Original Research Article

ASSESSMENT OF RURAL WOMEN AGRO PROCESSING ACTIVITIES IN IMPROVING HOUSEHOLD FOOD SECURITY IN THE SOUTHERN GUINEA SAVANNAH AGRO-ECOLOGICAL ZONE OF NIGERIA.

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ABSTRACT

The study assessed rural women involved in agro-processing activities to improve household food security. Four hundred and twenty rural women, out of four hundred and sixty questionnaires distributed who were engaged in agro-processing activities served as respondents to this study. A well-structured questionnaire, was used in the collection of primary data. Secondary data were collected from journals and articles. Data were analyzed using descriptive statistics such as frequency and percentage as well as factor analysis. The hypothesis of the study was tested using Spearman Rank Correlation. This result revealed that Majority (72.17%) of the respondents were married. The major occupation among respondents was farming (71.30%). The household size of majority (52.17%) of the respondents was between 6 and 10, and 54.78% had a moderate level of involvement in agro processing activities. Respondents had level of food security (48.79%). The result of socioeconomic characteristics of the respondents revealed that involvement in agro processing activities enhanced the annual income of majority of the respondents. Transportation, capital availability, farm resources and source of information were major constraints. The study concluded that rural women, who were involved in agro processing activities improved the level of food security. The study recommends the provision of loan opportunities to farmers for agricultural process, proper distribution of capital, adequate reimbursement and monitoring for extension agents, creation of markets that are proximal to farm sites, provision of farm resources such as seeds, fertilizers, and processing equipments, with good medical centres made available.

Keywords: Women, agro-processing, Guinea Savannah, food, security, Nigeria

INTRODUCTION

In developing countries like Nigeria, rural women engage in small-scale agriculture to ensure the availability of food. Most food undergoes processing in order to improve household food security. Growth and development of rural economy are essential pre-conditions to the development of a nation as a whole. The gap between rural-urban socio-economic disparities has to be lessened through increase in the standard of living for people in the rural areas.

The sustainable development goal of eradicating extreme poverty and hunger has the targets to halve between 1990 and 2015 the proportion of the people whose income is less than one dollar per day. Three quarter of the people living on less than one dollar per day lives in the rural areas found mostly in developing nations [1]. Tackling the problem of poverty among the people is an issue that has posed a great challenge to government in developing countries.

Food processing offers opportunities for enterprising people to generate income and employment using locally available resources. However, despite this standard of living and food

security especially among the rural populace remains a major concern due to subsistence nature of the country's agriculture.

The problem of low standard of living, hunger and poverty could also stem from low level of food management capacity after production, lack of agro-processing initiations as many farmers labour under uncertainty about how to process, preserve and package in order to catch up with season related opportunities among others [1]. More attention need to be paid to what happens after food is harvested in the face of improved modes of agricultural practices which have translated into better yields. A post-harvest food loss is very important because food is often produced in large quantity that cannot be possibly consumed at a time and requires to be processed in order to store for a long time.

Attention should be given also to value addition before home consumption and export; this could result to extension of shelf life, make food available all year round, more variety available through food processing and preservation and improve the income of the rural Women by generally improving earning potential capacity. Nigerian women form an indispensable part of human resources for development because without their contribution, the economy will be difficult to advance to a better level [2]. According to UNDP women play a dominant role in agriculture in Nigeria and are believed to make up to 60% 80% of the agricultural workforce. FA0 reported that about 70% of women live in rural areas and contribute about 44% of family feeding and income through agriculture. Women's greatest contribution to Nigerian economy is in agricultural sector in the rural areas where majority of Nigerians live. Unfortunately, women's input is considered to make very little contribution to the GDP because it is viewed as being weakly productive and production are mostly at subsistence level [3]. This may have resulted to their efforts remaining largely unrecognized [1], [4]. Women's activities in manufacturing and processing food remain underestimated because most of their activities are undertaken as secondary activities generally hidden behind subsistent agriculture [5]. Post-harvest production, trading of consumer crops is often the final stage of diversified female activities which begins with growing or gathering natural products and processing them. However, only the first and the last stage are captured thereby the value addition is underestimated. Food processing helps in extending the shelf life and storage time, to change the colour, flavor and texture to make food more attractive and palatable [6].

An important area of agriculture that needs to be immediately addressed is agro-processing, a key in agricultural production that is often neglected. The need for strong famer agro-processor relationship to ensure the availability of adequate quantity and quality of raw materials at the required time and location [7]. And if agricultural development projects are to contribute as they should to food security, they cannot just produce and be satisfied with more production, they must be interested in their produce, what happens to it, its' end and impact [8].

