Consumer Preferences for the products of Minor Millets in Tumakuru District of Karnataka

ABSTRACT

The study was carried out in Tumakuru District of Karnataka state during 2021-22 to examine the consumer preferences for the products of Minor millets. Sample consumers are categorized into urban and rural consumer and data was enumerated from a total sample of 40 consumers comprising of 20 urban and 20 rural consumers. Finger millet was the most consumed among the urban consumers with 3.5 kg per month followed by foxtail millet 2.5 kg per month and little millet 2.0 kg per month, while other millets are equally being consumed by the urban consumers. The monthly household food expenditure among urban consumers, expenses made on groceries (38.03 percent), vegetables (13.75 percent) and millets (13.65 percent). The total food expenses made by urban consumers were Rs. 5404 of which 13.65 per cent was made on millets which amounted to Rs. 745. In case of rural consumers was Rs. 3906 which wasle ss than the urban consumers (Rs.5404). For each respondent, part-worth were estimated using OLS regression analysis, rural consumers also found price to be the most significant attributes accounting 40.74 percent of relative importance, gaining awareness among consumers in consumption of millets for nutritional value and health benefits is improving progressively.

Keywords: *Minor millets, Consumer preferences, conjoint analysis*

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Comment [D4]: Rural consumers were Rs. 3906 which wasless than urban consumers (Rs.5404).

INTRODUCTION

Millet is a common term to categorize small-seeded grasses that are often termed nutri cereals or dryland-cereals, and includes sorghum, pearl millet, ragi, small millet, foxtail millet, proso millet, barnyard millet, kodo millet and other millets. Millets are the cereal crops generally small-seeded and known for high nutritive value. Increasing interest in reviving the consumption of millets across various countries is favoring the growth prospects of this market in recent years. A number of initiatives are also being undertaken toward enhancing millet cultivation and consumption to reduce health risks caused due to diabetes, obesity, cardiovascular diseases. Millets contains calcium, iron and fibers which help to fortify essential nutrients for the healthy growth in children. The usage of millets in infant food and nutrition products is increasing and many manufacturers are expanding their business. In terms of nutritional property, they are superior to certain highly consumed cereals such as rice and wheat. Increasing unsustainable nature of rice and wheat production which are water intensive and are likely to be unsustainable, as fresh water resources are depleting around the globe. Millet grows easily in dry climate, have smaller harvesting period and require minimal water quantity. High product prices in comparison with largely consumed grains are acting as a hindrance for penetration in urban food market. Photo-insensitive & resilient to climate change, millets are hardy, resilient crops that have a low carbon and water footprint, can withstand high temperatures and grow on poor soils with little or no external inputs. Therefore, growing awareness amongst population regarding health benefits associated with millets consumption will boost industry growth by 2025.

The usage of millets in infant food and nutrition products is increasing and many manufacturers are expanding their business operations by acquiring smaller firms. It has also found usage in beverages like beer. Gluten-free beers are specially produced for individuals focused on reducing their gluten intake or diagnosed with celiac disease or a gluten intolerance. Breweries have started to add gluten-free beer option to increase their consumer base. Numerous developing nations and federal governments are framing long-term policies to roll out nutrition programs aimed at tackling malnutrition. The support of government initiatives and inclusion of millets in various food and beverage products are likely to enhance its industry size. Changing outlook towards low cholesterol and fat free alternatives, and rising awareness towards healthy diets may boost gluten free food demand. Increasing preference for healthy bakery preparations among

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consumer is motivating manufacturers to use natural and gluten free ingredients. Gluten free food products offer same taste & consistency without high concentration of saturated and trans-fat. Rising inclination to adopt healthy food habits and shift towards low calorie alternatives may stimulate market share. It can also help in providing food security to large population in the coming years. With steadily increasing demand from urban population in Asia Pacific, mainly India and China, farmers have begun drifting towards millets cultivation over rice and wheat. Although, minor millets are nutritionally superior, the non-availability of refined and processed millets in ready-to-use form has restricted their use on a larger scale (Shanthakumar et al. 2010). Millet grains offer many opportunities for value addition and diversified utilization which may create income enhancement opportunities for the farmers.

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OBJECTIVES

- To examine the Consumer preferences for the products of minor millets

METHODOLOGY

Study area

The study was conducted in Tumkur district of Karnataka state as the district ranks first in area and production of millet crop. Keeping this in view, Tumkur district was purposively selected to conduct the research study. Considering maximum area under millet cultivation as criteria, the four taluks viz., Chiknayakanhalli, Tiptur, Sira and Pavagada district were selected to conduct research study.

