, geographical disparities and frequency of intake. Descriptive data including CAGR, percentages and household frequency patterns were employed to illustrate trends.

Qualitative Evidence: Research incorporating attitudes, perceptions, cultural beliefs and barriers was synthesised through a thematic narrative approach, highlighting enduring socio-cultural justifications for insufficient millet intake.

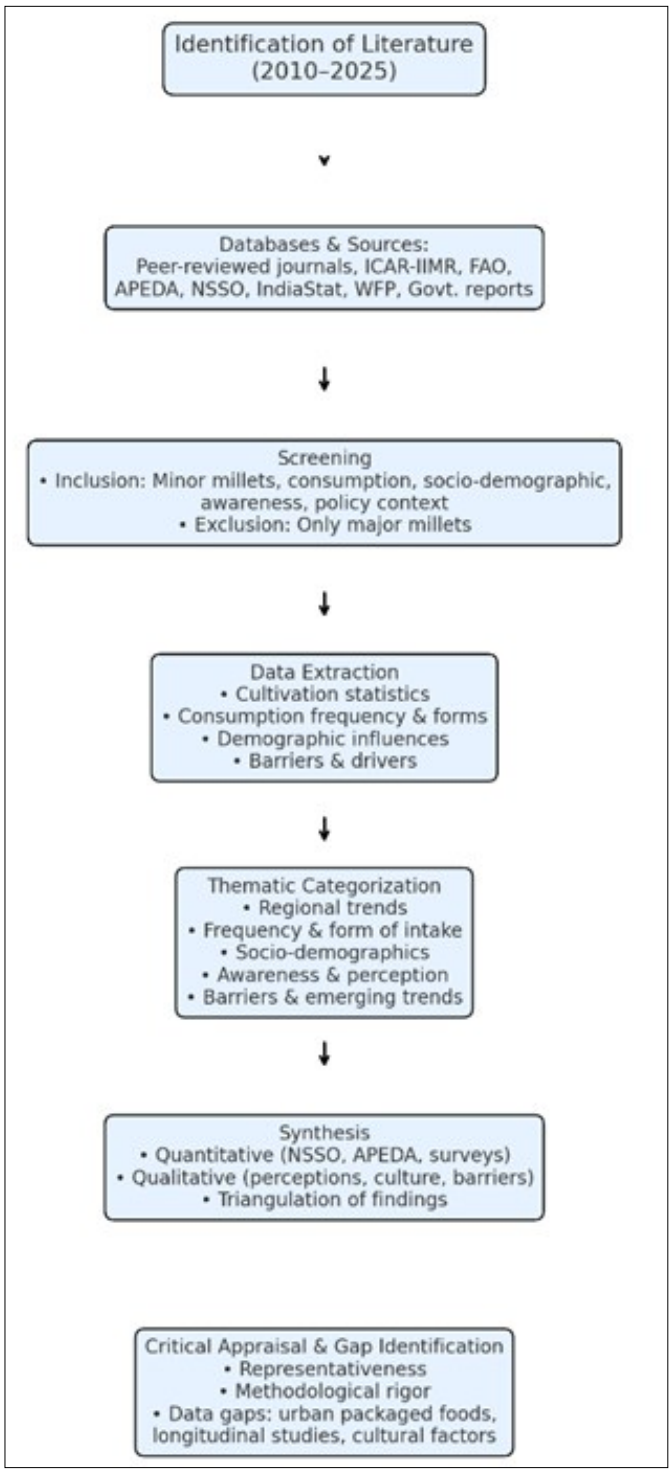
Triangulation and Cross-Validation: To ensure the data's reliability, it was verified against findings from independent academic research. We employed triangulation to integrate quantitative data, such as production and consumption statistics, with qualitative data, including consumer preferences, myths and cultural roles.

Critical Assessment and Identification of Gaps: To assess dependability, each study was evaluated based on sample size, representativeness of the population and methodology employed. Deficiencies were identified in the subsequent areas—lack of longitudinal consumption data at the household level, limited information regarding urban consumption of packaged millet products, insufficient integration of cultural and behavioural variables with policy initiatives.