This is where agro-processing comes in to stabilize the produce and facilitate its handling, availability and utility. Another important area that required urgent attention is the area of agro-processing, this is to reduce spoilage, waste and losses in quantity and quality of farm produce between the time of harvest and of marketing/consumption [9].

Inability of a farmer to process and store his/her produce efficiently so that a good quantity of produce can be sold at a good price when it is scarce is one major factor responsible for economic non-viability of rural faming [10]. Despite the dominant and important role women play in agricultural production in the country, they are hardly given any attention in the area of training or visitation by extension agents with improved technologies. Therefore there is a need to assess their level of participation in order to ensure the improvement of food security in households. In Nigeria, there are significant regional differences in women participating in agriculture. For instance, a study of women in the country revealed that on an overall basis, 40% of the rural women regard farming as their major occupation. Women make up halve of the rural population and they constitute more than halve of the agricultural labour force. Rural women in particular are responsible for half of the world's food production and produce between 60% and 80% of the food in most developing countries. Yet, despite their contribution to global food security, women famers are frequently underestimated and overlooked in development strategies [11].

One quarter of Africa's population do not consume enough food to allow for an active working life more than one-half of Africa's "food in secure" live in seven countries, Ethiopia, Nigeria, Zaire, Tanzania, Kenya, Uganda and Mozambique [12].

Food security comprises two main requirements, assuring the availability of food and assuring the ability of households to acquire food through income. Women in rural areas are integral participants to the success of the agricultural sector; this makes their involvement in agro-processing quite necessary for food security in households. Women's role in agriculture is highly variable as a result; any intervention to promote and enhance the role of women in agro food-processing should be examined and assessed.

The implications for household food security are serious if purely economic rationales are pursued. [13].

Food security is the condition in which all people in a country or household have access to sufficient food to live healthy and productive lives [16]. Food security depends on the level of agro-processing activities including the level of agricultural produce. Historically, women in developing societies have been principally concerned with food crop production. As far back as three decades ago, [14] noted that women accounted for about 70 % - 80 % of food production in sub-Saharan Africa. The productivity of women famers is constrained by the same factors. These include lack of time and limited mobility due to multiple domestic and reproductive responsibilities; women's limited access to assets and agricultural services, illiteracy, low participation and limited decision-making. However, women have a unique base to increase the productivity of small holder agriculture and in effect contribute to household food security.

In as much as other relevant research has been carried out by other researchers on agro-processing and food security, with the population of rural women involved still unknown, this particular research is basically concerned with assessing rural women's participation in agro-processing activities in improving household food security. The following research questions become pertinent.

1. What are the socio-economic characteristics of rural women involved in agro- processors in the Southern Guinea Savannah Agro Ecological zone of Nigeria?
2. What is the level of rural women's involvement in agro processing activities?
3. What is the level of food security among rural women agro food processors?
4. What is the impact of agro-processing on household food security?
5. What are the constraints involved in rural women's agro-processing activities?

Objective of the study

The broad objective of this study is to assess rural women's involvement in agro processing activities and its implication on household food security in the southern guinea savannah agro-ecological zone. The specific objectives of this study are to:

1. Describe the socio-economic characteristics of rural women involved in agro- processing activities
2. Analyze the level of involvement of rural women in agro processing activities;
3. Analyze the level of household food security among rural women agro food processors
4. Analyze the impact of agro-processing in improving household food security; and
5. Identify the constraints involved in rural women's agro-processing activities.

Statement of hypothesis

The null hypothesis was stated as follows:

$H_{O:}$ There is no significant relationship between the level of involvement of rural women in agro processing activities and the level of household food security.

Methodology

Study Area

The research was carried out across the states within the Southern Guinea Savannah agro ecological region of Nigeria, including parts of Plateau, Taraba, Nasarawa, Abuja, Niger and Kwara States.

