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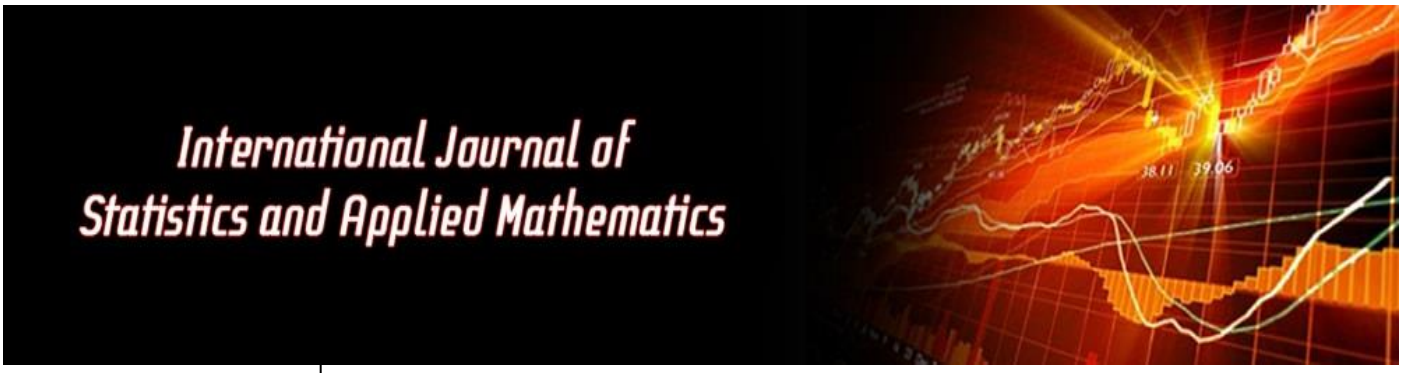

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Consumer preferences on millet-based value-added products in northern Tamil Nadu

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Abstract
Consumer preference towards sustainable Agri-value added food products are increasing and ready to give a higher price (Cecchini *et al*. 2018). The present study investigates consumer preferences for millet-based value-added products in Northern Tamil Nadu. This study examines the socio-economic traits of sample respondents, awareness about millet products, willingness to pay and purchasing patterns. 60 sample respondents were interviewed using a well-structured and pre-tested interview schedule. Percentage analysis was used to evaluate the socio-economic profile of the sample respondents, awareness, willingness to pay, purchase frequency, and perception towards millet-based value-added products. Study results reveal that all the sample consumers are well aware of millet flour and the health mix was 92%. Quality and nutrient content were the major attributes of consumer preference for food products. (Balaji Parasuraman *et al.*, 2021). The majority of the consumers perceived that value-added millet products have substantial nutritional value (88%). More than half of the sample respondents perceived that it has antioxidant properties. More than forty percent of the sample respondents are willing to pay more (21-30%) for both the ready to cook as well as ready-to-eat millet-based value-added products. Descriptive statistics and exploratory factor analysis were used to find the factors that influence consumers to choose millet-based value-added products. Study results reveal that sample consumers' families used to consume an average of around 4.3 kgs of millet. The typical family income ranged from Rs. 15,000 to Rs. 80,000, with an average of about Rs. 45,400. Families usually consisted of about 5 members, and the average age within these families was around 36 years, ranging from 23 to 62 years old. The selection of marketing channels was influenced by socio-economic and demographic factors such as age, education, and occupational position. (Balaji *et al*., 2001). The consumption of millet-based value-added products was influenced by higher family income, a larger family size, and older age. Consumer choice and some socio demographic factors, including marital status, having children, family size, and family yearly income, are significantly correlated with family income and expenditure, consumption expenditure, and frequency of purchases in a month. (Balaji Parasuraman *et al.*, 2022). Families with more income, more members, and older individuals tended to consume more millet-based value-added products.