An Analytical Framework: Ultimately, the evidence was consolidated into a cohesive framework illustrating the influence of production, awareness, socio-demographics, market access and cultural practices on millet consumption. The framework facilitated discussions and recommendations for policy, awareness initiatives and enhancements to the value chain.

Table 1. Nutritional profile of minor millets (7)

Minor millet	Protein (g/100g)	Dietary fiber (g/100g)	Calcium (mg/100g)	Iron (mg/100g)
Foxtail millet	11.2	8.0	31	2.8
Little millet	9.7	7.6	17	9.3
Kodo millet	8.3	9.0	27	0.5
Barnyard millet	11.2	10.1	20	5.0
Proso millet	12.5	7.6	14	0.8
Browntop millet	11.5	12.5	30	6.5



Overview of minor millet cultivation in India

Minor millets such as foxtail, little, kodo, barnyard and proso millets have localized cultivation in India. In 2017-18, they were grown on about 0.546 million ha and produced 0.439 million tonnes, as per ICAR MilletStats. ICAR-IIMR's most recent institutional estimates put the number slightly lower at 0.54 million ha and 0.40 million tonnes, fixing the stability of the area of cultivation.

On the other hand, total millet cultivation of aggregate millet crops (pearl millet, sorghum, finger millet and small millets) has grown to 12.19 million hectares with overall production of 15.38 million tonnes in FY 2023-24, according to APEDA. APEDA all-millet data classify total millet coverage of 13.086 million ha in 2021-22 as a testament to sustained importance in India's cereal baskets.

Large millet production is still localized in a limited number of states, whereas small millets are specifically led by Madhya Pradesh (34.3 %) and Uttarakhand (14.0 %) in 2023-24. Rajasthan, Karnataka, Maharashtra, Uttar Pradesh, Haryana, Tamil Nadu, Andhra Pradesh and Gujarat are other leading millet -producing states.

In the last 70 years, millet production, both major and minor millets in India, has changed dramatically. The area under millet also reduced significantly from about 35 million ha in the 1950s to 13.6 million ha in 2020, primarily due to the emphasis of Green Revolution on rice and wheat (1). Yet, productivity per unit area has increased through the production of improved seed varieties and agronomic procedures. In particular, area under minor millets reduced from about 0.5 to 5 million ha during 1961-2020, but slightly lower reduction was seen in pearl millet. This reduction is part of a wider trend towards more commercially rewarding crops like rice, wheat, maize, cotton and soybeans (8).

Regional Consumption patterns of minor millets

Minor millet consumption varies across India, with some regions showing higher intake due to factors like traditional dietary habits, nutritional benefits and availability. Assam and Bihar, particularly in rural areas, have the highest consumption of small millets. However, there's a general trend of declining consumption in many regions, potentially influenced by changing dietary preferences and the availability of other food staples like fine cereals through the Public Distribution System (PDS) (9). Fig. 1

