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### Analysis of Consumer Preference for Products along Dairy Value Chain in Kano State, Nigeria

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#### Abstract

The study analyzed the consumer preference for dairy products in Kano State, Nigeria. Primary data were collected at random using a well-structured questionnaire from 120 dairy consumers from the study area. Descriptive statistics, Garrett's ranking technique and multiple regression model were used in the analysis of the data for this study. The results show the average age of the dairy products consumers was 36.75 years with a mean household size of 7. Majority (90.8% and 51.7%) were male and married and also 65.0% had tertiary education. Most (39.2%) of the dairy consumers sourced their dairy products from supermarkets.

The results further revealed that yoghurt and Fermented milk were the most preferred dairy products. Followed by Ice cream, Evaporated milk, Ghee and Butter. The results also indicated the monthly expenditure on dairy products is significantly influenced by Age ( $P < 0.01$ ), Monthly income ( $P < 0.05$ ) and Availability ( $P < 0.05$ ). High price is the major hiccups to dairy consumption. It is concluded that yoghurt is the most preferred dairy product. It is recommended that investment should be intensified on dairy products to ensure regular supply of the quality products at affordable prices.

**Keywords:** Dairy Products, Consumer, LGAs, Multiple Regression

#### 1. Introduction

Dairy milk contributes significantly in households' food consumption with an average of 134 kcal of energy, 8 g of protein and 7.3 g of fat/capita per day in 2009 across the globe (FAOSTAT, 2012). In Nigeria, estimated annual milk consumption is about 1.7 million tonnes while annual local production is estimated at 0.6 million tonnes, leaving a deficit of about 1.1 million tonnes. This deficit is made up for by milk imports which is valued at about N450 billion annually. Most Nigeria's dairy processors (who are mainly multi-nationals with few indigenous firms), import milk powder and reconstitute it into liquid milk and other dairy products such as yoghurt, ice cream and confectioneries while others repackage imported powdered milk into small affordable sachets. Such multi-nationals include Friesland Foods, Glanbia, Cussons-PZ, Promasidor and others (Annate *et al.*, 2012, Ilu and Annate, 2016 and Price water coopers (PWC), 2017) <sup>[3, 5, 8]</sup>. Therefore, imported milk products account for almost 90% of milk consumed in Nigerian cities, a situation that is not economically healthy for local dairy industries.

Demand for dairy product in Nigeria is rising rapidly due to the growing population, urbanization and rising per capita income (Ilu and Annate, 2016) <sup>[5]</sup>. Demand for a product determine the success of any product in the market (Kumar, Verma, Sharma and Khan, 2017) <sup>[7]</sup>. Therefore, study on consumer preferences for dairy products should be carried out repeatedly over time in order to understand how consumers' tastes and preferences are evolving and how to adapt the dairy production and marketing systems and further processing technologies accordingly (Shree, Kathiravan and Sarathechandra, 2021) <sup>[9]</sup>. This study is aimed at examining the demographic variable of the dairy products consumers, consumer preference for dairy products, socioeconomic factors determining the expenditure on dairy products and the constraints attached to dairy products consumption.

#### 2. Methodology

##### 2.1 The study area

The study area is Kano State which is one of the 19 northern states in Nigeria. The State created on May 27, 1967 from part of the northern region. Kano state has the total land mass of 20,131 km<sup>2</sup> (7,773 sq mi) borders Katsina to the north-west, Jigawa to the north-east, Bauchi to the south-east and Kaduna to the south-west. The State has the total population of 9,383,682 people and per capita of 1.288 USD equivalents in 2017.

**2.2 Sampling techniques**

Purposive and simple random sampling procedure were employed. Eight LGAs of Kano metropolis were purposively selected based on population density and presence of heterogeneity. These are Kano Municipal, Nassarawa, Tarauni, Fagge, Dala, Gwale, Kumbotso and Ungoggo LGAs. Finally, a total of one hundred and twenty (120) dairy products consumers were randomly selected across the eight (8) LGAs purposively selected.