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Selection of respondents

Consumer's data related to millets consumption were collected from 40 respondents of Tumkur district using random sampling method. Among 40 respondents, 20 were from rural areas producing millet while remaining 20 respondents were from urban area of the selected district. Rural respondents were surveyed from Tiptur, Chikkanayakanahalli, Sira and Pavagada while urban respondents were also surveyed from Tiptur, Chikkanayakanahalli, Sira and Pavagada where lot of millet based products processing, value addition and marketing are carried out.

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Research design

- Conjoint analysis was adopted for the study

The data was tabulated, coded and analysed using IBM SPSS statistical software. The dependent variable willingness to pay (WTP) was regressed on selected explanatory variables to identify explanatory variables which highly influence the producers and consumers WTP for new variety. The logistic regression coefficient (βi) can be used to estimate adjusted odds ratios for each of the independent variables in the model.

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Tabular Presentation

Descriptive analysis was employed to compile the socio-economic status, cost and returns of minor millet cultivation, labour use pattern and marketed surplus. In order to facilitate interpretation of findings.

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RESULTS AND DISCUSSION

Monthly Average Consumption of Millets by Urban and Rural Consumers

The monthly average consumption of millets among the urban and rural consumers are studied and indicated in Table 1. The millets such as foxtail millet, little millet, finger millet, kodo millet, brown top millet and barnyard millet were the different millets consumed. Finger millet was the most consumed among the urban consumers with 3.5 kg per month followed by foxtail millet 2.5 kg per month and little millet 2.0 kg per month, while other millets are equally being consumed by the urban consumers. On the other hand, rural consumers consume more quantity of finger millet i.e., 5.5 kg per month followed by foxtail millet 04 kg per month, while little millet also having demand and monthly average consumption of little millet among rural people is 03 kg per month. In value terms kodo millet and brown top millet (Rs.150 & Rs. 95 per kg) was priced high for urban consumers.The price of millets is low in rural areas since they use millets which are produced by them.

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Comment [D24]: On the other hand, rural consumers consume more finger millet, i.e., 5.5 kg per month followed by foxtail millet 04 kg per month, while little millet also has demand and monthly average consumption of little millet among rural people is 03 kg per month.

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Thus, it can be observed from the table. 1 that urban consumers consumed wide verities of millets when compared to rural consumers even at a higher price. Likewise, rural consumers depended more on locally available or millets produced on their own field. Here, urban consumers had taken alone a share in consumption of millets due to its nutritional and health awareness (95.00 percent) whereas in rural consumers, they consume millets because of traditional staple food (90.00 percent) followed by own production (80.00 percent).

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Table 1: Monthly Average Consumption of Millets by Urban and Rural Consumers

Sl. No	Millets	Urban consumers (n=20)			Rural consumers (n=20)		
		Quantity (kg)	Price/kg	Value(Rs.)	Quantity (kg)	Price/kg	Value(Rs.)
1	Foxtail millet	2.5	58.00	145	04	45	180.00
2	Little millet	2.00	85.00	170	03	50	150.00
3	Finger millet	3.5	35.00	122.5	5.5	25	137.5
4	Kodo millet	1.0	150.00	150	0.75	80	60.00
5	Browntop millet	1.5	95.00	142.5	0.5	60	30.00
6	Barnyard millet	0.5	75.00	37.5	-	-	-

Monthly Household Food Expenditure of Rural and Urban Consumers

The monthly household food expenditure of rural and urban consumers are presented in Table 2. The results revealed that the household major expenditures were on groceries, vegetables, milk, fruits, millets, meat and miscellaneous. Among the urban consumers, expenses made on groceries 38.03 percent were the major followed by vegetables (13.75 percent) and millets (13.65 percent) respectively. The total food expenses made by urban consumers were Rs. 5404 of which 13.65 per cent was made on millets which amounted to Rs. 738. Similarly, in the case of rural consumers, groceries (47.37 percent) were the major expenditure, followed by millets (14.21 percent), vegetables (12.80 percent) and milk (8.96 percent), respectively. The expenses made towards millets were 14.21 percent amounting to Rs. 555. The total expense made toward food by rural consumers was Rs. 3906 which was less than the urban consumers (Rs. 5404). The share of millets in culinary of rural consumers was 14.21 per cent, and that of urban consumers was 13.65 per cent. Similarly the urban consumers used almost all types of millets but the rural consumers consumed only foxtail, finger and little millets as they were grown in their farms and neighborhood.