Keywords: Consumer preference, millets, value addition and awareness

Introduction
Millet, a group of cereal grains rich in nutrients, comes under the Poaceae family. These grains are often called "coarse cereals" or "cereals of the poor." Millets are not only used in traditional dishes but also modern food products like cookies, bread, health mix, and more. Minor millet is nutritionally superior, the non-availability of refined and processed millets in ready-to-use form has restricted their use on a large scale (Shanthakumar *et al*. 2010) [21]. Millet consumption as direct food had significantly declined over the past three decades (Vilas, 2018) [22]. India possesses one of the highest malnutrition rates globally and prominent millet producer. (Gragnolati *et al*., 2005 [7]. Rural customers consumed finger millet, small millet, and foxtail millet, with foxtail millet being the most preferred millet. (Durgad, 2021) [5]. Farmers traditionally produced, while FPOs offer inputs, guidance, procurement, and wholesaling the millet value-added products (Gokul *et al*. 2019) [6]. The government of India had proposed to the United Nations to declare 2023 as the International Year of Millets

(IYOM). The proposal of India was supported by 72 countries and United Nations General Assembly (UNGA) declared 2023 as the International Year of Millets on 5th March 2021. India is the largest producer of millet as of 2021, with a total share of 41%, followed by Niger (12%) and China (8%). India also ranks 12th among those countries that produce high yields of millet but the consumption pattern of millet and value-added products is low which results in poor diet and malnutrition among the people. To overcome this issue, the consumer's preference for millet and millet-based value-added products must be studied. The study discussed aims to explore consumer preferences for millet-based value-added products in Northern Tamil Nadu, considering the increasing significance of millets in the region's agriculture and diets.

2. Methodology

The Northern Zone of Tamil Nadu, which comprises the districts of Chennai, Kancheepuram, Chengalpattu, Cuddalore, Villupuram, Vellore, Tiruvannamalai, Dharmapuri, and Tirupathur, is the second-largest millet-producing region in Tamil Nadu. This study was carried out in the Tiruvannamalai, Dharmapuri, and Tirupathur districts, since these three districts have comparatively millet production higher than other districts. 60 sample respondents were randomly selected for the study. The primary data was collected from consumers through a well-structured interview schedule. Simple percentage, regression analyses, and descriptive statistics were used to analyze socioeconomic characteristics. Collected data was analyzed using SPSS 26 software and the data were analyzed, tabulated and discussed.

3. Results and Discussion

Socio-economic characteristics of consumer's millet-based value-added products

Table 1: Socio-economic characteristics of consumers millet-based value-added products (n=60)

S. No	Particulars	No of respondents	Percent
1	Gender		
a)	Male	34	56.67
b)	Female	26	43.33
	Total	60	100.00
2	Age (Yrs)		
a)	Up to 30	17	28.33
b)	31-45	26	43.33
c)	46-60	13	21.67
d)	Above 60	4	6.67
	Total	60	100.00
3	Education		
	SSLC	7	11.67
	HSC	8	13.33
	Under Graduation	29	48.33
	Post-Graduation	16	26.67
	Total	60	100.00
4	Occupation / Profession		
	Private sector employee	27	45.00
	Public sector employee	11	18.33
	Business	15	25.00
	Homemaker	7	11.67
	Total	60	100.00
5	Family type		
	Nuclear	56	93.33
	Joint	4	6.67
	Total	60	100.00
6	Average Monthly Income		
	Below 30,000	9	15.00
	30,001-50,000	28	46.67
	50,001-1,00,000	23	38.33
	Total	60	100.00
7	Food Habit		
	Vegetarian	11	18.33
	Non-vegetarian	49	81.67
	Total	60	100.00

The study focuses on consumer preferences for millet-based value-added products. The majority of sample consumers were male (57%) and were aged between 31-45 (43%) completed undergraduate degrees (48%) followed by post-graduation (27%) and worked in the private sector (45%). Most of the sample consumers are nuclear families (93%) and had a monthly income between Rs. 30,001 to 50,000 (47%).