**2.3 Method of data collection**

Structured questionnaire was used to obtain primary data from the identified actors in dairy products consumers. The information elicited include age, sex, household size, educational status, dairy products mostly preferred and the constraints associated with dairy products consumption.

**2.4 Analytical techniques**

Descriptive statistics, Garrett’s Ranking Techniques and Multiple regression model were employed to achieve the objectives of the study.

**2.4.1 Descriptive statistics:** Descriptive statistics such as frequency, percentage, mean, minimum and maximum were used to describe the socioeconomic characteristics of the dairy products consumers.

**2.4.2 Garret’s Ranking Technique:** Garrett’s ranking technique was employed to ascertain the consumer preference for dairy products. In these techniques, consumers were asked to rank the dairy products identified for the purpose of this research using numbers 1 to 6 in order of their preference with “1” as the dairy product preferred most, “2” the second most preferred dairy product and “6” as the dairy product preferred least. These ranks were used to calculate the percentage position using Garrett’s formula as:

$$\text{Percentage position} = \frac{100 * (R_{ij} - 0.5)}{N_j} \tag{1}$$

Where:

R<sub>ij</sub> = rank given for the i<sup>th</sup> dairy product by j<sup>th</sup> consumer;  
N<sub>j</sub> = number of dairy products ranked by j<sup>th</sup> consumer.

The percentage position of each rank was converted into scores referring to the table given by Garrett and Woodworth (1969)<sup>[4]</sup>. For each product ranked, the scores of individual consumers were added and divided by the number of consumers for whom scores were assigned. Therefore, the dairy products were ranked based on the

mean scores.

The percentage position and their corresponding Garrett’s score is presented in Table 1.

**Table 1:** Percentage Position and their Corresponding Garrett’s Table Value

Rank	Percentage Position		Garrett’s Table
1	100(1 – 0.5)/6	8.3	77
2	100(2 – 0.5)/6	25	63
3	100(3 – 0.5)/6	41.7	54
4	100(4 – 0.5)/6	58.3	46
5	100(5 – 0.5)/6	75	37
6	100(6 – 0.5)/6	91.7	23

Source: Researcher’s own computation

**2.4.3 Multiple regression:** Multiple regression model was used to determine the factors influencing monthly expenditure on dairy products by the consumers in the study area. Therefore, three forms of the equations linear, semi log and double log were tried using ordinary least square (OLS) method. Linear form was selected as the leading equation in terms of high R square value, high number of variables that are significant, signs of the parameters and less magnitude of the standard error.

The model is explicitly expressed as:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + e \tag{2}$$

Where:

- Y = Amount spent on dairy products per month (N)
- X<sub>1</sub> = Age
- X<sub>2</sub> = Household size (Numbers)
- X<sub>3</sub> = Educational status (Non-formal education = 1, Primary = 2, Secondary = 3 and Tertiary = 4)
- X<sub>4</sub> = Monthly income of the dairy products consumer (N)
- X<sub>5</sub> = Availability of the dairy products (1 = Available everywhere and 0 = Not available everywhere)
- β<sub>1</sub> - β<sub>5</sub> = Parameters to be estimated
- e = error term.

**3. Results and discussion**

**3.1 Socioeconomic Characteristics of the Dairy Products Consumers**

Socioeconomic characteristics play an important role in the choice of dairy products and the monthly expenditure on dairy products as well. The socioeconomic variables captured in this section include age, sex, marital status, household size and educational status.

**Table 2:** Socioeconomics Characteristics of the Dairy Products Consumers

Variables	Frequency	Percentage	Mean	Minimum	Maximum
<b>Age</b>					
20 – 29	42	35.0	36.75	23	65
30 – 39	38	32.7			
40 – 49	19	15.8			
50 – 59	13	10.8			
60 – 69	8	6.7			
<b>Sex</b>					
Male	109	90.8			
Female	11	9.2			
<b>Marital Status</b>					