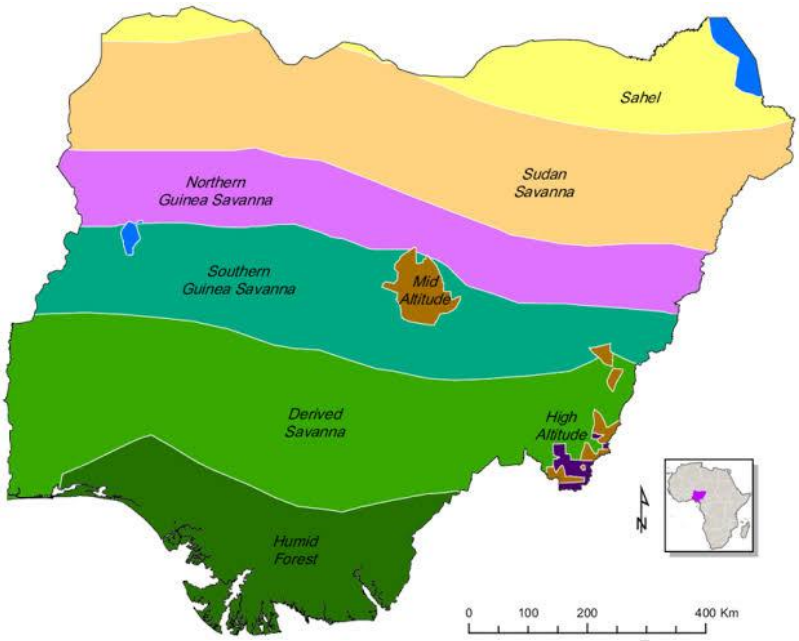

Plate 1: Map showing the Agro Ecological Zones of Nigeria [15]
Source: https://agriculture-nigeria/agro-ecological-zone/

Methods of Data Collection

The data for this study were collected mainly from primary sources. Primary data were collected using a well-structured questionnaire, copies of which were distributed and administered on the 452 respondents selected for the study. These questionnaires consist of three sections**;** A, B, and C. Section A deals with the socio-economic characteristics of the respondents, section B deals with the level of the respondents involvement in agro-processing and the level of food availability and section C dealt with the impact and constraints of agro- processing on the respondents. Secondary data were collected from World Bank, internet, journals and articles.

Validation of Research Instrument

The research instrument for this study was face validated by the department of Agricultural Extension and Communication, Federal University of Agriculture Makurdi to ensure that it possessed both face and content validity, and the questionnaire was designed based on the specific objectives of the study.

The questionnaire was carried out using split-half technique. In this method, the research instrument was administered once to the same group of respondents.

Methods Data Analysis

Data collected were analyzed using descriptive statistics such as percentages and frequency distributions to analyze specific objectives 1, 2,3 and 4, while factor analysis was used to analyze specific objective 5. The factor analysis model used is $\mathbf{X} = \boldsymbol{\mu} + \mathbf{L}\,\mathbf{F} + \mathbf{e}$. The null hypothesis was tested using Spearman Rank Correlation coefficient.

Measurement of Variables: Both dependent and independent variables was used, these includes.
Age: was measured in years by indicating the chronological age of the respondents.
Marital status: This was measured by indicating the respondents' marital status in terms of single, married, divorced and widowed.

Household size: This was measured by indicating the number of individuals in the family.

Work experience: This was measured by indicating the respondent's' number of years in processing.

Level of education: This was measured by the respondents' highest level of education in terms of Non-Formal Education, Primary School Education, Secondary School Education and Tertiary Education (Ordinary National Diploma (OND), Nigeria Certificate in Education (NC Higher National Diploma (HND, first degree and Masters' Degree).

Annual income: This was measured in Naira. The level of food security among rural women agro food processors and the impact of agro processing in improving household food security were measured using the Spearman Rank Correlation classified under, very high, high, moderate, low and very low. The rate of their involvement in agro-processing activities was measured based on the various variables from frequency distribution to get a specific percentage. This has enabled the researcher to assess the rural women's agro-processing activities in improving household food security.

Model Specification

Spearman rank correlation

In order to analyze the relationship between the level of involvement of rural women in agro processing activities and the level of household food security among the respondents, the Spearman rank correlation analysis was adopted. The variables were specified as follows:

Y= Food security

X = level of involvement in agro processing activities

The Spearman rank correlation coefficient r, can take any value between -1 and +1. A statistically significant correlation coefficient in the range $0 < r \leq 0.3$ will be regarded as weak correlation; $0.3 < r \leq 0.6$ will be regarded as moderate correlation; $0.6 < r < 1$ will be regarded as strong correlation, while a correlation coefficient of 1 will be regarded as perfect correlation.

Food security level was measured on 5-point scale as follows: Very low level of food security=1; Low level of food security=2; Moderate level of food security= 3, High level of food security=4; Very high level of food security 5. Food insecurity was however scored zero (0).

