



Value Addition Initiatives of Women in Processing Dairy Products in Kwara State, Nigeria

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Abstract

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This study assessed the value addition employed in processing of dairy products in Ilorin West Local Government Kwara state, Nigeria. Two-stage sampling procedure was employed to select 114 respondents from Wara, Ogundele, and Egbejila communities. Interview schedule was used to collect data from respondents. Descriptive and inferential statistical tools were used to analyse data. The study shows that majority of the respondents were had no formal education (71.9%), average cattle owned by respondents was 12 cattle, motivated by family tradition (59.6%), all (100%) were aware of value addition in dairy products, Wara/Cheese (65.8%), Nunu (34.2%), May-Shanu (21.9%), Washigeri (20.2%), Fura De Nunu (18.4%), and Kindirimu (10.5%) were the valued added products produced among dairy processors in the study area. The major challenges faced by processors include lack of access to modern equipment (mean= 2.33), poor asses to capital (mean=2.07), lack of storage facilities (mean=1.58) and lack of knowledge (mean=1.43) on value addition. It can be concluded that employed several value addition initiatives to product different kinds of dairy products. Government should provide adequate modern equipment which will enhance easy production on of dairy products to improve the processors standard of living.

1. Introduction

Dairy products are one of the main sources of essential nutrients that are vital in human food. This is because little quantity of dairy products as food can increase the nutritional level of people living in low-income households (Food and Agriculture Organization of the United Nations, 2011). Dairy production is fast increasing in developing countries owing to rapid population growth (Hemme and Otte, 2010). In Nigeria, the yearly average milk consumption in the country is about 20 liters, which is four times below World Health Organization (WHO) least recommendation (Annatte, 2010).

Fulani herders still dominate the dairy sub-sector in Nigeria (Okeke et al. 2016; Ugwu, 2010). Dairy production is characterized by low milk production because production is mostly done by men through hand milking while women often engage in the processing and marketing. These local women

process these products into nunu (fermented milk), kindrimo (sour yogurt), cuku (Fulani cheese) and wara (Yoruba cheese) and market these milk products in semi-urban and urban cities and in the communities (Akinyele et al. 2009).

Keeping dairy animals often leads to a surplus of milk. If milk production is higher than consumption in a certain area, the surplus can either be sold on the market, or it can be processed so that it does not go off. A number of factors can motivate farmers to consider on-farm processing of their milk. In some cases, family members are planning to join the farming venture and if adding land or cows is not an option, the farmer somehow has to increase the value of products sold. In other situations, the dairy owner may be frustrated with price fluctuations in the conventional milk market and want to try selling to consumers who will pay more for a locally produced farmstead product (Shittu et al. 2008). In still other cases, family members may be interested in food

preparation and cooking and want to make and sell dairy-based food products. Any of these reasons may lead a dairy producer to explore the possibility of producing and marketing added-value dairy products by bottling milk or making cheese, butter, yogurt, ice cream, or other dairy products (Fakayode et al. 2012).

Moreover, the traditional dairy products mentioned have a very short shelf life and needed to be processed in order to increase their shelf life. In order to improve the quality and enhance the market potential of dairy product, value addition is considered alongside the processing. Value-added products can help farm become more viable and more visible to the public and open up new markets but there are more risks involved when selling value-added versus marketing directly to local milk cooperative. Value-added describes what happens when you take a basic product and increase the value of that product and usually the price by adding extras in the manufacturing process, or by tacking on extra products and/or services (FAO, 2016).

Few studies related to milk production have been carried out in Kwara state (Alhaji et al. 2019; Dauda et al. 2018; Okeke et al. 2016; Fakayode et al. 2012; Akinyele et al. 2009) but none has investigated the value added initiatives of the processors. It is against this background that this study examined the value addition initiatives of women in processing dairy products in Kwara State, Nigeria. This study is important because the dairy industry is a distinct sector of the livestock economy; hence its development has a big role to play in terms of employment and income generation (Dayanandan, 2011). More importantly, the findings of this study will provide a fundamental framework for the dairy processors on the mode of processing their product so as to improve production activities. The study will also contribute greatly to the existing knowledge on production of dairy products and useful for further research.