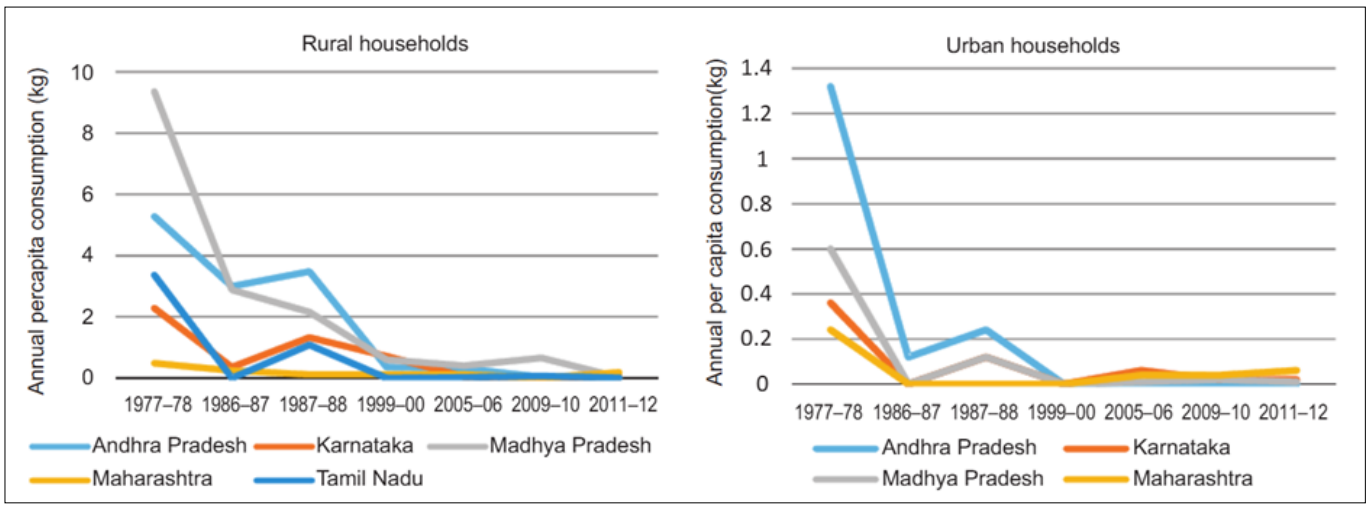


Fig. 1. State-wise consumption trends of minor millets.

presents consumption trends in rural and urban households of some states to illustrate this regional variation.

Consumption of minor millets in India is highly uneven by place, based on agro-climatic favorability, food culture and market access. State-to-state comparison based on NSSO data and regional research shows that Bihar and Assam have 2 of the highest per-household minor millet consumption levels at 18.7 kg/month and 18.8 kg/month respectively. Tamil Nadu and Karnataka, being traditional millet states, have significantly lower consumption levels of about 1.8 kg and 7.1 kg per household per month respectively (10).

This regional variation can be partly attributed to the urban-rural disparity in millet consumption. Rural households, particularly in tribal and rain-fed regions, exhibit greater familiarity and sporadic usage of minor millets, typically storing them in traditional food containers. A rural Karnataka study indicated that 79 % of the respondents were sporadic users of millets, with usage more a function of habit than active decision or nutritional awareness (11). Urban households, especially in metro cities, exhibit lesser consumption of millets and predominantly in health-conscious food. A survey conducted in Chennai during 2024 indicated that 41 % of the respondents consumed millets 1—3 times a week, and the same percentage consumed them only 1—3 times a month.

Food cultures and agro-climatic conditions also determine consumption. Dryland farming states like Madhya Pradesh, Chhattisgarh, Odisha and Jharkhand with their tribal populations have historically included small millets like kodo, barnyard and little millet in daily diets because of their ability to grow in poor soil and low rainfall. These habits have remained in inaccessible rural pockets, particularly with the tribal population, who continue to prepare millet-based gruels, rotis and steamed cakes in particular seasons and festivals. Conversely, in irrigated, rice-dominated states like Punjab and Kerala, consumption of minor millets is at trace levels. (5).

Frequency and form of minor millet consumption

The intake of minor millets in India is mostly irregular and differs significantly between urban and rural groups. Several studies emphasize that frequent intake of minor millets is uncommon and the millets are usually taken on a weekly or sporadic basis. In a study conducted in rural Karnataka, none of the participants consumed minor millets daily. Indeed, 84 % of farmers and 87 % of non-farmers took minor millets on an occasional basis, usually limited to traditional or festival foods (12). Likewise, a survey conducted in Chennai on urban adults reported that 41 % took millets 1-3 times per week and another 41 % took them on only 1 -3 times per month (11). A larger urban study in 7 Indian cities with a sample size of more than 15000 respondents reported that almost 50 % of the respondents consumed millets at least once in a week (13). Fig. 2 represents the consumption frequency of different nutri-cereals in urban households (14).

With regard to forms, the minor millets find application in a vast range of traditional, as well as contemporary preparations. Some of the traditional common forms are porridge (kanji), roti, idli, dosa, upma, ambali (fermented millet beverage) and sweets like holige and appam. In rural areas, the majority of the population continue to use whole grain or millet flour to cook these foodstuffs at home, following age-old culinary traditions. Urban consumers, on the other hand, are increasingly opting for RTC and RTE millet foods like instant dosa mixes, millet-based cookies, flakes and health bars. This trend is an indicator of a wider trend away from traditional to contemporary consumption patterns, especially in urban areas. A Telangana study reported that 56 % of urban consumers regularly consumed packaged RTC/ RTE millet products, while only 9 % of rural consumers consumed them (15). Flour and grain preferences still dominate rural areas because of availability and affordability, while the urban market is leading the consumption of processed millet foods as part of health and convenience trends (5). Perceived health advantages, convenience in preparation, taste and availability of the products are some of the driving factors behind these trends.