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Table 2: Monthly Household Food Expenditure of Rural and Urban Consumers

Sl. No	Particulars	Urban consumers (n=20)		Rural consumers (n=20)	
I	**Age**	Amount (Rs.)	Percent	Amount (Rs.)	Percent
1	Groceries	2055	38.03	1850	47.37
2	Vegetables	745	13.79	500	12.80
3	Milk	695	12.86	350	8.96
4	Fruits	320	5.93	200	5.12
5	Millets	738	13.65	555	14.21
6	Meat	550	10.17	250	6.40
7	Miscellaneous	301	5.57	201	5.14
Total		5404	100	3906	100

Consumption Pattern of Millet Products among Consumers

Consumption pattern of consumers for millet products are discussed in Table 3. Millet rice items such as palav, colored rice, malt, upma, sweets made out of millets baked products and snacks were the different millet products consumed by both urban and rural consumers. Rice items were consumed on a daily basis by all the consumers while upma was the next form of the millet consumption by both rural (65.00 percent) and urban (55.00 percent) consumers on a weekly basis most of the other products were purchased from retail outlets and hence the rural consumers did not have access to such products and urban consumers occasionally consumed such products.

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Table 3: Consumption Pattern of Millet Products Among Urban and Rural Consumers

Sl. No.	Millet Products	Urban consumers (n=20)			Rural consumers (n=20)		
		Numbers	Percent	Frequency of Consumption	Numbers	Percent	Frequency of Consumption
1	Millet Rice items	20	100.00	Daily	20	10.00	Daily
2	Malt	09	45.00	Weekly	08	40.00	Weekly
3	Upma	11	55.00	Weekly	13	65.00	Weekly
4	Idli/dosa	08	40.00	Weekly	07	35.00	Weekly
5	Sweets	05	25.00	Weekly	-	-	Weekly
6	Baked products	04	20.00	Occasionally	-	-	Weekly
7	Snacks	03	15.00	Occasionally	02	10.00	Occasionally

Reasons Influencing for the Purchase of Minor Millets for Consumption

It was noticed from the Table 4 that the major factors considered by the urban consumers while purchasing minor millets were as nutritional and health benefits (95.00 percent) followed by doctor's advice (55.00 percent) delicious taste in nature (30.00 percent) and suggestions from friends and relatives (25.00 percent). Similarly for rural consumers were expressed as traditional staple food (90.00 percent) followed by own production (80.00 percent) that is produced by household itself and nutritional value and health benefits (65.00 percent). Urban Consumers bought these products along with the monthly grocery in retail stores or they purchase it whenever they felt to consume these millet products. In case of the rural consumers household itself acts as a producer since majority of the rural respondents consumed as traditional staple food. Nutritional content was major factor for urban consumers which was influencing the purchase as most of the consumers were educated and having health consciousness as well as were aware about the nutritional benefits.

Comment [D32]: Urban Consumers bought these products along with the monthly grocery in retail stores or purchased them whenever they wanted to consume these millet products.

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Table 4: Reasons Influencing for the Purchase of Minor Millets for Consumption

Sl. No.	Particulars	Urban consumers (n=20)		Rural consumers (n=20)	
		Numbers	Percent	Numbers	Percent
1	Delicious taste	06	30.00	-	-
2	Nutritional and health conscious	19	95.00	13	65.00
3	Suggested by friends and relatives	05	25.00	-	-
4	Own production	-	-	16	80.00
5	Traditional staple food	-	-	18	90.00
6	Advice from doctors	11	55.00	-	-

Preferences for the Products of Minor Millet among rural and urban Consumers

The important attributes of millet that determine consumer preferences in urban and rural area were taste, colour, aroma, nutrition quality, size of grain, price, texture, taste and acceptability. For each respondent, the part-worth's were estimated using Ordinary Least Squares (OLS) regression analysis. The relative importance of the part-worth functions was compared across different attributes within segments in order to arrive at the relative importance of each attribute. Average part-worth's and the relative importance of the attributes for urban and rural area are presented in Table 5. Among all the attributes of millets studied for urban consumers,

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price was found to be the most important and first consideration for consumers, accounting for 32.22 per cent of relative importance with low price having the utility of -7.44. Nutritional quality had a strong influence on consumer's preference after price in urban area accounting for 17.03 per cent with further improve having the utility 10.44. The individual utilities for small, medium and bold size grain (13.09 percent preference) were -6.63, -9.51 and -8.65 respectively. Texture formed the fifth most important factor having a relative importance of 8.38 per cent, with soft one having the utility of 1.22. Aroma had the least important attribute accounting 4.80 per cent of relative importance. In general, consumption of millet in urban areas was relatively lower, compared to rural areas may be due to availability of other food substitutes. Likewise, rural consumers also found price to be the most important attribute accounting 40.74 per cent of relative importance, with low price having the utility of 9.86. Color had more influence on consumer's preference after price among rural consumers with a relative importance of 25.24 per cent with 'white' having the utility of 6.7. Taste was the third most important factor influencing consumer's preference after nutritional quality, accounting 9.7 per cent of relative importance, with sweet having the utility of5.01. While, size of grain was less important attribute with relative importance at 3.06 per cent. Acceptability was also least preferred attribute even by rural consumers also (3.90 percent). The fit of the additive model to the individual data was good. In case of urban consumers, Pearson's rank correlation value with 0.878 was significant at 5 per cent level, similarly, the Kendall's correlation value with 0.617 was also found to be significant at 5 per cent level. Similar pattern of correlations Pearson's rank (0.809) and Kendall's rank (0.617) were observed at 5 per cent level of significance for rural consumers (Table 5). This gives strong confidence in the suitability of the additive model. The urban and rural consumers would prefer reduction in price of millets rather than taste and aroma because the price of millets was very high compared to other cereals in the market. Consumers were aware of nutritional aspects and expressed to improve further and to reduce sweetness in millets because it was mainly consumed by diabetic patients, people with obesity and health conscious. Colour was also one of the most preferred attribute in which most them preferred yellow/white because polishing of millets would lead to loss of nutritional value. Consumers also preferred non-scented bold seed for consumption. These results show there is a scope for development of crops.