Consumer awareness about different millet-based value-added products

Table 2: Consumer awareness about millet-based value-added food products (n=60)

S. No	Millet based products	No of Consumers
1	Cookies	53 (88)
2	Cake	25 (42)

3	Bread	32 (53)
4	Laddu	47 (78)
5	Murukku	49 (82)
6	Dosa mix	49 (82)
7	Upma mix	19 (32)
8	Pongal Mix	16 (27)
9	Millet flour	60 (100)
10	Health mix	55 (92)
11	Pasta / Noodles	22 (37)
12	Malt	29 (48)

(Figures in parenthesis represent percentage to total)

The above table presents consumer awareness about the different millet-based value-added products in the respective study area. All the sample consumers are well aware of millet flour. Next to millet flour the product health mix (92%) and millet cookies (88%) are the second product aware among the sample consumer, followed by Dosa mix and murukku (81.67%), Laddu (78.33%), Bread (53.33%), Malt (48.33%), Cake (41.67%), Pasta/ noodles (36.67%).

Consumers' perception towards consumption of millet-based value-added products

Table 3: Consumer's perception towards consumption of millet-based value-added products (n=60)

S. No	Perception	No of Consumers
1	More Nutritional content	53 (88)
2	High Antioxidant properties	37 (62)
3	Decrease cholesterol level	35 (58)
4	Superior taste	19 (32)
5	Traditional consumption	22 (37)
6	Rich Fibre content	28 (47)
7	Recommendations from others	34 (57)

(Figures in parenthesis represent percentage to total)

The above table presents the Consumer perception towards the consumption of millet-based value-added products. The majority of the sample consumer (88%) perceived those value-added millets had high nutritional content and more than half of sample respondents perceived that it has more antioxidant properties (61%) followed by decreased cholesterol levels (5%), recommendations from others (57%), rich fibre content (47%), traditional consumption (37%) and superior taste (32%).

Consumer's perception towards the price of organic millet value-based value-added products

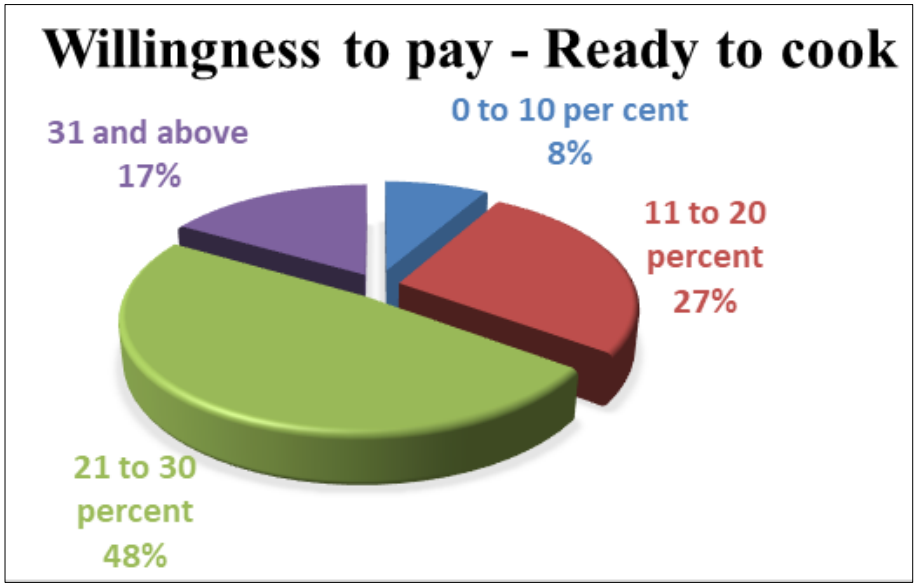

Fig 1: Consumer's perception towards the price of organic millet-based value-added products (n=60)

The willingness of consumers in the relevant study area to pay for millet-based value-added products is shown in Figure 1. Over 48% of the sampled respondents are willing to pay more (21-30%) for ready-to-cook products, followed by 27% who are comfortable with a price range between 11 to 20 percent. Additionally, 17% are open to a price range of 31% and above, while 8% have a preference towards a price range between 0 to 10 percent.