The general objective is to assess the extension base value addition on dairy product processing. The specific objectives are to: (i) determine the socioeconomic characteristics of the respondents, (ii) evaluate the respondents' knowledge of value addition on dairy products, (iii) examine the value addition method employed by the respondents, (iv) assess the challenges facing dairy product processors in the study area.

Hypothesis of the study was: There is no significant difference between selected socioeconomic characteristics and the knowledge on dairy product processing of respondents.

2. Materials and methods

2.1 Study Area

Kwara state is located in the North Central zone of Nigeria. The state has a land area of about 32,500 square kilometres and a population of over 1.5 million which is made up of three main ethnic groups namely Yoruba, Nupe and Baruba. More than 90% of the rural populations who form the bulk of the state total population are engaged in farming. Vegetation of the state is well suited for the cultivation of a wide variety of food crops. These crops include yam, cassava, maize, cowpea, rice, sugar cane, fruit and vegetables. Livestock are also reared in different parts of Kwara State (Fakayode et al., 2012).

The state has sixteen local governments namely: Asa, Baruten, Edu, Ekiti, Ifelodun, Ilorin East, Ilorin South, Ilorin West, Irepodun, Isin, Kaiama, Moro, Offa, Oke-Ero, Oyun, and Patigi. Of these LGAs, Ilorin West Local Government Area (LGA) is the main local producers of milk products because of Fulani tribe and other tribe who are smallholder livestock keepers with lactating cows and milk vendors (Okeke et al. 2016).

2.2 Sampling Procedure and Sample Size

The population of this study comprised of all (288) registered and contact dairy farmers of the Agricultural Development Project (ADP) in Ilorin west local government area of Kwara State. Choice of Ilorin west LGA was because of the stable involvement in dairy product processing.

Two-stage sampling procedure was employed to select respondents. The first stage involved a purposive selection of three (3) villages namely; Wara, Ogundele, and Egbejila due to their prominence in dairy cattle processing. Secondly, thirty eight (38) dairy product processors were randomly selected from each community making a total of 114 sample size.

2.3 Data Analysis

Data obtained from the field survey was subjected to both descriptive and inferential statistical tools. Descriptive statistics involving the use of frequency counts, percentages, mean scores and standard deviation was used to present the findings. The hypothesis of the study was investigated using the Chi-square test. Chi-square test was used for the analysis because the independent variables are nominal and the dependent variables are ordinal.

3. Results and discussion

3.1 Socio-economic Characteristics of Respondents

Table 1 shows the distribution of respondents according to their sex. Male processors accounted for 13.2% of the respondents while 86.8% were female which constitute the majority. Traditionally, male cattle herdsman often see value addition of dairy product as predominantly women's

work. In the rural areas, specific tasks are done either by men or women. Usually women are responsible for household jobs, such as cooking, collecting water and firewood or looking after children. However, in this study the percentage of men into value addition of dairy products was extremely low because it is purposively known as woman's work. Men are usually involved on nomadic farming and other activities such as men's that practices afforestation and deforestation activities. Dairy product processing is known to be ascribed to the female in Fulani's culture of Nigeria.

As indicated in Table 1, the average age of the respondents was 37 years. This shows that respondents were young and still have enough strength to carry out the operations involves in milk processing activities. As regards marital status, majority (95.6%) indicated they were married. The percentage of the married respondents shows how the female respondent often engaged in early marriage. Respondents had large household size of 8 persons. Household size can determine processors level of production and the amount of income earned by such processor. It is also believed that the greater the numbers of household size, the larger the scale of production and vice versa. Majority (71.9%) of the respondents had no formal education. This implies that most of their female do not go to school and may be that they have no passion for western education. Only 3.5% of the respondents had tertiary education to improve their farming, processing and management activities and their standard of living through knowledge received as some information are disseminated in term of new technology to enhance dairy product production. Majority (67.5%) of the respondents engaged in trading and some (25.4%) were engaged in artisans as other occupation apart from value addition on dairy products processing. This implies that respondents did not depend solely on dairy product but were engaged in trading to diversify means of livelihood and some of them after selling their product in the morning, they don't have anything to do so they decided to engage in artisan in order to pass their time.