Comment [D37]: Nutritional quality strongly influenced consumer's preference after price in urban area accounting for 17.03 per cent with further improve having the utility 10.44.

Table 5: Consumer Preferences for the Products of Minor Millet (n=40)

Sl. No.	Attributes	Attribute levels	Urban consumers (n=20)		Rural consumers (n=20)	
			Utility	Relative importance (%)	Utility	Relative importance (%)
1	Price	Low	-7.44	32.22	9.86	40.74
		High	-3.72		19.73	
2	Color	White	-2.74	13.55	6.7	25.24
		Yellow	-3.49		7.7	
		Black	-2.74		3.1	
3	Size of grain	Small	-6.63	13.09	-0.33	3.06
		Medium	-9.51		-0.65	
		Bold	-8.65		-0.98	
4	Aroma	Natural	-0.36	4.80	-0.26	5.76
		Scented	-0.72		-0.53	
5	Nutritional quality	Maintain same	5.22	17.03	1.5	5.75
		Further improve	10.44		3.0	
6	Texture	Soft	1.22	8.38	-0.47	5.74
		soggy	2.45		-0.94	
		fluffy	3.67		-1.4	
7	Taste	Pungency	-0.40	4.92	2.50	9.7
		Sweet	-0.81		5.01	
8	Acceptability	Acceptable	-0.66	5.98	-0.97	3.9
		Not acceptable	-1.32		-1.95	
TOTAL			50.57	100	-26.23	100
Correlations			Values		Values	
Pearson's rank correlation			0.878		0.809	
Kendall's rank correlation			0.617		0.617	

Note: Significant at 5 per cent level

CONCLUSION

Majority of the urban consumers were middle aged between 35 to 55 years while 62.50 per cent among the rural consumers. It was instructing to notice that most of the millet consumers were

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literates. Urban consumers consumed more types of millets when compared to rural consumers even at a higher price. Likewise, rural consumers depended more on locally available or millets produced on their own field. Major share of the expenditure by both urban and rural consumers was on groceries. The share of millets in culinary of urban consumers was 13.65 percent, and that of rural consumers was 14.21 per cent. Minor millets are neglected in terms of support for both production and promotion, compared to other crops. Since Tumakuru is leading producer of minor millets (little millet, finger millet, foxtail millet, kodo millet) and now area under barnyard millet (*korale*) is also increasing in the study area. There is opportunity for the economic improvement of millets production, value addition and marketing have done in the area pertained for study.

REFERENCES

AMARAPURKAR, S., and BANAKAR, B., 2017. A case study of consumer preference towards foxtail millet products. *Int. J. Com. Business Man.*, **10**(2): 267-270.

AMBANA GOUDA DURGAD, AMRUTHA T JOSHI AND HIREMATH, G.M., 2021consumer preference for foxtail & little millet in North Eastern Region of Karnataka. *Economic Affairs*, **66**(1): 101-108

BARRATRY RS, RAJAPUSHPAM R., 2018. A Study on perception of millet products among household consumer in Salem District. *IOSR Journal of Business and Management* (IOSR-JBM); 20(8):67-76.

KALIDAS, K., AND MAHENDRAN, K., 2017. Buying behavior of consumers towards instant millet based food products. *Food Sci. Res. J.*, **8**(2): 196-202.

SHIRISHA S., 2018. A study on consumption pattern of millets and millet - based products in Guntur city, AP. M.Sc. Thesis. Submitted to ANGRAU, Guntur, Andhra Pradesh, India

VILAS, T., 2018. From green revolution to millet revolution, Indian Institute of Millets Research, Hyderabad, The Hindu, March 26, pp.3-4.

Comment [D39]: All references are not included in the article??