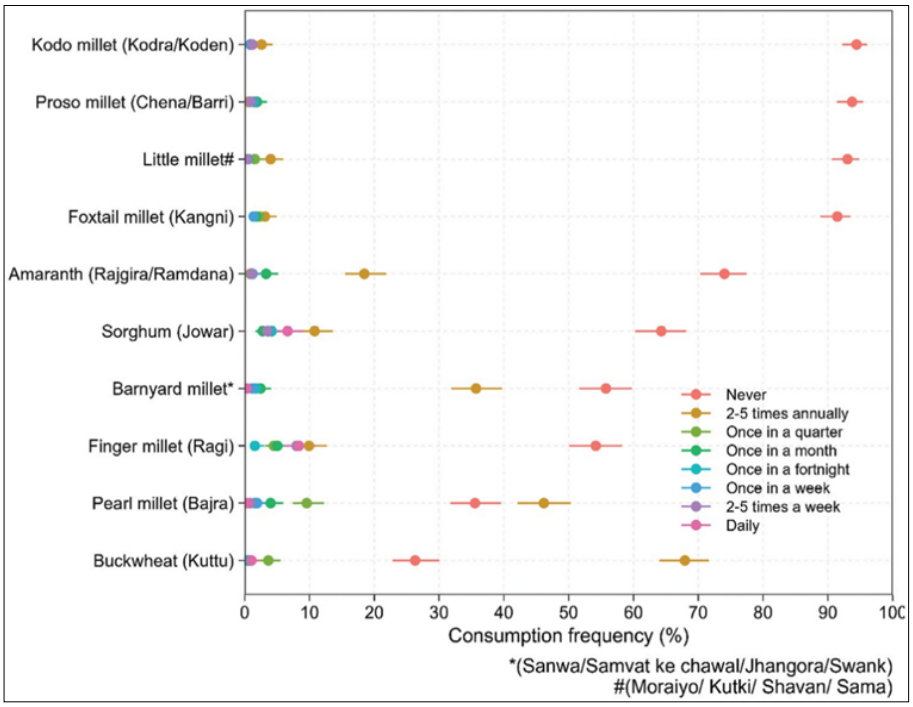


Fig. 2. Consumption frequency of nutri-cereals in urban households (14).

Socio-Demographic influences

Socio-demographic factors like gender, age, education, occupation, income and social class significantly influence the awareness and consumption of minor millets. For example, awareness and knowledge of millets are often higher among those with more education and those in higher social classes. Income also plays a role, with higher-income households sometimes exhibiting a greater frequency of millet consumption. However, traditional perceptions of millets as "poor man's food" can hinder consumption among certain groups (16, 17).

Age, Sex and Income Group

Minor millets consumption patterns are highly variable with income and age but with minimal variation by gender. In a survey of Chennai (n=100), 25—35 years included the highest frequency of consumption, but a substantial percentage of individuals over 55 years also consumed with some frequency. Though more women were involved, gender and frequency of consumption were not strongly associated (χ^2 test, $p>0.05$). More frequent consumption by higher-income groups (> ₹50,000/ month) (48 % weekly compared to 41 % monthly in lower incomes) was observed with income significantly and positively associated with consumption frequency (χ^2 test, $p<0.05$). A study in Kerala (n=641) also reported that age and income affected consumption but not gender—a perspective also dominant in Andhra Pradesh, where occupation affected consumption but not gender (18).