The analysis in Table 1 reveals 14% of the respondents produced dairy products on a small scale while 48.2% of the respondents produced it on a medium scale and 37.7% of the respondents produced dairy products on a large scale. The percentage of respondents that produce in large scale means they have edge over small and medium scale in terms of resources needed in processing activities. The average number of cattle owned by respondents was 12 cattle. The few number of animal kept may be one

of the reasons most the respondents were not producing in large scale. Table 1 shows the varieties of cattle kept by respondents. About 8.8% of the respondents kept Keteku, 15.8% of the respondents kept Muturu, most processors don't use Muturu because it has low milk production. 21.9% of the respondents kept Red Bororo because its milk colour is yellow and has high nutrient, and 53.3% of the respondents kept white Fulani because it has high rate of milk production and it increase their scale of production and source of income. Varieties of dairy animal kept by respondents may determine the level of production of the animal. Some animal varieties are special purpose milk production varieties. Such varieties will produce more milk when compare to others due to it genetic makeup.

Table 1 shows the distribution of respondents according to their motivation they were being motivated due to the interest they have in processing of dairy product and think it can improve their source of income and since they have herds of cattle it makes them decide on processing the cattle's milk instead of being kept for ordinary meat purpose. 40.4% of the respondents were motivated by interest while 59.6% of the respondents were motivated as family traditional. Fulani dairy cattle processors were mostly motivated due to their family background as Fulani are known to be born and breed with cattle milk. Most of their women inherit processing skills from their parent to continue same business when married.

3.2 Information Sources on Value Addition of Dairy Product Processing

Table 2 shows that all the respondents had heard of value addition of dairy product processing. A total of 114 respondents were sampled and 100% gave a positive response since value addition knowledge of dairy product processing is known and being passed to them by their fore fathers and they also find more knowledge relating to value addition on dairy product processing to improve and enhance the result of their product and also passed the knowledge down to their children. About 26.3% of the respondents heard of value addition of dairy in the year 2010, 11.4% of the respondents had heard of value addition of dairy in the year 2011, 18.4% of the respondents had heard of value addition of dairy in the year 2012, and 43.9% of the respondents had heard of value addition of dairy in other years other than the ones listed above. Early awareness of value addition of dairy will go a long way to curb the incidence of tape worm and other diseases associated with milk consumption.

Table 1. Socio-economic Characteristics of Respondents (n=114)

Variable	Frequency	Percentage
Age (years)		
1-20	1	0.9
21-40	85	74.6
41-60	26	22.8
61 and above	2	1.8
Mean=37 years		
Marital status		
Single	1	0.9
Married	109	95.6
Divorced	1	0.9
Widowed	3	2.6
Household size (persons)		
1-5	16	14.0
6-10	46	40.4
11-15	32	28.1
16-20	14	12.3
21 and above	6	5.3
Mean=8.0		
Level of education		
No formal education	82	71.9
Qur'anic education	8	7.0
Adult education	14	12.3
Primary education	4	3.5
Secondary education	2	1.8
Tertiary education	4	3.5
Cattle owned (Numbers)		
1-5 cattle	17	14.9
6-10 cattle	45	39.5
11-15 cattle	16	14.0
16 cattle and above	36	31.6
Mean=12		
Varieties of dairy animal kept		
Keteku	10	8.8
Muturu	18	15.8
Red bororo	25	21.9
White Fulani	61	53.3
Scale of production (Number)		
1-5 cattle for production (Small)	16	14.0
6-10 cattle for production (Medium)	55	48.2
11 and above (Large)	43	37.7
Motivation		
Interest	46	40.4
Family Tradition	68	59.6

Only 3.5% of the respondents affirmed that they often got their information from newspaper, those that make use of newspaper are majorly the civil workers because they are educated and can read and write which improves their knowledge on value addition on dairy product processing. 43.0% of the respondents got their information from the extension officer through diffusion of innovation either material based or knowledge based through extension agents, this increase their knowledge, 52.6% got theirs from

family and friends, majority of the processors got their information from their ancestors. 0.9% got theirs from internet are the educated dairy processors who can read and write and are mostly the civil workers. The result in table 2 revealed that 99.1% of the respondents surveyed affirmed that they had been practicing value addition before this time since it is the custom Fulani and others that are not Fulani have knowledge and interest in processing.