Mean score of between 1.00 and 2.35 was regarded as low food security level, mean score of between 2.36 and 3,.65 was regarded as moderate food security level. Mean score of between 3.66 and 5.00 was regarded as high food security level.

Similarly, level of involvement in agro processing activities was measured on 5-point scale as follows: Very low level of involvement =1; Low level of involvement= 2; Moderate level of involvement = 3; High level of involvement = 4; Very high level of involvement=5. Non-involvement was however scored zero (0). Mean score of between 1.00 and 2.35 was regarded as low involvement level; mean score of between 2.36 and 3.65 was regarded as moderate involvement level; mean score of between 3.66 and 5.00 was regarded as high involvement level.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

The result in Table 1 shows that majority (36.52%) of the respondents were in the age of 30 and less than 40 years. This suggests that most of the Women involved in ago processing activities in the study area are within the age bracket of active farm work. Majority (72.17%) of the respondents were married. This suggests that there may be high demand for food and additional income as the family size increases.

The household size of majority of the respondents (52.17%) of the respondents was between 6 and 10. This result suggests that the women involved in agro processing activities in the studied area have large number of household members, which could serve as source of family labour in agro processing operations. Majority (50.43%) of the respondents had no formal Education.

This means that agro processing activities in the study area is dominated by the uneducated class.

Major occupation among the respondents was farming (71.3%). This is agrees with what was documented [17, 18] that states that agriculture is the major occupation of people in Nigeria, employing over 70% of the active labour force. Agriculture is mostly practiced in the countryside by rural dwellers in small scale through traditional intensive method which makes it labour intensive

oriented. This implies that the women involved in agro processing activities in the studied area are mostly farmers. Majority (34.67%) of the farmers had farming experience of between 11 and 20 years. This suggests that the women involved in agro processing activities in the studied area have been involved in farming business for a long time now. The annual income of majority of the respondents (60.87%) was between ₦10,000 and ₦100,000.

Table 1: Distribution of Respondents by Socio-Economic Characters

Variables	Frequency	Percentages
Age		
20 to 30	76	16.52
30 to 40	168	36.52
40 to 50	144	31.30
≥50	72	15.65
Total	**460**	**100**
Marital Status		
Single	60	13.04
Married	332	72.17
Divorced	28	6.09
Widowed	40	8.70
Total	**460**	**100**
Household Size		
1-5	136	29.57
6-10	240	52.17
11-15	44	9.57
15	40	8.70
Total	**460**	**100**
Educational Status		
No formal Education	232	50.43
Primary Education	108	23.48
Secondary Education	80	17.39
Tertiary Education	40	8.70
Total	**460**	**100**
Major Occupation		
Farming	328	71.30
Trading	92	20.00
Civil Service	40	8.70
Total	**460**	**100**
Working Experience		
1-10	40	8.70
11-20	176	38.26
21-30	140	30.43
31≥40	26	22.61
Total	**460**	**100**
Annual income		
10,000 - 100,000	280	60.87
110,000 - 200,000	140	30.43

200,000 & above	40	8.70
Total	**460**	**100**

Source: Field Survey, 2018

Level of Involvement in Agro Processing Activities among the Respondents

The result of the level of involvement in agro processing activities among the respondents is presented in Table 2. The result shows overall level of involvement in agro processing activities among the respondents in descending order from low to high. The result indicates that the overall mean score (M) was 3.63 and standard deviation (SD) was 0.61 While more than a half (54.78 %) of the respondents had a moderate level of involvement agro processing activities, 28.7 % of them had a low level of involvement in agro processing activities, and 17.39 % had a high level of involvement in agro processing activities. The respondents moderate involvement in agro processing is factored to a number of reasons, grossly hinged on poor farming implements and tools. This has limited farming to small scale or even subsistence farming and agro processing, as only a few farmers can afford to go into large scale involvement and production. Small scale farming in particular is characterized by low levels of technology, high workloads, and primitive hand tools such as hoes and ploughs [19]. The levels for each dimension of involvement in agro processing activities among the respondents are presented in Table 2.