Married	62	51.7			
Single	36	30.0			
Widow/widower	15	12.5			
Divorced	7	5.8			
<b>Household Size</b>					
1 – 6	65	54.2	7	2	21
7 – 12	37	30.8			
13 – 18	12	10.0			
19 – 24	6	5.0			
<b>Education Status</b>					
Non formal Education	8	6.7			
Primary Education	13	10.8			
Secondary Education	21	17.5			
Tertiary Education	78	65.0			
<b>Occupation</b>					
Public Service	52	43.3			
Farming	10	8.3			
Trading	40	33.4			
Artisanship	18	15.0			
Total	120	100			

Source: Field survey, 2017

The results in Table 2 presents the socioeconomic characteristics of the dairy products consumers in the study area. The results revealed that most (35.0%) of them were within the age group of 20 – 29 years. Followed by 31.7% who were within 30 – 39 years, 15.8% within 40 – 49 years and only 10.8% and 6.7% were within age brackets of 50 – 59 and 60 – 69 years respectively. The average age of the consumers was 36.75 years. This connotes that majority of the dairy products consumers were within their youthful age. This finding agreed with the work of Abdullahi, Kiyogwom, Tanko and Jibir (2014) [1] on “Dairy product consumption prevalence in Northern Nigeria in Sokoto Metropolis” who found that significant proportion of the respondents were middle aged people with an average age of 39 years. Majority (90.8% and 51.7%) were male headed and married respectively. While 30.0% were singled, 12.5% were divorced and only 5.8% were widowed. This confirmed the finding of Koduru and Krishna (2021) [6] who reported that majority (52.5%) of the dairy products consumers in Guntur district, India were males. The results also indicated that majority (54.2%) of the dairy consumers had a household size of 1 – 6 persons, 30.8% had 7 – 12 persons, while 10.0% and 5.0% had between 13 – 18 and 18 – 24 persons with the mean of 7 persons. This shows that the consumers had a relatively large household size which ultimately affect their demand for dairy products. The results further showed that majority (65.0%) had tertiary education, 17.5% had secondary education, 10.8% of them had primary education

and only 6.7% with Non formal education. This implies a high level of literacy among the dairy products consumers in the study area and therefore had a greater influence in the choice of dairy products. The study also revealed that 43.3% of the dairy consumers were public servant, followed by 33.4% traders, 15.0% engaged in artisanship and finally 8.3% were farmers.

### 3.2 Preference for Dairy Products

In this section, sources of dairy products and ranking of the dairy products in order of preference by the consumers are presented.

Table 3: Sources of Dairy Products

Variable	Frequency	Percentage
<b>Where do you buy dairy products?</b>		
Super market	47	39.2
Shops/kiosks	25	20.8
Restaurants	21	17.5
Vendors	27	22.5
Total	120	100

Source: Field survey, 2017

From the results in Table 3 shows that 39.2% of the dairy consumers buy dairy product in the supermarket, 22.5% from vendors, 20.8% from petrol kiosks and only 17.5% from the restaurants.

Table 4: Ranking the Dairy Products in Order of Preference

S. No	Dairy products	Rank						Number of respondents	Total score	Mean score	Rank
		1	2	3	4	5	6				
1	Yoghurt	58	20	19	9	8	6	120	7600	63.33	1 <sup>st</sup>
2	Fermented milk	18	30	34	16	17	5	120	6592	54.93	2 <sup>nd</sup>
3	Ice cream	24	25	15	20	10	26	120	6121	51.01	3 <sup>rd</sup>
4	Evaporated milk	10	23	20	22	18	27	120	5598	46.65	4 <sup>th</sup>
5	Ghee	8	12	15	25	33	27	120	5174	43.12	5 <sup>th</sup>
6	Fresh milk/UHT	2	10	17	28	34	29	120	4915	40.96	6 <sup>th</sup>

Source: Field survey, 2017

Table 4 presents the results for the ranking of dairy products by dairy consumers. The results show that among the dairy products presented to the consumers, Yoghurt is ranked 1<sup>st</sup> with a mean score of 63.33, followed by Fermented milk

(54.93) ranked 2<sup>nd</sup>. This finding moves in tandem with that Abdullahi *et al.*, (2014) [1] who found that Yoghurt and Nono were the most widely consumed dairy products in Sokoto metropolis. Ice cream (51.01) ranked 3<sup>rd</sup>; Evaporated

milk (46.65) ranked 4<sup>th</sup> then Ghee (43.12) ranked 5<sup>th</sup>. Lastly, Fresh milk was least preferred with a mean score of 40.96 and therefore ranked 6<sup>th</sup>. The least preference for fresh milk might be due the fact that fresh milk is readily available everywhere at affordable prices like Yoghurt which found in different sizes of package (bottle and sachets) at varying prices that are affordable.