3.3 Knowledge of the Respondents on Value Addition Of Dairy Products Processing

Table 3 reveals the respondents knowledge on value addition of dairy processing. Majority (99.1%) of the respondents affirmed that the best time to milk cow is in the morning because if the cattle were not milked in the morning, the calf could have consume most of milk needed for production while the remaining 0.9% of the respondents said it is not the best time may be said due to lack of knowledge of value addition of dairy products. Majority (61.4%) of the respondents indicated that it is rightful to process milk 6 hours after milking because it reduces level of milk deterioration while the remaining 38.6% of the respondents gave a contrary view. Majority (95.6%) of the respondents confirmed that the sodom apple is an effective coagulant to use because it does not change the taste and gives longer shelf life. Majority (94.7%) of the respondents affirmed that neem cannot be used in the absence of Sodom apple because they know the level of Sodom apple effectiveness. 88.6% of the respondents reveals that basket is a protective package for dairy products, 86% also reveals that dairy product has a longer shelf life, 81.6% of the respondents revealed that dairy products can be exposed to sunlight after processing, 91.2% of the respondents indicated that milk cannot be preserved in sack before processing, 98.2% of the respondents shows that milk should not be processed without being pasteurized, and 95.6 said that pasteurization does not necessarily requires high temperature.

3.4 Value Added Products Employed By Respondents

Data presented in Table 4 reveals the value added product employed by the respondents. Majority (65.8%) of the respondents employed Wara/Cheese as their own value added product. Production of Wara/Cheese were said to be popularly acceptable products because it is mostly consumed raw, boiled, roasted, or fried by most Nigerian. Hence, processor make more income from making Wara/Cheese because buyers often demand the product in large quantity and transport it to major cities like Ilorin, Lagos, and Ibadan (Akinyele et al. 2009).

Other products employed by processors as indicated in Table 4 were nunu product (34.2%), May-Sanu (21.9%), Washigeri (20.2%), Fura de Nunu (18.4%) and Kindirimu (10.5%) as their own value added product of milk processing.

3.5 Challenges Faced by Respondents

Table 5 shows the challenges faced by respondent who engaged in dairy processing. Lack of access to modern equipment was ranked first with a score mean of 2.33. This implies that the respondents still used the local method of processing dairy due to the lack of purchasing power of this modern equipment. If this modern equipment become accessible, respondents may still found it difficult to use as a result of the lack in technical know-how. This is where the extension agent need to come in proper dissemination of agriculturally based innovation and technology. Poor access to capital was ranked second with a score mean of 2.07. The respondents affirmed that they are often neglected by the government and are often seen as non-educated individuals whose impact is insignificant in the society. From the personal interview authors had with the respondents, authors deduced that respondents are willing to collect loan if available in order to expand their scale of production. Lack of storage facilities was ranked third with a score mean of 1.58.

Hypothesis Testing

H0: There is no significant relationship between the socio-economic characteristics of the respondents and the perceived knowledge by the respondents.

Education qualification of the respondents with chi-square value of 0.072 and Sig. (p-value) of 0.447 is not significant, gender of the respondents with chi-square value of -0.052 and Sig. (p-value) of 0.583 is not significant, and marital status of the respondents with a chi-square value of 0.365 with a Sig. (p-value) of 0.000 is highly significant. As marital status is attained by Fulani's woman it is expected to have enough knowledge of dairy products processing, the study suggest that marital status increased knowledge seeking behavior of them Therefore, the null hypothesis was rejected and the alternate hypothesis was accepted that there is a significant relationship between the respondent's socio-economic characteristics and the perceived knowledge by the respondent on value addition of dairy production.