Table 2: Distribution of Respondents by level of Involvements in Agro Processing Activities

Involvement Dimension	Level	Mean Score	Frequency	percentage	Mean	SD
Fish Produce	Low	1.00-2.35	192	41.74	2.63	0.74
	Moderate	2.36-2.35	160	34.78		
	High	3.66-5.00	108	23.48		
Irish potatoes	Low	1.00-2.35	148	37.17	3.43	0.66
	Moderate	2.36-2.35	232	50.43		
	High	3.66-5.00	80	17.39		
Olive Plant	Low	1.00-2.35	152	33.04	3.46	0.64
	Moderate	2.36-3.65	212	46.09		
	High	3.66-5.00	96	20.87		
Groundnut	Low	1.00-2.35	80	17.39	3.67	0.58
	Moderate	2.36-3.65	228	50.43		
	High	3.66-5.00	152	33.04		
Wheat	low	1.00-2.35	116	25.21	2.88	0.72
	Moderate	2.36-3.65	200	43.48		
	High	3.66-5.00	144	30.43		
Acha (Hungry Rice)	Low	1.00-2.35	80	17.39	3.75	0.51
	Moderate	2.36-3.65	208	46.09		

	High	3.66-5.00	172	37.39		
Poultry Produce	Low	1.00-2.35	156	33.91	2.73	0.78
	Moderate	2.36-3.65	176	39.13		
	High	3.66-5.00	128	27.83		
Process vegetables Crops	Low	1.00-2.35	148	32.17	2.78	0.75
	Moderate	2.36-3.65	180	40.00		
	High	3.66-5.00	132	28.70		
Soybean	Low	1.00-2.35	176	38.26	3.41	0.65
	Moderate	2.36-3.6548	192	42.61		
	High	3.66-5.00	92	20.00		
Overall involvement	low	1.00-2.35	132	28.70	3.63	0.61
	Moderate	2.36-3.65	248	54.78		
	High	3.66-5.00	80	17.39		

Source: Field Survey, 2018 Minimum Mean = 1; Maximum Mean = 5

4.3 Level of Food Security among the Respondents

The result shows overall food security level of respondents in descending order from low to high. The result indicates that the overall mean score (M) was 3.51 and standard deviation (SD) was 0.52. While about a half (48.796) of the respondents had a low level of food security, 16.52% of them had a high level of food security, and 34.78% had a moderate level of food security. This is an indicator that though most of the respondents appreciated farming and agro processing, food security in the region is low. Currently, the number of people without enough food to eat on a regular basis remains stubbornly high, and is not falling significantly. Worldwide around 852 million people are chronically hungry due to extreme poverty, while up to 2 billion people lack food security intermittently due to varying degrees of poverty [20]. The levels for each dimension of food security among the respondents are presented in Table.

Table 3: Distribution of Respondents by Level of Food Security

Food Security Dimension	**Level**	**Mean Score**	**Frequency**	**Percentage**	**Mean**	**SD**
Food available for Consumption	Low	1.00-2.35	232	50.43	3.66	0.50
	Moderate	2.36-3.65	80	17.39		

	High	3.66-5.00	148	32.17		
Accessibility of food	Low `	1.00-2.35	96	20.87	3.58	0.54
	Moderate	2.36-3.65	212	46.09		
	High	3.66-5.00	152	33.04		
Cost of food	Low `	1.00-2.35	76	16.52	3.77	0.44
	Moderate	2.36-3.65	152	33.04		
	High	3.66-5.00	232	50.43		
Amount of food	Low `	1.00-2.35	120	26.09	3.48	0.65
Consumption	Moderate	2.36-3.65	200	43.48		
	High	3.66-5.00	140	30.43		
Quality of food	Low `	1.00-2.35	76	16.52	3.45	0.57
Consumed	Moderate	2.36-3.65	212	46.09		
	High	3.66-5.00	172	37.39		
Balanced diet	Low `	1.00-2.35	124	26.96	3.59	0.55
	Moderate	2.36-3.65	180	39.13		
	High	3.66-5.00	156	33.91		
Sale of processed	Low `	1.00-2.35	148	32.17	2.25	0.71
food	Moderate	2.36-3.65	128	27.83		
	High	3.66-5.00	184	40.00		
Overall food	Low `	1.00-2.35	224	48.79	3.51	0.52
Security	Moderate	2.36-3.65	160	34.78		
	High	3.66-5.00	76	16.50		

Source: Field Survey, 2018.
Minimum Mean = 1; Maximum Mean = 5

Impact of Agro Processing Activities among the Respondents.