Rural households versus urban health-conscious consumers

The urban-rural disparity in millet consumption is one of motivation and product forms. Rural consumers eat small millets as a matter of tradition, availability and practice. As per a World Food Programme survey across 5 Indian states, millets were largely eaten as chapatis, rotis or dalaia in rural areas, whereas urban consumers ate ready-to-cook products. Among better urban segments, 52.6 % had seen increased millet consumption in the last 5 years, with social networks and health-consciousness as the prime drivers. The change marks a move away from staple cereals and urban demand is driven by convenience, health awareness and peer influence (19)

Education level and awareness correlation

Tertiary education levels are closely associated with millets' awareness and consumption. Among Telangana school-going kids (8—9th grades), 56.25 % were aware of millets and awareness was highly associated with actual consumption (χ^2, $p<0.05$). Among Udaipur (urban, adult women, n=120), 63.3 % were aware of millets and education was highly predictive of awareness and consumption behavior. Similarly, in Coimbatore, age, gender and awareness were also good determinants according to a study—every additional year of age raised probability of consumption by 0.53 %, female gender raised odds by 8.8 % and every unit rise in awareness raised consumption by 31.7 % ($p<0.05$).

Public awareness of nutritional value

Though most of the consumers depend on millets for health, knowledge about their nutritional value is uneven. In a survey of 100 women students, 90 % of them knew that millets are nutritious, but only 4 % of them used them daily and 26 % for flavor only. Since high awareness did not translate to regular use, it is evident that there is a gap between knowledge and practice. Urban Delhi households cited health as the main driver: 92.8 % used finger millet (ragi) for health and 76 % used barnyard millet for cultural reasons, as evidence of how perceived nutrition and tradition drive choices (18).

Cultural associations and myths

Small millets are also generally considered to be “poor man's food” and related to seasonal use like winter staple or fasting food. According to a WFP/IIMR 2025 survey, 75 % of the participants were not aware of the nutritional qualities of millet and most thought millets could only be consumed during winter or took a long time to cook. Such myths deter year-round uptake.

Peer food culture and local practices influence

Tradition and peer consumption are important drivers of millet consumption habits. Barnyard millet was consumed more in urban Delhi on account of its cultural significance during festivals and fasting and 76 % of the respondents attributed cultural reasons, whereas health reasons motivated ragi consumption. Cultural practice in communal or familial settings is likely to promote the utilization of millet.

Festivals, fasting and tribal traditions role

Minor millets are strongly rooted in ritual and seasonal tradition, especially among tribal and indigenous societies. Barnyard millet, for example, is commonly cooked as rice substitutes in festivals and fasting, assisting in safeguarding culinary traditions as daily consumption diminishes (20, 21). A historical look reveals millets' critical role in Vedic, folk and tribal cuisine, once more consolidating their ceremonial and cultural standing (22).

Barrier to consumption

Several factors hinder the broader consumption of minor millets despite their nutritional benefits, as summarized in Fig. 3. These include misconceptions about their nutritional value compared to other cereals, limited availability and higher cost and consumer preferences for taste and texture. Addressing these barriers requires targeted interventions like awareness programmes, improved processing techniques and accessible marketing strategies.

Limited market access and low availability

One of the key problems is the limited availability of minor millets in local markets, particularly in urban and remote locations. A survey of slum dwellers in Bhubaneswar indicated that 56.4 % of the women mentioned non-availability of millets as a key discouragement to frequent consumption. This was reported despite of high awareness (93.4 %) of the nutritional value of the grains, hence the gap between awareness and access (3).

Inability to cook and know how to prepare recipes

Most consumers, particularly urban consumers, are not aware of the methods of cooking millets, thereby decreasing their inclination to incorporate them in regular meals. A survey of Hyderabad consumers indicated that poor familiarity with millet recipes and poor awareness of the proper methods of cooking them were the key de-motivators. Traditional cooking techniques with millets are on the decline, especially among the younger generation (19).

Packaged millet product prices being too high

Cost is another significant deterrent. In a pan-India survey across seven cities, the population-largely in middle- and upper-income groups identified the exorbitant price of ready-to-cook and