Figure 2 Consumer's willingness to pay towards the price of organic millet value-based value-added products (n=60)

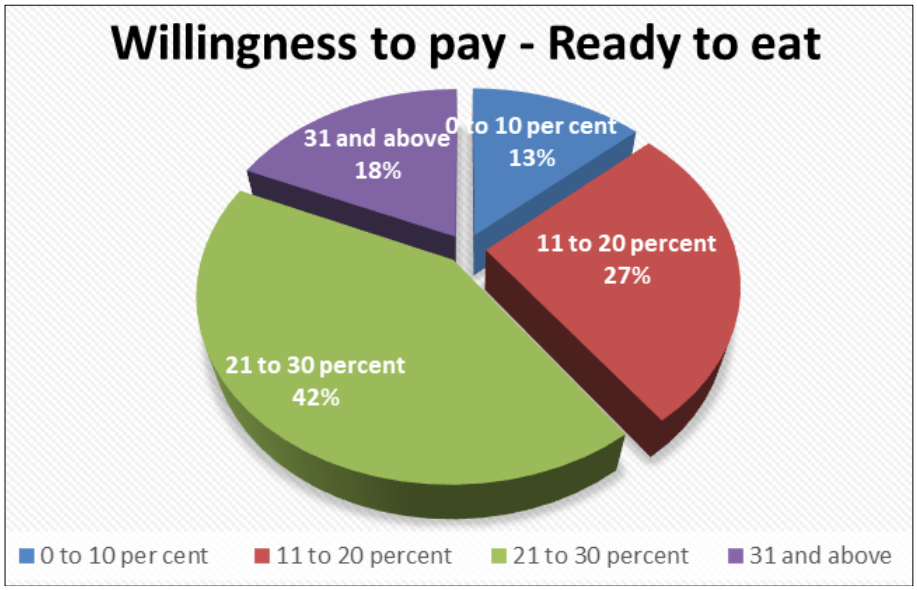

Fig 2: Shows the way consumers perceive their willingness to pay for millet-based value-added items in the relevant study area

Specifically, for ready-to-eat millet-based value-added products, the majority of the sampled consumers (42%) perceive a price range between 21% to 30%, followed by 26.67% for the price range of 11% to 20%. Moreover, 18.33% consider the price range of 31% and above, while 13% have a preference towards a price range between 0% to 10%.

Purchase frequency of millet-based value-added products

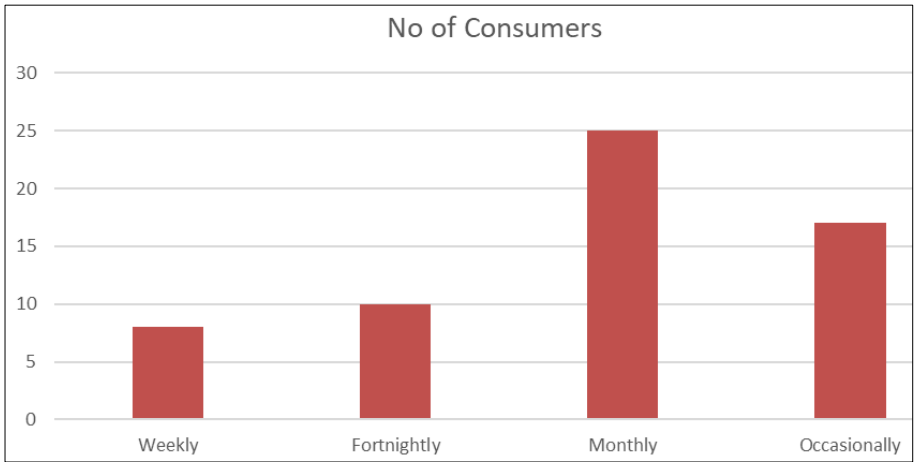

Fig 3: Purchase frequency of millet-based value-added products (n=60)

In Figure 3, the purchase frequency of millet-based value-added products from the respective study area is displayed. Forty-one percent of the sampled consumers purchase millet-based value-added products every month, followed by 28.33% making occasional purchases. Additionally, 16.67% make purchases every fortnight, and 13.33% make weekly purchases.