### 3.3 Determinants of Expenditure on Dairy Products

The results for the multiple regression for the determinants of expenditure on dairy products in the study area are presented in Table 5.

**Table 5:** Determinants of Expenditure on Dairy Products

Variable	Coef.	Std. error	t- value	Sig.
Constant	1138.587	182.883	6.226	0.000
Age	-7.614	2.823	-2.697	0.009*
Household size	-7.243	7.156	-1.012	0.315 <sup>NS</sup>
Educational status	33.158	25.181	1.317	0.193 <sup>NS</sup>
Monthly income	0.001	0.000	2.552	0.013**
Availability	275.372	117.254	2.348	0.022**
R- Squared	0.413			
Adj R- squared	0.365			
F- value	8.712			0.000*

**Note:** \* and \*\* mean significant @ 1% and 5% respectively.

The results in Table 5 are the regression results determinants of expenditure on dairy products. The results indicated that the coefficient of multiple determination ( $R^2$ ) was found to be 0.413. This implies that 41.3% of the variation in the monthly spending on dairy products was jointly explained

**Table 6:** Constraints Associated with Dairy Products Consumption

Constraints	Frequency	Percentage
High price	105	87.5
Not available everywhere	21	17.5
Health issue	13	10.8
Not too sure of the safety of the products	76	63.3
Non-availability of Some products all the year round	57	47.5
Availability of low-quality milk products	43	35.8

**Source:** Field survey, 2017

**Note:** Multiple responses possible

The results for the multiple responses of the constraints associated with dairy products consumption is presented in Table 6. High price of the product was considered the constraint mostly affecting the dairy products consumption as indicated by 87.5% of the consumers. Followed by 63.3% not too sure of the safety, 47.5% non-availability of some products all the year round, 35.8% availability of low-quality milk products while 17.7% and 10.8% reported not available everywhere and health issue respectively as the constraints associated with dairy product consumption.

### 4. Conclusion and recommendations

From the results of the study, it can be concluded that in the study area, majority of the consumers of dairy products were young, and yoghurt was the preferred product with age, monthly income and availability as the socioeconomic factors influencing the monthly expenditure on dairy products. High price, not too sure of the safety and non-availability of some products all the year round remain the major constraints affecting the consumption of dairy products. Therefore, it is recommended that investment

by the independent's variables included in the model. F-Value was 8.712 and significant at 1% implying the goodness of the model. Three out of six variables included were significant. Therefore, Age was negative and significant at 1% level with a value of -7.614. This indicated that as the age of the consumer increase by 1 year, amount spent on dairy products would decrease by N7.614. This might not be unconnected with the fact that older people are wary of taking highly protein food because of their health-related issues. This accord the finding of Adebayo and Okoruwa (2007) [2] who found that age was negatively related to the demand for local yoghurt and butter in Adamawa. Monthly income was positive and significant at 5% with a factor of 0.001 which means any increase in monthly income by N1 all things being equal, the amount spent on dairy product would increase by N0.001. Availability was also positive and significant at 5% level. This implies that availability dairy products have a direct relationship with the amount spent on dairy products. This happened as results of the availability of Fulani women and younger people who hawk fermented milk (Nono) and sachet yoghurt respectively within the streets of towns attract much people to purchase for their products.

### 3.4 Constraints Associated with Dairy Product Consumption

The constraints affecting the consumption of dairy products include high price, not available everywhere, health issue, safety of the product, non-availability of the products year-round low-quality products.

should be intensified on dairy products to ensure regular supply of the quality products at affordable prices.

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