The result in Table 4 shows that majority (60%) of the women who were involved in agro processing activities in the study area gained positive increase in knowledge. This implies that involvement in agro processing activities helped to enhance their processing experience as well as the annual income of majority (64.35%) of the respondents. This led to the enhancement of the health status of some (47.83%) of the respondents. Majority (59.13%) of the respondents have also acquired more skills in processing as a result of their involvement in agro processing activities. Furthermore, there was an improvement in the economy of majority (59.91%) of the respondent as a result of their involvement in agro processing activities. Processing of agro – raw materials is very beneficial in several ways and generally ensures food security in the following ways: Preservation of agro raw materials, thus reducing wastage; increases economic gains of those involved in the food supply chain; guarantees long term availability; extension of shelf life of agro raw materials; reduces import dumping and

capital flight in the country; increases nutritional quality through transformation to different food products [20, 21].

Table 4: Distribution of Respondents by Impact of Agro Processing Activities

Variables	Frequency	Percentage
Increase in Knowledge		
Positive	276	60.00
Negative	184	40.00
Total	**460**	**100**
Increase in annual income		
Positive	296	64.35
Negative	164	35.65
Total	**460**	**100**
Increase in health status		
Positive	220	47.83
Negative	240	52.17
Total	**460**	**100**
Increase in skill acquisition		
Positive	272	59.13
Negative	188	40.87
Total	**460**	**100**
Increase in society economy		
Positive	244	53.04
Negative	216	46.95
Total	**460**	**100**
Any trade involved		
Positive	252	54.78
Negative	208	45.22
Total	**460**	**100**

Source: Field Survey, 2018

Constraints to Agro processing Activities among the Respondents

The result of the factor analysis of the perceived constraints to agro processing activities among the respondents is presented in Table 5. The result of the principal component analysis using Varimax rotation method shows that the important constraints to agro processing activities among the respondents were transportation, inadequate capital, and inadequate supply of farm resources, lack of access to information and lack of access to health centres. The implication of this result is that agro processing activities in the study area is constrained mainly by input mobilization and resource management.

Table 5: Factor Analysis Rotated Component Matrix for the Perceived Constraints among the Respondents

	COMPONENT

	1	2
Transportation	0.871*****	- 0.087
Inadequate Capital	0.935*	- 0.161
Inadequate supply of farm resources	0.950*	- 0.028
Land tenure	0.017*	0.165
Lack of access to information	-0.278*	0.834*
Lack of access to health centres	0.935*	-0.161
Lack of basic infrastructure	-0.098*	0.293

Source: Field Survey, 2018
Extraction method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization
*****Important Constraints

Relationship between the Involvement of Rural Women in Agro Processing Activities and the Level of Household Food security.

The result in table 6 shows that 5% level of significance, the hypothesis (Hol) that there is no significant relationship between the involvement of rural women in agro processing activities, and the level of household food security is rejected. This suggests that there is a significant positive relationship between the involvement of rural women in agro processing activities, and the level of household food security in the study area.

This implies that the level of the household food security among the respondents in the study area changes with change in the level of involvement of rural women in agro processing activities in the study area.

Table 6: Correlation Coefficient Matrix of Relationship between the Involvement of Rural Women in Agro Processing Activities and the level of Household food security

Variable	Y	X
Y	1.00	
X	0.68*	1.00

Source: Field Survey, 2018
Correlation Coefficient (r) is significant at 5% level (2-tailed).
Y = Food Security Level
X = Level of Involvement in Agro Processing Activities.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study concluded that the level of rural women's involvement in agro processing activities in the Southern Guinea Savannah Agro-Ecological zone to improve household food security was low. The level of household food security among respondents in this study changes with change in the level of involvement of the rural women in agro processing activities. Their Involvement thereby increased the knowledge and skills of those involved.

However, major constraints that affected their level of involvement in agro processing activities were inadequate capital, inadequate farm resources, poor or no source of information on the right innovation and processing techniques, poor medical facilities and transportation problems.

Recommendations

The study recommends that;

1. The government should provide sources of obtaining loans for agricultural processes and ensure its proper distribution to make capital available as this would encourage the involvement of rural women's' agro processing activities to improve household food security.
2. The government should ensure that extension agents are adequately reimbursed and monitored to allow effective and efficient dissemination of right innovation information on the use of chemicals and processing techniques.
3. The government should create avenue for market proximity to farms. Also, the route linking the farms to the markets should be tarred to avoid loss of goods which results from pits and pot holes on the road.
4. The government should make farm resources such as seeds, fertilizers and processing equipment obtainable to increase productivity
5. Good medical centres should be made available in accessible forms.

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