Factors influencing the Millet based value-added product

Table 4: Factors influencing the millet-based value-added products

Coefficients						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	-4.540	1.742		-2.607	.012
	Family income	7.259E-5	.000	.327	2.732	.008
	Family size	.699	.313	.249	2.230	.030
	Age	.067	.033	.238	2.019	.048

a. Dependent Variable: Consumption

$Y=7*10^{-5}$ (FI)+ 0.6 (FS) + 0.067 (A)

Where,

FI - Family income, FS - Family size, A - Age

In the above table, the linear regression analysis explores factors influencing the consumption of millet-based value-added products. The model's coefficients explain that family

income, family size, and age significantly impact consumption. Higher family income, larger family size, and older age are associated with increased consumption. The statistical significance of these relationships is supported by low p-values. Family income was significant at 1%, while the other two characteristics were significant at 5%. In this study, it was noted that for every 1% increase in family income, there was a corresponding increase in consumption quantity of about 7 * 10^{-5} (0.000007%). Similar to this, it was found that consumption increased by 0.69% for every 1% increase in family size. Also, it was discovered that the consumption amount would increase by around 0.067% for every 1% increase in age. Regression formulas are useful in the prediction of agriculture crop Production. (Nagini *et al.*, 2016) [12] in their study found that there was a correlation between Area-in Hectares, and Production-in-Tons which was 0.3305138 which means as the area increases the agriculture crop production or yield also increases.

Descriptive analysis

Table 5: Descriptive analysis of consumers millet-based value-added products (n=60)

	Family consumption	Family income	Family size	Age
Mean	4.300	45400.00	4.50	35.78
Standard Error	0.479	2157.53	0.17	1.70
Median	3.500	45000.00	4.00	29.50
Mode	1.000	50000.00	4.00	24.00
Standard Deviation	3.707	16712.12	1.32	13.16
Range	15.000	65000.00	6.00	39.00
Minimum	0.000	15000.00	1.00	23.00
Maximum	15.000	80000.00	7.00	62.00
Sum	258.000	2724000.00	270.00	2147.00
Count	60.000	60.00	60.00	60.00

The above table revealed, family consumption, income, size, and age in relation to millet-based value-added products. On average, families consumed around 4.3 kgs of these products. Family income averaged about Rs. 45,400 with a range between Rs. 15,000 to Rs. 80,000. Family size typically consisted of 5 members. The average age was approximately 36 years, ranging from 23 to 62 years.

4. Conclusion

The study focuses on consumer preferences for millet-based value-added products. The majority of sample consumers were male (56.67%) and were aged between 31-45 (43.33%) completed undergraduate degrees (48.33%) followed by post-graduation (27%) and worked in the private sector (45.00%). Most of the sample consumers are nuclear families (93.33%) and had a monthly income between Rs. 50,001 and 1,00,000 (61.67%). All sample consumers were aware of millet flour, and awareness of other millet-based products varied, with the health mix being the most known product (91.67%). The majority (88.33%) perceived millet-based value added has high nutritional content, followed by antioxidant properties (61.67%). In terms of willingness to pay, more than forty percent of the sample respondents are willing to pay more (21-30%) for both the ready to cook as well ready to eat millet-based value-added products. In terms of purchasing behavior, most respondents bought millet-based products every month (41%), followed by occasional purchases (28.33%). In terms of millet-based value-added products, families usually consumed about 4.3 kgs on average. The families' typical income was around Rs. 45,400, varying from Rs. 15,000 to Rs. 80,000. Most families had around 5 members, and the average age within these families was about 36 years, spanning from 23 to 62 years old. The consumption of millet-based value-added products is influenced by family income, family size, and age. If a family has a higher income, a larger family size, and older members, they tend to consume more of millet-based value-added products. %. That is for every 1% increase in family income, there was a corresponding increase in consumption quantity of about 7 * 10^{-5} (0.000007%). Similar to this, it was found that consumption increased by 0.69% for every 1% increase in family size. Also, it was discovered that the consumption amount would increase by around 0.067% for every 1% increase in age.

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