Table 2. Information Sources on Value Addition of Dairy Product Processing

Responses	Frequency	Percentage
Have You Heard Of Value Addition Of Dairy Product Processing?		
Yes	114	100.0
No	0	0
If Yes, When Did You Heard of Value Addition of Dairy		
2010	30	26.3
2011	13	11.4
2012	21	18.4
Others	50	43.9
What is your Information source?		
News paper	4	3.5
Internet	1	0.9
Family and friends	60	52.6
Extension officers	49	43.0
Have You Been Practicing Value Addition?		
Yes	113	99.1
No	1	0.9

Table 3. Knowledge of Value Addition on Dairy Processing among respondents

Knowledge Areas Value Addition	Frequency	Percentage
Best time to milk is morning		
Yes	113	99.1
No	1	0.9
Process milk 6 hours after milking		
Yes	70	61.4
No	44	38.6
Sodom apple is effective coagulant		
Yes	109	95.6
No	5	4.4
Other coagulant besides Sodom apple		
Yes	16	14
No	98	86
Use of neem in absence of Sodom apple		
Yes	6	5.3
No	108	94.7
Is basket a protective package for dairy products		
Yes	101	88.6
No	13	11.4
Dairy products have a longer shelf life		
Yes	98	86
No	16	14
Can dairy product be exposed to sunlight after processing?		
Yes	93	81.6
No	21	18.4
Milk can be preserved in sack before processing		
Yes	10	8.8
No	104	91.2
Can milk be process without pasteurizing		
Yes	2	1.8
No	112	98.2
Does pasteurizing require high temperature		
Yes	5	4.4
No	109	95.6

Table 4. Value Added Product Employed among Respondents

Value Employed	Frequency	Percentage
Nunu	39	34.2
May-Shanu	25	21.9
Kindirimu	12	10.5
Wara/Cheese	75	65.8
Fura De Nunu	21	18.4
Washigeri	23	20.2

Table 5. Challenges Faced By Respondents

Challenges	Mean (\pm SD)	Rank
Lack of access to modern equipment	2.33 \pm 1.38	1st
Poor access to capital	2.07 \pm 1.06	2nd
Lack of storage facilities	1.58 \pm 0.96	3rd
Low access to labour	1.52 \pm 0.67	4th
Lack of adequate knowledge about value addition	1.43 \pm 0.66	5th
Disease outbreak among cattle	1.40 \pm 0.53	6th
Labour intensive	1.39 \pm 0.78	7th
Scarcity of input	1.25 \pm 0.49	8th
Inadequacy of grazing land	1.19 \pm 0.48	9th
Low market output price	1.17 \pm 0.44	10th

Scale used: Strongly agree=5, Agree=4, Undecided=3, Disagree=2 and Strongly disagree=1

Table 6. Results of Chi-square analysis

	Perceived knowledge of respondents		
	X ²	Sig.(p-value)	Remark
Educational	0.072	0.447	Not significant
Gender	-0.052	0.583	Not significant
Marital status	0.365	0.000	Significant

4. Conclusion and recommendations

Based on the findings of the study, it can be concluded that employed several value addition initiatives to product different kinds of dairy products. Wara/Cheese, Nunu, May-Shanu, Washigeri, Fura De Nunu, and Kindirimu were the valued added products among dairy processors in the study area. The major challenges faced include lack of access to modern equipment, poor asses to capital, lack of storage facilities and lack of knowledge on value addition.

To further enhance the value addition capacity of dairy processors in the study area:

Government should provide adequate modern equipment which will enhance easy production on of dairy products to improve the processors standard of living.

There should be loan scheme by the government that will attract little interest and help dairy products processors increased their capital base and in return will improved the quantity of dairy products outputs and the processors sources of income.

Modern technology and skills of operation should be provided through demonstration so as to

reduced labor cost and labor stress which will in turn increased respondents production of dairy products.

Government should provide adequate and accessible storage facility to reduced and minimized wastages of dairy products.

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