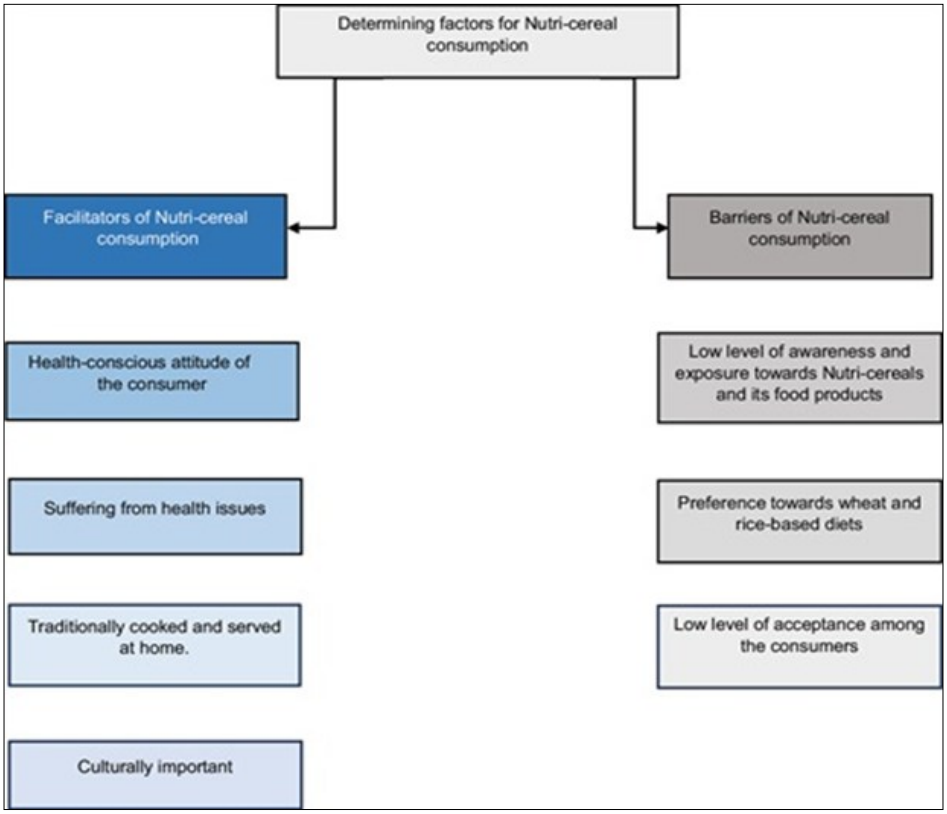


Fig. 3. Facilitators and barriers to nutri-cereal consumption in urban households (14).

packaged millet food as a discouragement against its regular consumption. In contrast to subsidized foods such as rice and wheat, millet foods are value-added foods, constraining their application for regular consumption (21).

Time- intensive cooking process

The conventional millet preparation takes longer, discouraging consumption in time-hungry households. Across several cities, respondents consistently indicated similar feedback that the time consumed in millets was a discouragement. This was particularly clear among urban working women of Bhubaneswar, who pointed out that the extended preparation time took away from its convenience for everyday meals (12).

Taste and texture preferences

Habit and taste have a significant role in food choice. Around 40 % of the respondents in a multi-city survey reported that the taste and consistency of wheat or rice were acceptable to their families and millets thus could not be added in daily meals. A further 22 % reported the unacceptable taste of millets by children and youth who were used to refined cereals (12).

Recent shifts and emerging TRENDS in minor millet consumption

In the last few decades, small millets have seen a modest comeback, especially in Indian cities, driven by health consciousness, policy action and market intervention. These trends imply a rewritten script-from poor man's cereal of the past to a contemporary, nutrition-rich "superfood."

Millet revival in urban well-being markets

Urban consumers are embracing millets as components of health-oriented diets. A mixed-methods survey of 875 urban Indians revealed that health awareness, social network influence and media exposure were critical drivers of millet consumption. The subjects linked millet consumption to weight management, diabetes control and overall lifestyle improvement. In most instances, the persons encountered millets through friends or community health groups, reflecting the emerging influence of social settings (24).

Social media, celebrity chefs and awareness campaigns role

Social campaigns like the Odisha Millets Mission (OMM) and national campaigns throughout the International Year of Millets (2023) have gone a long way in making millet increasingly popular (20). These campaigns, powered by social media, celebrity cooks and influencers, have succeeded in upgrading millets from “poor man's food” to high-end health grains. The application of contemporary branding and storytelling has especially won the hearts of young, urban consumers (24).

Youth and women's altered attitudes

Urban women and youth's changing lifestyles and increasing diet-related ailments have led them to reconsider diets rich in millet. In the Bhubaneswar slum study, 59 % of women agreed to experiment with millet recipes, which reflects receptiveness to dietary change when access and awareness are enhanced. Urban women also frequently mention weight management, diabetes prevention and organic food substitutes as reasons for opting for millets over refined cereals (24).

School meal, Integrated Child Development Services (ICDS) and midday meal schemes

Institutional integration of millets into government nutrition programmes has been shown to be a good approach in increasing consumption, particularly in women and children. The Odisha Millets Mission, for instance, has integrated millet-based snacks and laddus into ICDS and Mid-day Meal programmes. The interventions have increased millet production and demand and diet diversity among the vulnerable populations (3).

Strategies to encourage increased millet consumption among Indians

At the policy and institutional level

Incorporate additional minor millets into PDS, the Mid-day Meal Scheme and ICDS to normalise millet consumption across all socioeconomic demographics (1, 25).

Pricing support and subsidies: Establish a Minimum Support Price (MSP) for minor millets and provide additional benefits to enhance their competitiveness against rice and wheat in pricing.

Awareness initiatives: National and state-level programmes, shown by the Odisha Millets Mission, can demonstrate the interconnection between nutrition and climate resistance.

Perpetual supply chains: Establish strategies for procuring and storing millets to ensure their constant availability in retail outlets (28, 29).

Production levels and agricultural producers

Value chain development: Assist Farmer Producer Organisations (FPOs) and cooperatives in collaborating to market and process their products, enhance millet varieties that yield higher, exhibit insect resistance and are enriched with nutrients to improve both productivity and nutritional value.

Processing infrastructure: Establish dehulling, malting and milling apparatus in remote areas to enhance operational efficiency and improve product quality.

Market linkages: Utilise e-commerce platforms and farmers' markets to establish direct connections between farmers and urban markets (26, 27).

At the industry and market level

Encourage the food industry to develop millet-based goods (flakes, noodles, snacks, bakery items) that are RTC and RTE to meet the demands of urban consumers.

Collaborations between the public and private sectors: ICAR-IIMR, entrepreneurs and food businesses jointly develop innovative concepts for millet-based cuisine.

Export promotion: To enhance demand and increase farmer income, promote small millets as gluten-free superfoods in international markets.

Branding and marketing: Leverage social media, renowned chefs and influencers to transform perceptions of millets from “food for the impoverished” to “superfood”.

At the home and consumer level

Nutrition education: Instruct individuals in educational institutions and communities with the health advantages of millets.

Cultural revalorization: Promote the consumption of traditional millet meals and festival cuisines to link cultural pride with dietary practices.

Cooking acquaintance: Provide individuals with recipe books, classes and culinary demonstrations to alleviate their apprehension regarding culinary skills.

Urban health trends: Leverage city residents' focus on weight management, diabetes control and organic food consumption to encourage increased millet intake (25, 26, 29).

Conclusion

The consumption of tiny millets in India is influenced by tradition, knowledge, accessibility and evolving dietary trends. Individuals in rural and tribal regions continue to employ them intermittently for cultural and subsistence purposes. Nonetheless, urban residents are recognising their utility by making health-oriented choices. However, restricted availability, high costs, insufficient knowledge of cooking techniques and adverse perceptions continue to hinder their frequent utilisation. Concurrently, heightened health awareness, institutional food initiatives and policy endorsement are gradually dismantling these obstacles, so generating momentum for a revival. The future is promising for small millets. They could become increasingly prevalent in school meals, ICDS and PDS, thereby normalising their consumption. Improvements in processing and product innovation may enhance usability and acceptance. Enhanced market linkages and equitable pricing may incentivize both producers and consumers. Their gluten-free and climate-resilient attributes render them suitable for both domestic nutritional security and international health food markets. Reviving traditional foods and reinterpreting cultural links might enhance their popularity. With appropriate support from policy, markets, research and consumer awareness, small millets can transition from obscure grains to vital components of sustainable, resilient and safe nutritional food systems.

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Authors' contributions

PJ collected the literature and wrote the manuscript. MM contributed to editing, summarizing, and revising the final manuscript. KD participated in the approval of the manuscript. RPS contributed to summarizing and revising the manuscript. AS also contributed to summarizing and revising the manuscript. All authors read and approved the manuscript.

Compliance with ethical standards

Conflict of interest: Authors do not have any conflict of interests to declare.

Ethical issues: None

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